Building the Tallest Tower

This project asks students to work together in small groups to meet the challenge of building the tallest tower with a select set of materials.

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<th>Curriculum/State Standards</th>
<th>Materials</th>
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<tr>
<td>2.3 Measurement and Estimation</td>
<td>Multiple sets of specified blocks:</td>
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<td>2.4 Mathematical Reasoning and Connections</td>
<td>Cuisinaire Rods, Unit Blocks, Hollow Blocks</td>
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<td>2.5 Mathematical Problem Solving and Communication</td>
<td>Pictures of a variety of buildings and blue prints of building elevations</td>
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<td>2.7 Probability and Prediction</td>
<td>Drawing pages</td>
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<td>2.9 Geometry</td>
<td>Colored pencils</td>
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<td>3.2 Physical Sciences: Physics</td>
<td>Graph Paper or other visual graphing materials</td>
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<td>25.4 Pro-Social Relationships with Peers</td>
<td>Rulers, yardsticks and tape measures</td>
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<td>Camera</td>
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Overview
This lesson focuses on cooperation, planning and problem solving. Students work in teams to develop the tallest tower possible using a select set of blocks. They discuss and plan their structure on paper, build the tower, and then measure their tower. The structure must remain standing for at least 2 minutes (long enough to be measured and photographed). The lesson is repeated 3 times (over several days) with different materials and different team groupings. A visit from a local architect wraps up the unit with discussions of ‘real life’ applications of this type of challenge.

Objectives
The students will practice team building, problem solving, and negotiation skills. The students will sort and classify materials by shape, size and weight. The students will interact with building materials learning about balance, gravity, and 3 dimensionality. The students will utilize large and small muscles during planning and building. The students will learn about the careers of architect, structural engineer, and construction.

Materials
- Multiple sets of specified blocks: Cuisinaire Rods, Unit Blocks, Hollow Blocks
- Pictures of a variety of buildings and blue prints of building elevations
- Drawing pages
- Colored pencils
- Graph Paper or other visual graphing materials
- Rulers, yardsticks and tape measures
- Camera

Readiness Activity
Distribute photographs of buildings large and small and lay out architectural drawings. Allow the children to look at all the pictures and drawings. (approx. time: 5-7 minutes)
Discuss the way architects and structural engineers plan and draw buildings before construction begins.

Strategies/Activities
Divide class into small teams and explain the nature of the Tallest Tower Challenge. Show students the material they will build with. Ask each team to plan and draw the structure they will build. Remind them to pay close attention to height without compromising stability. Allow 8-10 minutes for drawing time. After this initial planning stage, ask students to estimate (in inches) the measurement of their final tower. Next, move students to the floor area where equal piles of blocks have been laid out for construction. Remind students to work cooperatively.

This winning project idea submitted by:
Kathleen K. Blass
Charlestown Playhouse
Phoenixville, PA

K
GRADE LEVEL
ARTS
LANGUAGE
MATH
MISC
SCIENCE
HISTORY
SOCIAL STUDIES

1 WEEKS
$500 TOTAL BUDGET

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This winning project idea submitted by:
Kathleen K. Blass
Charlestown Playhouse
Phoenixville, PA
Building the Tallest Tower

....continued....

and quickly to build the “tallest tower”.
Allow ~8 minutes for building time. Some teams will finish much more quickly.
As each team completes their building, photograph and measure each tower. Monitor their estimations and compare with actual results.
Graph tower height on a large classroom graph showing each group’s results.
Assign a ‘winning team’ for today’s challenge.
Hold a class discussion about today’s challenge. Discuss the difficulties of working with today’s material, the struggles to work cooperatively, and the behaviors which proved most successful for structure building (taking turns, talking with teammates, cheering each other on, accepting set-backs like buildings falling over, trying again and again, etc.) Ask if each team’s structure was similar to the one they designed in the drawing stage. Did the design change? Why or why not? Ask if students think that professional architects and engineers change their plans after construction has begun on a real building. Allow students to predict the answer to this and then save the question to ask the visiting professional at the end of all 3 Tallest Tower Challenge phases. Explain that on days 2 & 3 a similar challenge will take place with different building materials. Allow children to predict which building material will be easiest and which will be hardest for overall tower building success.
Repeat procedures on days 2 and 3 with different building materials.

At the end of day 3 review, compare and contrast all graphs. Discuss the differences between building materials. Monitor and discuss predictions.

Culminating Activity
Invite building professionals into the classroom to discuss their work and how lessons learned in this challenge are part of their everyday work. Professionals might include architects, engineers, or construction workers. Allow time for the children to ask questions and perhaps discuss some of the ‘real’ issues that came up during the construction phase of the challenge.

Evaluation Method
At the end of the final phase, allow children to discuss the entire unit. What was their favorite part? What made the lessons difficult? What made them fun? What new challenges could the group try in a different lesson?
Use the rubric (attached) to evaluate group interactions and each student’s willingness to work together towards a common goal (drawing and building the Tallest Tower).
Through group discussions, evaluate the students’ understanding of measurement, estimation and graphing techniques used.
First grade graphing reinforces ‘patterns by asking students to sort objects.

**Curriculum/State Standards**
1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

**Overview**
Over the course of 2 weeks the students worked in whole groups, small groups and by individually. This project was really successful. The students were very involved in the activities because they got to eat their results. The students began to understand the higher level skills of how many more and how many less.

**Objectives**
The students will organize, represent, and use data to create a tally chart, picture graph, and bar graph.

**Materials**
floor graphing mat, double sided graphing pocket chart, self checking math match ups, graph chart paper, 3 oz Dixie Cups. fruit snacks, Mike and Ike candies, Gummy Bears, M&M’s, Reese’s Pieces Peanut Butter M&M’s, Laffy Taffy, mini assorted candy bars, candy hearts, Skittles

**Readiness Activity**
Make a graphing mat for each student on white paper. Then give them M&M’s, Gummy Bears or Reese’s Pieces to sort by color. Near Valentine’s Day, give each student a box of conversation hearts to graph. They can lay the candy pieces into the squares in the columns for each color. To extend the activity, have them color in the squares to make a bar graph after they have made the real graph.

**Strategies/Activities**
Give each student a cup of Skittles candy. Have students sort the candy into color groups. Then have the students create a tally chart to organize their data. I usually ask my students questions about which color they have the most of, least of, total number of candy, etc. As a class, review what a pictograph is. As a class come up with a way to represent the Skittles candy with a picture. We ended up using colored circles. Remind the students that the pictograph has a title and key. In the key, each circle represents a certain number of that candy. We usually end up using a key of each. (ex. O = Skittles)
Students then fill in their own pictograph. Review bar graphs with the class. Discuss putting a title and axis labels on the graph. At this time have students label these things on their graph. Students will color one square for each candy they have on their bar graph. I usually have them use the color of the candy for that bar. Discuss as a class the findings. We graphed different candies each day.

**Culminating Activity**
none

**Evaluation Method**
Students will turn in their colored graphs. Teacher will check for accuracy. Students will also answer questions after you complete each graph let the students talk about their observations and then ask questions about the graph. Some questions to consider are:

**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Kim Tague
Newport Special School District
Newport, AR
Graphing with Goodies

....continued....

• Which column has the most? the least?
• Are any columns the same?
• How many ________ are there?
• Are there more ________ or more ________?
• How many more ________ are there than ________?
• How many fewer ________ are there than ________?
• How many are there altogether?
# Double the Dimensions

<table>
<thead>
<tr>
<th>Curriculum/State Standards</th>
<th>Strategies/Activities</th>
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<tr>
<td>Students will find the volume of rectangular prisms. Students will find the surface area of rectangular prisms. Students will use the correct units of measurements.</td>
<td>Students will learn about volume by measuring the length, width, and height of boxes brought in by students. They will then find the surface area of those same boxes. Next, students will choose a rectangular prism(box) to double the dimensions. After they choose a box they will draw their rectangular prism with the dimensions, and draw the new rectangular prism with new dimensions. They will then start to build their new box including their graphics. When their new box is built, they will find the volume and surface area of the new box. They will compare the volumes and surface area of the original and new box, and discover the relationship of doubling the dimensions.</td>
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**Overview**
The students find the volume and surface area of different boxes and containers. The students choose a box to double the dimensions and build this new box. They will find the volume and surface area of their new box and discover the effect of doubling the dimensions.

**Objectives**
The student will measure the length, width, and height of a rectangular prism using the correct units. The student will find the volume and surface area of the rectangular prism. The student will double the dimensions of their rectangular prism and find the new volume and surface area.

**Materials**
rulers, card-stock, craft cutter, scissors, construction paper, markers, glue

**Readiness Activity**
The teacher has a box full of cereal and a carton full of mile and relates what’s inside those two containers to Volume. Using the same containers, the teacher covers the containers with butcher paper and tells the students that the amount of paper required to cover each individual box is surface area. A discussion is then had on different containers and content to further discuss volume and surface area.

**Culminating Activity**
The students presented their new boxes to the rest of the class. Their boxes were also displayed at Open House.

**Evaluation Method**
Students were graded on the accuracy on their measurements. Students presented their new rectangular prism to the class and presented their measurements and were graded on a rubric.

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**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Marvin Soto
Los Alisos Middle School
Norwalk, CA

**GRADE LEVEL**

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**GRADE LEVEL**

- **ARTS**
- **LANGUAGE**
- **MATH**
- **MISCELLANEOUS**
- **SCIENCE**
- **SOCIAL STUDIES**

**2 WEEKS**

**$425 TOTAL BUDGET**
Soda Pop Taste Test

Students get to generate their own data and create the graph on a graphing calculator.

**Curriculum/State Standards**
S-ID.1: Represent data with plots on the real number line.
S-ID.3 Interpret differences in shape, center, and spread in the context of data sets, accounting for outliers.

**Overview**
Students will generate real world data and then use that data to make a decision about a product. Students will use technology to generate the data summary and the graph for the data.

**Objectives**
The student will generate his own data through the taste test.
The student will use technology to compare the taste quality of two sodas.
The student will use data to determine which soda is the better quality.

**Materials**
cups
two sodas (I used Meijer brand lemon-lime soda and Sprite)
graphing calculators – minimum of one per group of 4 students, but ideally 1 per student

**Readiness Activity**
Students should have a working knowledge of how to enter data into a graphing calculator. Students should know the definitions of Mean, Median, Range, lower quartile, upper quartile, minimum value, maximum value, and outlier.

**Strategies/Activities**
1. Students decide on a rating scale for the soda. They take a blind taste of each soda, and then record their rating score on the board.
2. Each team enters the data into the graphing calculator.
3. Students use the calculate function to compute the mean, and record this data in the comparison table.
4. Students create a stacked box and whisker plot of the data, and use the trace key to find the data summary. They will record these in the data comparison chart.
5. Students will answer the follow up questions in the packet.

**Culminating Activity**
Have a class discussion about the absence or presence of outliers, what they noticed about the data spread, and how they came to the conclusion of which soda was better.

**Evaluation Method**
Students could be evaluated on a participation basis (teachers would observe them as active participants during the activity, and then participants in the whole class discussion). Students could write a paragraph describing the activity, and what they learned from it.
Treasure Map Math

Curriculum/State Standards
Curriculum - MG 1.1-Comparison of Length/Width/Volume MG 2.1-Recognizing Geometric Figures NS 3.1-Estimation VA 2.1 Texture in Art VA 2.2-Mixing Colors

Overview
The Treasure Map Math project is designed to give students and their parents an amazing math adventure in a day. Students will be given a treasure map and a goody bag to put their treasure in when they enter the classroom. Students will use their map to navigate through the classroom to 5 different station locations to collect their treasure. When a station is completed, parents may stamp their child’s paper showing they have completed that activity.

Objectives
The student will recognize and create 2D shapes using texture.
The student will be able to make educated estimates of various objects.
The student will be able to weight various objects and compare them to the weight of other objects.
The student will be able to understand and explain the concept of mixing primary colors to create secondary colors.
The student will be able to use a ruler to measure various objects using inches.

Materials
crayons boxes, Play-doh, estimation jars, erasers, pencils, gum balls, fabric, jewels, bags, treasure map paper, juice boxes, chips, rulers

Readiness Activity
Students have learned the various math skills throughout the school year. This project provides hands on activities that reinforce those skills.

Strategies/Activities
At Station 1, students will measure various school supplies using an inch ruler that they will be able to take home in their bag.
At Station 2, students will mix primary colored play dough in a plastic baggy to create a secondary color (red + blue = purple) and get to keep their play dough when they are finished.
At Station 3, students will use a weigh scale to compare a box of crayons to the weight of various objects from the classroom and get to take the box of crayons when finished.
At Station 4, students will use fabric, jewels, glue, and scissors to create and learn about 2D shapes.
At Station 5, students will have the opportunity to look at a variety of jars filled with different size objects (eraser tops, gum balls, pencils, etc...) and estimate the number of items in the jar by comparing it to a jar containing five of that item. At the end of the treasure hunt, the estimation jars will be given away to students with the closest estimate. When the treasure map is complete, students will be guided to the treasure box to get a juice box and chips to reward all their hard work!

THIS WINNING PROJECT IDEA SUBMITTED BY:
Sara Salguero
Rio Vista Elementary
Cathedral City, CA

GRADE LEVEL
2-3
HOURS
$175
TOTAL BUDGET
Culminating Activity
none

Evaluation Method
Students will be evaluated based on teacher observation, completion of the treasure map, and parent feedback. Students will also be tested throughout the year on the various math concepts introduced throughout this project.
What’s On Sale?

This project connects mathematics to the real life experience of shopping and saving money.

Curriculum/State Standards
SC Math Standards
6-2.1 Understand whole number percentages through 100.
6-2.5 Generate strategies to multiply and divide decimals.

Overview
The students will select an item to sell, create an advertisement for the item, and calculate the sales price of the item.

Objectives
The student will write percents as decimals.
The student will multiply decimals.
The student will subtract decimals.
The student will calculate percent of a number.
The student will find sales discount.

Materials
poster board
card stock
construction paper (assorted colors)
fine-point permanent markers
markers
scissors

Readiness Activity
Calculate sale prices of several items when given the original price and discount percent.

Strategies/Activities
Create a sales advertisement on an 11” X 14” poster board. Illustrate an item (real or imaginary) that you would like to buy or sell. For example, you could choose to sell your favorite skateboard or your little brother. Provide a short item description (funny or serious) as well as the item’s original price. Try to make the item sound great! Use sales jargon such as “All sales final!” or “Money back guarantee.” Make a construction paper “flap” that has the discount (use 1%-99%) on the front and the sale price (after discount) underneath. Check your work with a calculator. Show your mathematical work on the back of the poster.

Culminating Activity
The students will present projects to the class.

Evaluation Method
The project will be evaluated using the following rubric:
30 Points A poster that contains an illustration of the item, a description of the item, and the original price of the item.
30 Points A flap with the discount (percent off) on the top and the sales price (after the discount) underneath.
40 Points Mathematical work is shown and correct.

THIS WINNING PROJECT IDEA SUBMITTED BY:
Kathryn Watkins
North Central Middle School
Kershaw, SC
The Art of Geometry /The Geometry of Art
This project taps into the creativity and interest of students.

Curriculum/State Standards
MA.912.G.1.1, MA.912.G.1.3,
MA.912.G.1.4, MA.912.G.2.3,
MA.912.G.2.4, MA.912.G.2.6 ,
MA.912.G.4.4, MA.912.G.4.5,
MA.912.G.4.6

Overview
Students had two main tasks, one was to identify geometric patterns or a geometric relation evident in a famous works of art, and they had to create their own artistic work using the tools of geometry learned during the course. It was very easy to get their attention when I showed them famous paintings and other works of art that had an obvious geometric subject matter. Artists like M.S. Escher inspired my students to try to incorporate their new understanding of geometric properties and rules and try to apply them in a way that was creative and elegant. The level of engagement for my geometry class increased and students were able to find an immediate outlet to demonstrate their understanding to the subject.

Objectives
The student will be able to identify the fundamental objects present in geometry and art. (point, line and plane)
The student will be able to identify geometric properties present in a work of art.
The student will create a hypothesis explaining the relation between math and art.
The student will use relationships between geometric objects to create an original work of art.

Materials
miscellaneous art materials
Even though the majority of the students were inclined to work with a two-dimensional medium, namely paint, there were also a few that created three-dimensional models and sculptures using balsa wood, glue and paint. Clay was available, but it was not adopted by any of the students in this class.

Readiness Activity
PowerPoint presentation exposing the students to famous works of art.
Discussion about the works themselves and about the use and importance of math for artists.

Strategies/Activities
- Give the students the opportunities to research and find an artist they like.
- Present works of art and architecture in which the elements are obvious and gradually introduce other works in which the students do not necessarily recognize the objects at first glance.
- Present the geometry elements during the lecture and challenge the students to find a connection with their current work.

Culminating Activity
The final activity is the presentation of the work to an external audience: students from other classrooms, parents during open house or school events, or community outreach events are good opportunities to allow the students to present. If it is possible, try to organize a contest, where the audience selects their favorite work or an artist or expert selects the best samples.

This winning project idea submitted by:
Pedro P. Uribe
Parkway Middle School of the Arts
Lauderhill, Fl
The Art of Geometry / The Geometry of Art

....continued....

Evaluation Method
- Teacher generated rubric for academic content.
- Teacher generated rubric for artistic elements.
- Prize for winner (votes or expert judge)
Geometry in Architecture

Students become aware of and interested in geometry and structures around the world.

Curriculum/State Standards
Geometry – identifying and measuring angles, 3D shapes, faces/edges/vertices
Structures – 5th grade science

Overview
This project allowed students to explore structures around the world and evaluate them based on geometric properties. They researched the structures with a focus on geography and history, drew a large scale model of the structure, and identified geometric features found within the structure.

Objectives
The student will research a structure from around the world.
The student will draw a large-scale model of the structure, focusing on angle measurements and proportional relationships.
The student will identify angles, shapes, and 3-dimensional figures found within the structure.

Materials
research materials
posterboard
markers/crayons/colored pencils
compasses
protractors
rulers

Readiness Activity
A travel video was created to introduce the different structures offered. Students watched the video and identified their areas of interest.

Strategies/Activities
1. Show students travel video. Put photos of structures around the room and have students complete a picture walk to identify which structure they are most interested in researching.
2. Assign structure. Spend 2-3 period researching the structure. Students will answer the following questions in a paragraph:
a. Who designed the structure?
b. What are its dimensions?
c. Where is it located?
d. When was it constructed?
e. Why was it constructed?
f. Is it used today? If yes, how?
3. Teach students how to replicate drawings so they are within proportion of all of the lines and angles. Practice this skill with simple drawings.
4. Measure the angles shown on the picture of assigned structure.
5. Replicate drawing on a larger scale.
6. Identify lines, angle measurements, 3D shapes, and other geometric shapes found within the drawing.

Culminating Activity
Students presented their structure models and research finding.

Evaluation Method
rubric

THIS WINNING PROJECT IDEA SUBMITTED BY:
Rebecca Lobel
Lucy V. Barnsley Elementary School
Rockville, MD

GRADE LEVEL
5
ARTS
LANGUAGE
MATH
MISC
SCIENCE
HISTORY
SOCIAL STUDIES
1
MONTH
$250
TOTAL BUDGET

kids in need foundation
The project allowed students to prepare for math MCAS testing and to improve their math knowledge in general.

**Curriculum/State Standards**
Massachusetts Curriculum Framework for Mathematics  
Number Sense and Operations  
Patterns, Relations and Algebra  
Measurement  
Data Analysis, Statistics and Probability  
Geometry

**Overview**
Students would take individual tests using Jognog.com math game. They earned a tower once they passed a test with a minimum score of 80%. For every five towers the student received a $5 Subway gift card.

**Objectives**
The student will pass each math test by a minimum score of 80% to earn a “tower.” The student will earn 5 towers and be eligible for a $5.00 Subway card.

**Materials**
Internet access with laptops or desktop computers.  
Subway gift cards  
pizza  
soda

**Readiness Activity**
Teacher sets up students with user name and password.

**Strategies/Activities**
Teacher sets up each student with user name and password for site Jognog.com. Teacher creates Jognog classes within computer game for appropriate grade and ability level for students. Teacher also assigns students to the appropriate Jognog class. Finally the teacher assigns the tests to the classes. Jognog has premade tests for different skill levels of math and for different subjects within math.  
Teacher introduces Jognog to students. The teacher explains the guidelines on how to win a prize.  
Students are free to answer computer Jognog tests during designated school time or at home.  
Teacher reviews each student’s Jognog account for number of towers that students have earned and rewards the student when appropriate levels are reached.  
Teacher can have a poster that records the tower amount per student for all to see.

**Culminating Activity**
A pizza party was held for all math students at the end of the math MCAS testing cycle.

**Evaluation Method**
The number of towers that each student received.
Math Mania

Kids used higher thinking skills throughout this whole project.

**Curriculum/State Standards**
Our project focused on state standards in math.

**Overview**
Our project helps students deepen and apply their knowledge of the fifth grade math core content from our state standards. Students will create their own math games, using questions and answers that they have figured out together.

**Objectives**
The student will improve his/her knowledge of the math core content by writing regular short summaries of what he/she has learned and by analyzing and questioning information that other students have provided.
The student will gain a better understanding of the math core content by discussing and reviewing information with other members of their team.
The student will apply information from the math core content to create questions and answers for a math game.
The student will improve his/her skills in math after discussing and answering questions from games that were created by his/her peers.

**Materials**
24 board making game kits
6 packages of fine permanent markers--2 per classroom
3 large Post It easel pads
3 Illustrated Math Dictionaries
100 full size label sheets (for labeling game, attaching directions to the inside of the lid and listing contents of the game)

**Readiness Activity**
Throughout the year the fifth grade teachers will continually use formative assessment to monitor and adjust their instruction. One way to continually assess what the students understand in math is to give them a sticky note to write down a new understanding or what they have learned about a particular math concept. For example, with adding and subtracting fractions a student might write, “Fractions need to have a common denominator.” After the kids write their information on a sticky note, they will put it on the white board, (without their name on it). The teacher will write numbers on the sticky notes so that they can be easily referred to later. In table groups students will look at the sticky notes and see which ones they agree with. They will make a list of the ones that they agree with and a list of the ones that they don’t agree with or don’t understand. When the table groups are done they will discuss their results with another table group and see if either group wants to change their answers. Finally, the class will meet back together and review the results. If there is disagreement students can defend why they agree or disagree with what someone else wrote. If needed, students can consult the classroom math dictionary. After the students have finished the discussion, the teacher will clarify any misunderstandings. The correct responses will be recorded on the large post it note chart paper. The chart will stay on the wall as a reference. Later, when the students create their math games, they can use this information to help them create math questions.

**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Cheryl Hastings (and 5th grade team)
Machias Elementary
Snohomish, WA
Math Mania

...continued....

Strategies/Activities
Around the middle of March, students will start working on board games to help review and apply the information from the math core content. In each of the three classrooms students will be divided into groups of three or four students. Each classroom will have eight different groups labeled “A” through “H.” Each classroom will have groups that are divided like this: A. Multi-digit division B. Addition and subtraction of fractions and decimals C. Triangles and quadrilaterals: D. Representations of algebraic relationships E. Additional Key Content (i.e. prime numbers, graphing) F. Review of needed content from previous grade levels (i.e. multiplication with regrouping) G. Core Processes: Reasoning, problem solving and communication H. Core Processes: Reasoning, problem solving and communication

The last group, (H), will have two groups per classroom assigned to the core content because their topic is broader. Although the groups are different in each classroom, every group will have two classrooms with corresponding groups that are working on the same math core content that they are. Every group starts off by working on their own. For example, each of the three multi-digit division groups works independently of each other initially to create, on paper, a bank of questions with answers. Then, all of these groups meet together. As a larger team they review all the questions. Since all these groups studied and worked on the same core content, they will be more likely to spot any errors with the proposed questions. If there is any disagreement as to whether a question and answer are correct, they can check with the teacher, only after checking the math dictionary and discussing it among the group. Once all the questions have been reviewed, all students will go back to their smaller classroom groups and come up with a plan for their game. Each teacher will discuss with the students ahead of time procedures for making a fair game with rules that are easy to understand. Before the students are given their blank game making kit, (which includes a folding game board for students to design, pawns, dice, a sand timer, a blank spinner, blank cards, play money, and a storage box), they must first submit their written game instructions and a simple sketch of their board game to the teacher. After the directions and sketch are approved, students will be given their game making kit to create their math game.

Culminating Activity
Our culminating activity for this project will take place during the first week in June. Students will have a “Math Mania Day.” They will have time to play the board games that their peers have created. Students are inviting parents and grandparents to this event. As they are playing their games, students will be paired with a partner—either another student or one of their invited guests. Each partner functions as a team. Before answering a question in the game, students are encouraged to consult with their partner. We will end each game day by sharing one thing that we liked and one thing that we learned.

Evaluation Method
Students will be continually assessed informally by writing simple summaries of their understandings. They will also be assessed verbally as they defend why they agree or disagree with what other students have written on their sticky notes. As students are creating and discussing their game questions as a group, the teacher can assess their understandings of the core content. Students will be given formal written assessments as well. Teachers will prepare two different assessments for each of the math core content areas. One of the assessments will be given at the end of each unit, after students have had the opportunity to discuss what their classmates have shared. The other will be given in June after the students have had a chance to play the games created by their peers. These assessments will also be compared to the assessment that the students took at the beginning of fifth grade, which contains questions from each of the core content.
Math for Me

Kids used higher thinking skills throughout this whole project.

**Curriculum/State Standards**
Math Curriculum aligned: Investigations....
CCLS
KMD 1 KG 1,2,3 KCC 1,2,3 KOA 2

**Overview**
Math For Me was a program I developed that is 100% hands on. I have used many new materials to build choice centers that has enhanced the current math program we are using in kindergarten. It is more relevant, current, interesting and engaging.

**Objectives**
The students will use rulers, clocks, measuring tools, survey tools, real life foods and products to create surveys and graphs to answer a series of problems with 100% accuracy.

**Materials**
scales, rulers, food, measures, craft materials, timers, clocks (class set)
rubberbands, geoboards, timers, cards, games.

**Readiness Activity**
Center rotation 21 day prep schedule shows students how to properly use the Math For Me Centers. Materials have clear objectives with them with a specific task to be completed. There is a MAY do to follow the MUST do in the Math For Me rotations.

**Strategies/Activities**
The math program we use is lacking materials. I have decided to enhance the program by adding a math hands on rotational Math For Me system where kids can explore concepts with their own manipulatives; clocks, rulers, measures, cooking supplies, geoboards. There were 8 lessons involved, measurement, word problems, surveys, shapes, time, addition, missing number and number identification. VERY cute!

**Culminating Activity**
Students rotated for 3 weeks throughout the Math For Me Centers then had discussion (share and show) and exploration. Kindergarten children really need this hands on learning and our budget doesn't allow for such items this really was wonderful.

**Evaluation Method**
Assessment through Dibels to see growth (progress monitoring)
Observations
Portfolio and final piece work eval.

THIS WINNING PROJECT IDEA SUBMITTED BY:

Amy Wolfson
Waterfront
Buffalo, NY
It’s About Time

This clock project brings understanding and excitement into the math curriculum.

Curriculum/State Standards
Measuring and comparing fractions, measuring and comparing angles, telling time.

Overview
After having background knowledge making paper clocks, the student will make a wall clock out of lauan plywood and quartz clock movements. When completed, the clock will work with an AA battery. The students felt proud to actually take home a clock they built themselves. When building the clocks, I heard comments from the students like “Wow, this is really cool!” “I never knew I could make my own clock that really works!” “This was simple and fun!” All the students were engaged and excited to show off their clocks to their parents. One parent told me, “My daughter’s clock is so beautiful! This is an actual project that she made that I will proudly hang on the wall.”

Objectives
The student will understand fractional parts related to a whole by making a clock.
The student will measure and compare fractions using a model.
The student will measure and classify angles that include degrees and angle types: acute, obtuse, and right angles.
The student will be able to tell time using a hand-made clock.

Materials
1/2” brad fasteners, quartz clock movements dial thickness 1/2” shaft length 15/16,” clock hands 3 5/8,” assortment of geometric foam sticker shapes, 5.0 mm X 4 X 8 lauan plywood, AA batteries

Readiness Activity
Materials for each student: practice clock: • 8 x 8 piece of paper • 1/2” brad fastener • paper cut-out clock hands • protractor • ruler • pencil real clock: • quartz clock movement piece • clock hands • 8 x 8 piece of lauan plywood • protractor • ruler • 12 foam sticker geometric shapes • permanent marker • aa battery • optional: paint note: This lesson is most effective as a follow-up after teaching angles, fractional parts and time.

Practice Clock: 1. Ask the students to discuss with a partner: Is “time” important? Why or why not? 2. Invite some students to share their thoughts to the class. 3. Ask the students: What can we use to measure time? (planets, sun, calendars, clocks, stopwatch, watches, stars, sundials, hour glasses, water clocks, etc.) 4. Ask: Which one of these instruments mentioned do we typically use to measure time? 5. Say: If we looked at a clock, can you tell me anything about the placement of the numbers 3, 6, 9 and 12? 6. Today we will be using an 8 X 8 piece of paper to place numbers on, to replicate a clock. 7. If we divide this paper to place the numbers 3, 6, 9 and 12, what angle will each of these parts measure as? What do we call these angles? What fractional part will we be dividing a whole into? Using a ruler and/or protractor, divide your paper in fourths and write these four numbers in their proper place, like a clock. 8. Say: How can we determine where to place the numbers in between.

THIS WINNING PROJECT IDEA SUBMITTED BY:
Mary Lynn Hess
Goldsboro Elementary Magnet School
Sanford, FL

GRADE LEVEL
3
PERIODS
3-4
TOTAL BUDGET
$347

3-4
GRADES
ARTS
MATH
LANGUAGE
SCIENCE
HISTORY
SOCIAL STUDIES
MISCELLANEOUS

3-4
each of these numbers so it would be measured exactly into equal parts? What angle would be represented between the numbers 3 and 4? If measuring in degrees, what would it be? What fractional part would that be? 9. Instruct the students to measure accurately and place the remaining clock numbers on their piece of paper. 10. Attach the paper clock hands and brad fastener to finish the clock. 11. Have the students explore using their clocks. Afterwards, have the students pair up to ask their partner questions that reinforce vocabulary of angles, fractions, and telling time by manipulating their clocks.

**Strategies/Activities**

Real Clock: 1. Each student is given a piece of 8 X 8 piece of lauan plywood. Option: The students can decorate the face of the clock prior to the putting on the movements. 2. Measure and place foam sticker pieces where the 3, 6, 9 and 12 will go, using protractors and rulers for precise measurements. Label the numbers with a permanent marker on the foam. 3. Accurately measure and place foam stickers where the remaining numbers should be placed on the plywood. Label the numbers on the foam using a permanent marker. 4. Follow the directions to place the clock movements and hands on the piece of plywood. 5. Install an AA battery for the clock to be complete.

**Culminating Activity**

Using the clock, students work in partners to show: specific times, fractional parts and the angle types and degrees they represent: acute, obtuse and right angles. The teacher will circulate the room to evaluate for understanding of the concepts being practiced.

**Evaluation Method**

There were a few different evaluation methods used for this activity. To make sure the students understood angles, fractional parts and time, chapter and unit tests were used. For the actual clock project, teacher observation was used to evaluate the project.
**Curriculum/State Standards**
The fourth grade students and their teachers, Mrs. Hastings and Mrs. Vellier, at North Live Oak Elementary in Watson, Louisiana have been working to save the honeybees from colony collapse disorder. We have built bee habitats and planted gardens with high nectar and bee attractants, set the price, ordered, and sold honey straws in the concession stand to raise money for the project, created a motto and tee shirt design for a fundraiser, initiated the lift on a sixty year old ban on beekeeping in the city of Hammond, LA, created, drafted, and help introduce a bill to legislature at the state capitol for a specialty LA license plate, designed a license plate, created a scholarship fund for a graduate student studying biological problems facing honeybees, created community awareness of the problems facing honeybees, constructed a greenhouse for flowers and seedlings, planted 13 citrus trees on campus, and won first place in the state of LA in the Disney Planet Challenge!

**Overview**
Students visited a local nursing home and a classroom for students with intellectual disabilities. They made holiday crafts with each group. In addition, the older students interviewed the nursing home residents and talked about changes in schools, the world, etc., over the past 50-60 years.

**Objectives**
The students will acquire knowledge about the insect, Apis Mellifera, honeybee. The students will analyze biological problems facing honeybees. The students will generate a list of ways to help. The students will justify ways honeybees are important to LA agriculture. The students will integrate reasons for saving honeybees for purposes of persuasion. The students will write persuasive business letters using correct grammar and format. The students will create graphs that show honey straw and tee shirt sales. The students will analyze data for the purpose of ordering supplies. The students will produce a design for a LA plate. The students will participate in government planning committees for passage of HB234. The students will conduct interviews of state specialists and take notes. The students will organize and conduct presentations around the community. The students will conduct, analyze, hypothesize, and perform scientific experiment on plants and vegetables.

**Materials**
40 seed packets (1 per student), fertilizer, 11 watering cans, 11 trowels, 3 bags of potting soil, Miracle grow liquid feed, 13 citrus trees, rented an auger from Stein Lumber Yard, 13 stakes for citrus trees, 3 bags of pine bark mulch, fertilizer plant food stakes, 40 each of: cucumber, squash, and tomato plants, and multiple flats of perennials

**Readiness Activity**
Before planting, the students took a tour of Clegg’s, a local nursery. The owner

**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Kim Hastings and Kim Vellier
North Live Oak Elementary
Denham Springs, LA
of the facility led us through three greenhouses and described the various stages of plant and vegetable growing and shipping. The students also took notes on the gardening practices practiced by the nursery. The owner then sent an employee with an agriculture/horticulture degree to our school to help the students plant their own flowers and vegetables.

**Strategies/Activities**

The students gathered the materials needed to construct a greenhouse, they met after school several times, along with their parents, to construct the greenhouse. Next, the students researched species of plants and flowers that were popular honeybee attractants. The students researched the seed germination periods of the plants and flowers selected. The students then went on a field trip/tour of Clegg’s nursery and plant store to gain further knowledge about gardening practices. A certified Clegg’s employee then visited the school to help the students plant. Each of the plants and vegetables were placed in the greenhouse so experiments could be conducted. Various fertilizers and methods of plant nutrition and food were used to determine the healthiest plants and vegetables possible. Students took notes in their plant journals and documented daily. After synthesizing the information, students created graphs to display the results.

**Culminating Activity**

The students will combine all of the planting data in the form of graphs and charts and place into a PowerPoint presentation to present to other classrooms in the school. The students will also summarize their findings in the form of a newsletter to be sent to the local paper and agriculture commissioner, Mike Strain DVM.

**Evaluation Method**

Many forms of informal and formal methods will be used for evaluation. Plant journals, graphs, charts, PowerPoints, notes, and summaries of information. All information will lead back to the importance and role of the honeybee as it pollinates our plants and vegetables!
Bugs In Boxes Math

Bugs are a high interest subject for kindergarteners, so this project draws them in without much effort.

Curriculum/State Standards
Students will:
1. Count forward to 20 and backward from 10 with or without objects using different starting points.
2. Recognize and compare the ordinal position of at least five objects.
3. Create word problems based on sums to 10 and differences with minuends to 10.
4. Construct simple displays of data using objects or pictures.
5. Ask and answer questions by counting, comparing quantities, and interpreting simple displays of data.
6. Sort, classify, count, and represent up to 20 objects and justify the sorting rule.
7. Recognize, describe, extend, create, and record simple repeating patterns.
8. Recognize, describe, extend, and record simple growing patterns.
9. Build, draw, compare, describe, and sort 2-dimensional figures (including irregular figures) using attributes.
10. Compare and order objects according to observable and measurable attributes.
11. Use the attribute of length to describe and compare objects using non-standard units.

Overview
This project was designed to bring a high interest subject, bugs, into my kindergarten classroom to teach math. It is important to have enough resources and materials to meet the needs of each student. Because of this grant I was able to purchase and create the essential items to make these lessons come to life, literally. I began with math but extended the lessons to science and language. I used the umbrella word bugs because we included spiders, insects, and worms. The Bugs in Boxes books, by David A. Carter, have large, bold, and bright illustrations that often pop right out of the books. I used the books to introduce each concept then provided some pretty exciting manipulatives for student practice!

Materials
Beach Bugs: A Sunny Pop-up Book by David A. Carter
Bugs in Space: Starring Captain Bug Rogers by David A. Carter
Alpha Bugs: A pop-up Alphabet by David A. Carter
Bedtime Bugs by David A. Carter
Counting: A Bugs Pop-up Concept Book by David A. Carter
How Many Bugs in a Box? A Pop-up Counting Book by David A. Carter
Birthday Bugs: A Pop-up Party Book by David A. Carter
Up & Down: A Bugs Pop-up Concept Book by David A. Carter
Colors: A Bugs Pop-up Concept Book by David A. Carter
Love Bugs by David A. Carter
Opposites: A Bugs Pop-up Concept Book by David A. Carter
Big Bug Little Bug a Book of Opposites by Paul Stickland
Ten Busy Buzzy Bugs by Ruth Galloway
Felt Bugs Play and Count (www.thebookcompany.com.au)
Ten Little Ladybugs by Melanie Gerth Ill. By Laura Huliska-Beith
Ten Friendly Fireflies by Roseanne Thong Ill. By Amy Schimler
Ten Beads Tall By Pam Adams
plush bugs (assortment of 48)
bucket of plastic bugs

THIS WINNING PROJECT IDEA SUBMITTED BY:
Shirley Gillette
St. David Schools
St. David, AZ
Bed Bugs game  
Ants in the Pants game  
buttery pavilion  
Bug Alphabet Mats (Scholastic)

Art supplies: pipe cleaners, felt, fabric glue, glue dots, wiggly eyes, fiber fill, clay, toothpicks, beads, buttons, paint

Readiness Activity
We took several walks around school to look for bugs. We informally counted, played with, and discussed the world of bugs around us. We discussed the importance of knowing which bugs are approachable and which ones to stay away from.

Strategies/Activities
Start the butterfly pavilion early so you have time to order the caterpillars. Create interest in the project by taking a walk around school looking for bugs. Collect a few to take back and observe.

1. Students will count forward to 20 and backward from 10 with or without objects using different starting points.
2. Students recognize and compare the ordinal position of at least five objects.
3. Students will create word problems based on sums to 10 and differences with minuends to 10.
4. Students will construct simple displays of data using objects or pictures.
5. Students will ask and answer questions by counting, comparing quantities, and interpreting simple displays of data.
6. Students will sort, classify, count, and represent up to 20 objects and justify the sorting rule.
7. Students will recognize, describe, extend, create, and record simple repeating patterns.
8. Students will recognize, describe, extend, and record simple growing patterns.
9. Students will build, draw, compare, describe, and sort 2-dimensional figures (including irregular figures) using attributes.
10. Students will compare and order objects according to observable and measurable attributes.

Read Alpha Bugs, Beach Bugs, Birthday Bugs, Bedtime Bugs, Valentine Bugs, and Space Bugs by David A. Carter.

Give students a variety of art supplies. I used clay as the body base for this activity. Have each student choose which book they want to use for its attributes. If, for example, if the student chooses Birthday Bugs, the student will build bugs that go with that attribute such as candle bugs, cake bugs, present bugs etc. Have the class look at each collection and guess which attribute each student chose.

11. Student will use the attribute of length to describe and
Bugs In Boxes Math

....continued....

compare objects using non-standard units.
Read the book, Ten Beads Tall by Pam Adams. Give students a pipe cleaner with 10 beads on it. Provide students with a variety of containers, boxes, jars, cans etc and a variety of different sized toy bugs. Have students use the beads to measure the containers and decide which bugs will fit in which containers. Do the same activity using rulers.

Culminating Activity
Students make simple headbands depicting their favorite bug. They have to measure their heads in order to make the headbands fit. Students design wings using color and shape patterns. Students play bug toss by tossing the right sized bug into the right sized container. Students play Ants in the Pants, Alphabet Mats and Bed Bugs. Students create a bug from a variety of art supplies and make a habitat for it. Then describe the bug and how it grows and lives. Students use “Create-A-Bug” fruit snacks (Betty Crocker) to build a buggy snack. Students classify teacher created bugs into groups: flying bugs, crawling bugs and sliders

Evaluation Method
Pre-test: Teacher one on one oral evaluation of skills
On-going Evaluation: Teacher one on one oral evaluation of specific skill and teacher observations
Post-test: Teacher one on one oral evaluation of skills
This project is very effective in helping students understand special relationship between quantities.

**Curriculum/State Standards**

§111.34. Geometry  
(a) Basic understandings.  
(1) Foundation concepts for high school mathematics. As presented in Grades K-8, the basic understandings of number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry; measurement; and probability and statistics are essential foundations for all work in high school mathematics. Students continue to build on this foundation as they expand their understanding through other mathematical experiences.  
(2) Geometric thinking and spatial reasoning. Spatial reasoning plays a critical role in geometry; geometric figures provide powerful ways to represent mathematical situations and to express generalizations about space and spatial relationships. Students use geometric thinking to understand mathematical concepts and the relationships among them.  
(4) The relationship between geometry, other mathematics, and other disciplines. Geometry can be used to model and represent many mathematical and real-world situations. Students perceive the connection between geometry and the real and mathematical worlds and use geometric ideas, relationships, and properties to solve problems.  
(5) Tools for geometric thinking. Techniques for working with spatial figures and their properties are essential in understanding underlying relationships. Students use a variety of representations (concrete, pictorial, numerical, symbolic, graphical, and verbal), tools, and technology (including, but not limited to, calculators with graphing capabilities, data collection devices, and computers) to solve meaningful problems by representing and transforming figures and analyzing relationships.

(b) Knowledge and skills.  
(8) Congruence and the geometry of size. The student uses tools to determine measurements of geometric figures and extends measurement concepts to find perimeter, area, and volume in problem situations. The student is expected to:  
(D) find surface areas and volumes of prisms, pyramids, spheres, cones, cylinders, and composites of these figures in problem situations;  
(E) use area models to connect geometry to probability and statistics; and  
(F) use conversions between measurement systems to solve problems in real-world situations.

§111.32. Algebra I  
(a) Basic understandings.  
(1) Foundation concepts for high school mathematics. As presented in Grades K-8, the basic understandings of number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry; measurement; and probability and statistics are essential foundations for all work in high school mathematics. Students will continue
to build on this foundation as they expand their understanding through other mathematical experiences.

(2) Algebraic thinking and symbolic reasoning. Symbolic reasoning plays a critical role in algebra; symbols provide powerful ways to represent mathematical situations and to express generalizations. Students use symbols in a variety of ways to study relationships among quantities.

(3) Function concepts. A function is a fundamental mathematical concept; it expresses a special kind of relationship between two quantities. Students use functions to determine one quantity from another, to represent and model problem situations, and to analyze and interpret relationships.

(5) Tools for algebraic thinking. Techniques for working with functions and equations are essential in understanding underlying relationships. Students use a variety of representations (concrete, pictorial, numerical, symbolic, graphical, and verbal), tools, and technology (including, but not limited to, calculators with graphing capabilities, data collection devices, and computers) to model mathematical situations to solve meaningful problems.

(6) Underlying mathematical processes. Many processes underlie all content areas in mathematics. As they do mathematics, students continually use problem-solving, language and communication, and reasoning (justification and proof) to make connections within and outside mathematics. Students also use multiple representations, technology, applications and modeling, and numerical fluency in problem-solving contexts.

(b) Knowledge and skills.

(1) Foundations for functions. The student understands that a function represents a dependence of one quantity on another and can be described in a variety of ways. The student is expected to:

(A) describe independent and dependent quantities in functional relationships;

(B) gather and record data and use data sets to determine functional relationships between quantities;

(D) represent relationships among quantities using concrete models, tables, graphs, diagrams, verbal descriptions, equations, and inequalities; and

(E) interpret and make decisions, predictions, and critical judgments from functional relationships.

Overview

This project consists of constructing rockets out of plastic bottles. Students will be making bottle rockets according to specifications and directions provided. They will collect data before, during, and after the bottle rockets are built and launched.

Objectives

The students will find surface areas and volumes of different figures in problem situations. The students will use area models to connect geometry to probability and statistics. The students will use conversions between measurement systems to solve problems in real-world situations.

The students will describe the effect on perimeter, area, volume, time, and distance when one or more are changed.

The students will look into understanding the special relationship between quantities.

The students will use information to analyze and interpret relationships.

The students will make connections within and outside mathematics.

The students will learn, collect, organize, interpret, graph and present data.

The students will use information to analyze and interpret relationships.

The students will interpret and make decisions, predictions, and critical judgments from functional relationships.

Materials

- water bottles
- 1 gallon of water
- stop watches
- Sharpie pens
- Magic tape
- air needles
- washcloths
- construction paper
- plastic storage boxes
- air pumps
- pens
- scissors
- waste bags
- tees
- markers
- tape measures
Bottled Rockets

....continued....

PVC plastic pipe
rubber stoppers
cork
safety glasses

Readiness Activity
Before beginning this project, the students learned about surface areas and volumes of various figures and used conversions between measurement systems. They described the effect on perimeter, area, volume, time, and distance when one or more are changed.

Strategies/Activities
1. The students are grouped in groups of 3.
2. Students measure volume of the bottles, and dimensions. They also review possible dependent and independent relationships of flying the bottle rockets.
3. The students construct a flight launcher out of a rubber stopper and an air needle. After all students build their own bottle rockets, they go outside to fly them.
4. Students fill each bottle rocket with water and safely attach the “flight launcher” to it. This will be attached to an air pump and a 4”X2’ PVC plastic pipe.
5. Safety measures are taken into consideration before each flight. Students build pressure in each bottle as they pump air in the bottle. The bottle rocket naturally launches as it reaches its maximum pressure.
6. Students gather and record data to determine relationships of the trail and flight of each bottle rocket.

Culminating Activity
7. Students are given some sample situations and answer questions arising from those situations.
8. The students represent relationships among those flight trials using concrete models, tables, graphs, diagrams, and verbal descriptions.
9. The students interpret and make decisions, predictions, and critical judgments from these relationships.

Evaluation Method
10. Students make a short presentation regarding the results from their launch, tables, graphs, and predictions.
Rebuilding Our Classroom After the Tornado

Curriculum/State Standards
Draw and identify lines and angles and classify shapes by properties of their lines and angles.
Generalize place value understanding for multi-digit whole numbers.
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

Overview
I teach at a Title I school that was relocated after the March 2, 2012, tornado that ripped through our small eastern Kentucky community. Our school was damaged and many students and teachers lost their homes. We needed this grant to help replace classroom games that were lost during this horrific event. My fourth graders come from a variety of backgrounds and skill levels but one thing is true: they love to play games and learn through hands-on activities! We live in a time when students can no longer get by with just basic memorization of math facts. They need to have activities and games that offer a more visual and hands-on approach to learning. We are working hard to make sure our students have the solid foundation they need to be successful! They needed hands-on materials and games to help them practice math concepts such as place value, geometry, and fractions. We have used these materials during whole group instruction and they have been used for independent practice. The games have allowed students to have plenty of opportunities to practice math skills that are necessary for their success in fourth grade. It is also important that the students are able to think mathematically and these activities have allowed them to build the math skills they need.

Objectives
The students will have a deep conceptual understanding of topics such as geometry, fractions, and place value.

Materials
Pizza Fraction Fun Jr. game- 5 sets
Fence It In Exploring Area & Perimeter- 4 sets
Playful Polygons 2d Geometric-6 sets
Speed Place Value-6 sets

Readiness Activity
Students should have previous instruction on the concepts being taught: place value, geometry, fractions, etc.

Strategies/Activities
These games can be used during whole group instruction and they have been used for independent practice.

Culminating Activity
none

Evaluation Method
The students will be assessed using a variety of methods, such as: observation performance tasks exhibitions, demonstrations, portfolios, journals, teacher-created tests, rubrics, self- and peer-evaluations.

GRADE LEVEL
4

ARTS
LANGUAGE
MATH
MISC.
SCIENCE
HISTORY
SOCIAL STUDIES

ONGOING
$397
TOTAL BUDGET

THIS WINNING PROJECT IDEA SUBMITTED BY:

Kelly Markland
Salyersville Grade School
Salyersville, KY
Light Intensity

The light intensity lab gives students a hands on experience creating an exponential growth situation.

**Curriculum/State Standards**
A2.1.3 Represent functions in symbols, graphs, tables, diagrams or words
A.2.3.1 Identify a function as a member of a family of functions based on its symbolic or graphical representation. Recognize different families of functions have different asymptotic behavior.
A.3.2.1 Write the symbolic form and sketch a graph of an exponential function.

**Overview**
Students will have a hands on lab to collect data. They will use technology to plot their data and calculate the regression line and then graph the regression line to see how close it fits their data. Students will need to be aware of the properties of all families of functions so they can determine the appropriate function.

**Objectives**
The student will collect data and then create a graph to determine the appropriate family of function. The student will calculate the appropriate regression line (using the graphing calculator) based on the type of function. The student will compare the data for different colors of water and decide if certain colors permeate more light.

**Materials**
cups, spoons, water, food coloring, napkins, graphing calculators, TI light probe, Easy Link.

**Readiness Activity**
This was used as an end of the year activity, so students had already extensively studied the properties of linear, quadratic, exponential, and polynomial functions. Students should be very familiar with the graphing calculator list functions.

**Strategies/Activities**
1. Students begin with a cup approximately half filled with water. Students will connect the light probe to the Easy Link and TI 84 graphing calculator. The Data program will immediately launch.
2. A student will take the initial light reading. Insert the probe into the water. Make sure the probe is held steady and at the same depth for the entire lab. Record the data in a table:
   # of drops/Light intensity
3. While the probe is held in the same place, another student will add one drop of food coloring, stir it a bit, and then record the light intensity reading.
4. Repeat this process for 8-10 drops.
5. Graph the data to determine the type of function.
6. Calculate the symbolic rule for this function, check this rule with the regression line on the graphing calculator.
7. Before you begin the next color of water, discuss with the class:
   a. What type of function did you notice (hopefully exponential)
   b. What type of function do you predict for the other water colors? Why?
   c. Do you think the other colors will increase more or less rapidly? Why?
8. Repeat this process with several other food coloring drops.
Culminating Activity
Class discussion of the data. Were there any factors that may have affected the data? (clear or colored cup, amount of water starting in cup, water temperature, proximity to light source, etc). Which color of water had the greatest and least light intensity values?

Evaluation Method
I chose to grade this based on participation. I circulated the room and had discussions of the data, graph, and rule with each group to verify their understanding of exponential functions.
Geometry Sculptures

Students gain insight into how geometry is related to other areas of math, while creating hanging sculptures.

Curriculum/State Standards
5th grade geometry standard: Classify two-dimensional figures into categories based on their properties
6th grade geometry standard: Represent 3-d figures using nets made up of rectangles and triangles and use nets to find the surface area of these figures.

Overview
Students make nets of solids and then classify them based on attributes. Students create geometric hanging statues to display their thinking about the classification and then defend their choices in a gallery walk.

Objectives
The students will classify solids based on the attributes.
The students will create a hanging sculpture of the solids to show how the shapes are classified.
The students will justify their thinking with a gallery walk and exposition.

Materials
crayons, markers, scissors, popsicle sticks, tag board, cardboard, paint, paint brushes, mailing labels

Readiness Activity
Students examine the work of Alexander Calder and kinetic mobiles. Students will look at his geometric art and plan for a solids mobile that will balance. They will also begin an exploration in paper crafting in creating a holding mechanism for their art.

Strategies/Activities
1. Students look at images of Alexander Calder’s geometric sculptures.
2. Students will sketch what they believe would be their own art using 3-d shapes
3. Students examine several different nets to determine what solids will be made.
4. Students use copy paper to create 10 to 14 solids that they want to use in their mobiles.
5. The teacher must provide simple and complicated solids so that all levels of learners are supported.
6. Solids must have some common bases so students can make connections between different types of solids, i.e., rectangular prisms and hexagonal prisms have different bases but both have rectangular sides. Cones and cylinders have circular bases but different types of sides.
7. Students then design their mobiles by creating long sticks of popsicle sticks stuck together or other arrangements to hang their 3D solids from.
8. The solid nets are then copied on to tag board so students can decorate, assemble, and hang their creations on to their models.
9. Students use crayons, markers, and paint to personalize their mobiles.
10. Mobiles are arranged based on characteristics of solids. For instance the cylinder and cone would hang on a different side than the prisms because they have different characteristics in common.
11. Once completed, students use cardboard to construct a hanging mechanism for the mobile and set up their exhibit.

THIS WINNING PROJECT IDEA SUBMITTED BY:
Amanda Blake
Northtowne Elementary
Columbus, OH
Culminating Activity
1. Students are placed in groups and walk through the exhibits.
2. Students are responsible for grading each other’s work and asking for justification for at least two solids and their placement.

Evaluation Method
A rubric is used to evaluate the mobiles, exhibits, and justification of work.
Calculus in the Kitchen

The project is effective in helping students understand the relationship between change in volume and change in radius with respect to time.

**Curriculum/State Standards**
Students will design simple experiments or investigations and collect data to answer real world questions. Students will use tabular data and find numerical solutions. They will present their data graphically and analyze its meaning verbally.

**Overview**
Students will perform a Tootsie Pop lab to understand independent and dependent variables. Students will solve the lab using dimensional analysis and rate of change formulas.

**Objectives**
The student will be able to collect data and record it in an organized table, graph a best fit line, use a calculator to determine a regression equation, and make connections between the graph and the context of the problem.

**Materials**
Tootsie Pops, string or dental floss, rulers, second hand timers, graphing calculators, graph paper, donuts for students, Play Doh, index cards (all colors and sizes), poster boards, construction paper, colored markers

**Readiness Activity**
practice regression equations on calculators

**Strategies/Activities**
This activity requires that each student have their own Tootsie Pop, ruler, 8-10 strands of string and a time keeper. Students suck on their Tootsie Pop for 30-second intervals and record their data.

The data is measuring the circumference of the Tootsie Pop from the base of the Tootsie Pop around to the other side of the stick each time. Students must continue this process until the center Tootsie Roll is very evident. On the students’ data sheets, they will record the circumference and will determine the volume of the Tootsie Pop. The student will also compute the radius at each 30-second interval. The student will compute the changes in radius over time and the changes in volume over time for each 30-second interval. Students will graph the data from the changes in radius over time on a separate graph from the changes in volume over time.

**Culminating Activity**
Students wrote up a lab report of their procedure, with the analysis of their interpretations of how the volume and radius changed over time. This lab is to help students learn the process of explaining their process in a clear step by step format.

**Evaluation Method**
The students were evaluated by their lab reports and class discussions.

11-12
GRADE LEVEL

THIS WINNING PROJECT IDEA SUBMITTED BY:
Sandra S. Trevino
Buena High School
Sierra Vista, AZ

$269
TOTAL BUDGET
Time for Geometry

This is a hands-on project with options for differentiation.

**Curriculum/State Standards**
1. Make sense of problems and persevere in solving them.
2. Construct viable arguments and critique the reasoning of others.
3. Model with mathematics.
4. Use appropriate tools strategically.
5. Attend to precision.
6. Look for and make use of structure.
7. Look for and express regularity in repeated reasoning.

**Overview**
This project involves building a clock that students can use to practice telling time. Students will also use the clock to build on their understanding of circles, angles, and their relationships.

**Objectives**
The students will identify different attributes of a circle.
The students will measure angles in a circle using a protractor and identify them as acute, obtuse, or right.
The students will use the Pythagorean theorem to find the length of the hypotenuse (distance between clock hands when at a right angle).
The students will measure the length of the hypotenuse to verify the Pythagorean theorem.
The students will identify the relationship between an arc length and the measurement of the central angle.

**Materials**
clock kits, tacky glue, E6000 glue, batteries, clock face materials (wood, decorative items, numbers, etc.), stickers, Colorbok numbers, XY & Z numbers, assorted paper, scissors, clear acrylic sealer, foam brushes, jumbo craft sticks

**Readiness Activity**
Students will participate in a series of pre-tests on telling time and angle recognition.

**Strategies/Activities**
*Note: Directions for constructing the clock are not given here. Decoupage information is available at: [http://familycrafts.about.com/cs/decoupage/a/012201a.htm](http://familycrafts.about.com/cs/decoupage/a/012201a.htm)
Clock assembly directions are on the clock kit.

**Remediation:**
1. Students will be assessed on their understanding of telling time on a clock.
2. Students will participate in a variety of practice activities to learn how to tell time on a clock.
3. As students demonstrate mastery of telling time, they will have the hands-on experience of designing and building their own clocks.
4. Students will be tested on their ability to set the clock to display specific times.

**Standard:**
1. Students will begin with an exploration of angles in their environment. We will investigate angles within the classroom and will create a list of the kinds of angles we see.
2. Students will complete a variety of worksheets that assist with understanding angles and degrees; in addition, students will learn about and use protractors.
3. Students will expand their study of angles to circles by using compasses in a

**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Amy Pugliese
Mansfeld Life Skills Alt. to Suspension Pgm.
Tucson, AZ
variety of activities.
4. Students demonstrating mastery of an understanding of angles through a quiz will build a working clock as a hands-on complementary activity to their study of angles.
5. Students will choose materials to decoupage onto the clock face and materials to use as numbers. They will use a compass and protractor to determine the correct positioning of the numbers on the clock face. They will complete the clock using the clock kit which will include the clock mechanism and the hands.
6. Students will be tested on their ability to set the clock to display specific times; they will also have to determine the types of angles and degrees of measurement shown.

Advanced:
1. Students will participate in the standard activities; additionally, they will learn about advanced topics like the Pythagorean Theorem and arc length as related to their clock.

**Culminating Activity**
Students will create a demonstration of their clock and angles that they will present to the class.

**Evaluation Method**
Students will be evaluated on completion of worksheets. They will also be given a short quiz to test their knowledge of angles and ability to use a protractor. Students will be assessed on a rubric for their clock plan and design. Finally, they will be evaluated on the placement of their numbers on the clock so that the clock is telling the correct time.
This project allows students access to technology in order to assess their learning of algebra concepts.

**Curriculum/State Standards**
Because this project was spread out to each section of algebra and completed in small groups, all of the Algebra 1 content standards were addressed at one time or another by various students.

**Overview**
Students created digital explanations of the algebra content using digital cameras and images in our daily environment. These images were used within iMovie to create a slideshow along with students verbally explaining and documenting the algebra ideas.

**Objectives**
The student will summarize mathematical concepts.
The student will work collaboratively with a partner.
The student will gain further skills in utilizing daily technology.
The student will help others to learn the mathematical content through sharing his project.

**Materials**
digital cameras, MAC laptops, headphone/microphone sets, projector for sharing

**Readiness Activity**
Students learn and master the mathematical concepts in order to create their slideshows for their assigned algebra sections.

**Strategies/Activities**
After students have mastered algebra concepts, they “capture” the ideas in our daily environment in order to summarize their learning.

Students use the digital images to create a slideshow summary, including recording their voices documenting and explaining the slideshows and their content areas.

**Culminating Activity**
Slideshows are shared with classmates and can also be shared with parents and on iTunes U, in order to benefit students outside our own school.

**Evaluation Method**
Students are evaluated on their ability to explain and capture the mathematical concepts.

**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Brenda Mescher
St. Joseph Middle School
Battle Creek, MI
Parents as Math Partners

It is fun to have parents and children interact in a fun, meaningful way.

<table>
<thead>
<tr>
<th>Overview</th>
<th>Strategies/Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>The idea behind the project is to give parents experiences and materials to play math games at home with their children. We hold a parent night with children to teach the parents math games they can play at home with their children.</td>
<td>Teach the games: Monster Squeeze; Bump; Top-It; Dice Throw; Tug of War; Cross Out Addition; Spin A Number; Cover Half; Disappearing Train</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>The students will teach parents to play math games they are familiar with.</td>
</tr>
<tr>
<td>The students will develop math concepts through games.</td>
</tr>
<tr>
<td>The parents will learn 6 games to use at home with their child.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>gameboards</td>
</tr>
<tr>
<td>dice</td>
</tr>
<tr>
<td>decks of cards</td>
</tr>
<tr>
<td>counters</td>
</tr>
<tr>
<td>attribute blocks</td>
</tr>
<tr>
<td>blank dice</td>
</tr>
<tr>
<td>bean counter</td>
</tr>
<tr>
<td>oaktag 9x12 manilla</td>
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<tr>
<td>tongue depressors</td>
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<tr>
<td>ink cartridges</td>
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<td>dice</td>
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<td>decks of cards</td>
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<tr>
<td>clock</td>
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<tr>
<td>mini geo solids</td>
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<tr>
<td>primary balances</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Readiness Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>The children have been playing games all year. The goal is to have them teach parents to play the games they have learned. Before the math night children practiced the games we were to play.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Culminating Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>We held a parent night. Children taught their parents games they had learned throughout the year. These are games parents can easily use with their children the rest of the year as well as during the summer months.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>We use a rating scale that the parents fill out at the end of the night to help us determine the effectiveness of the night.</td>
</tr>
</tbody>
</table>

THIS WINNING PROJECT IDEA SUBMITTED BY:
Cindy Futter, Nancy Hall, Beth Allison
Honeoye Central School
Honeoye, NY

K
GRADE LEVEL
1
MONTH
$416
TOTAL BUDGET

GRADE LEVEL
ARTS
LANGUAGE
MATH
MISC
SCIENCE
HISTORY
SOCIAL STUDIES

This project focuses on enhancing the learning experience for parents and children through hands-on math activities, promoting a collaborative and enjoyable approach to mathematics education.

Parents as Math Partners aims to bridge the gap between home and school learning by empowering parents to engage their children in meaningful math games. This approach not only enriches the children’s mathematical understanding but also strengthens the bond between parents and offspring. The project utilizes a variety of materials and strategies to cater to different learning styles and preferences, ensuring a dynamic and inclusive experience.

Through the Readiness Activity, children are well-prepared to teach their parents the games they have learned throughout the year, fostering a sense of pride and accomplishment. The evaluation method employed at the culminating activity allows for a structured feedback mechanism, enabling educators and organizers to assess the project’s impact and make necessary adjustments for future iterations.

The total budget of $416 is allocated towards the specific materials and resources required for the project, ensuring that the necessary tools are available for all participants. This funding supports the successful execution of the project, allowing children to confidently lead their parents through the math games they have practiced earlier.
Behlau’s Third Grade Kite Boppin’ Day

This project allows children to study the history of kites while connecting it to the study of Ben Franklin.

Curriculum/State Standards
Identify lines of symmetry, observe simple systems, and describe the role of various parts, contributions of scientists like Ben Franklin who also used kites to discover electricity, collect information by observing and measuring, describe and select physical activities that provide enjoyment and challenge, elapsed time, using tools like a stopwatch, identify opportunities for participation in physical activity in the community, persevere when not successful on the first try and learning movement skills, choosing color and design, follow and explain a set of written multi-step directions; various writing standards were also used when writing about our kite adventure and various reading standards were met when reading about the history of kites.

Overview
This project allows for about a week long unit on the study of kites. The exciting part is that you can integrate this study into almost every subject and, at the end, students are able to make and fly their very own kites!

Objectives
The students will read about, discuss, and uncover the important history of kites. The students will create their own anemometer to measure the speed of wind and recognize the power of wind. The students will create a kites of their own by following written directions with teacher and parent guidance. The students will color, cut out, and tape on sticks according to the directions provided on the kites. The students will create their very own designs on the kites but must include at least one area with symmetry. The students will fly their kites on our designated day. The students will recognize the connection between wind speed and the elevation of their kites. The students will make predictions on how high and how long their kites will stay in the air and use stop watches to record it. The students will communicate with one another to maintain safe distances, etc. The students will utilize a kite first aide station to make any necessary repairs with teacher and parent help. The students will write short stories using the prompt: if my kite could take me anywhere where would I go...using the writing process to complete final copies of their writing to be shared with classmates.

Materials
The Warlord’s Kites, What’s the Big Idea, Ben Franklin?, items for the anemometer (Dixie cups, pencils, straight pins, and straws) and this would be one anemometer per three students, permanent markers, kite kits from www.kitesonaroll.com (four rolls)

You will need a lot of permanent markers if you are dong this as a grade level and they are expensive. You may also have to purchase stop watches, and if you would like more copies of the books, you have to purchase them as well. Below I mention Flat Stanley, and if you do not have the book, you will have to get it as well. I was lucky enough that my school had many of the items I

GRADE LEVEL
3

ARTS

LANGUAGE

MATH

MISCELLANEOUS

SCIENCE

HISTORY

SOCIAL STUDIES

1

WEEK

$500

TOTAL BUDGET

THIS WINNING PROJECT IDEA SUBMITTED BY:

Heather Oates
Behlau Elementary School
San Antonio, TX
Behlau’s Third Grade Kite Boppin’ Day

....continued....

needed already on hand.

Readiness Activity
None need expect that before flying, one should complete the above mentioned activities first to make those connections. Also, one must consider an area large enough to fly the kites and also a large area is needed to make kites. Parent help will also be needed.

Strategies/Activities
Students will begin learning about kites and their history/importance by hearing the teacher read the Warlord’s Kite. Discussion will take place along with a mini comprehension assessment. A discussion of Ben Franklin and his use of kites in discovering electricity will also take place using the book What’s the Big Idea, Ben Franklin? The teacher will read aloud sections in regards to Ben using the kite to fly across ponds as a child and then using it later to discover electricity. We will then move into anemometers by having the children work in small groups to build their own. They will use them in measuring wind using http://www.ciese.org/curriculum/weatherproj2/en/does/anemometer.shtml and will test our anemometers using a fan and recording spins per minute. We will then discuss what a good wind speed would be to fly kites. We will then take them outside and test the wind speeds by recording spins per minute. A brief lesson on kite safety will take place, and the students will read about and discuss this topic. They will then complete a brief summary of the kite safety

by filling in a kite shaped graphic organizer choosing 4 safety rules they feel are important. The teacher will send letters home requesting the help of parents in making kites. Each student will make their own kite using the Malay Bird kite kits. After making kites, we will have our own kite boppin’ day and the kids will go out and fly their kites using stop watches to record elapsed time of how long they could keep their kites in the air. After the kite flying day, students will be asked to develop and create stories of adventures with their kites. They will choose places they would like to visit and grab one friend to go along with them. I also use Flat Stanley that I purchased on my own to read during this time as well. Flat Stanley was used as a kite by his brother. We also complete the Flat Stanley project which you can find more information about on-line. Please feel free to contact me for copies of any forms I use to complete this unit. I would be happy to e-mail them to you. Also, the website www.bookadventure.com has a test for What’s the Big Idea, Ben Franklin? and Flat Stanley, if you would like to take a grade on comprehension.

Culminating Activity
Kite flying afternoon...

Evaluation Method
Observation but also the reading, math, and writing can be collected and graded.
The Kindergarten Cafe

This project incorporates math, science, social studies, and ELA standards in a fun, interactive center that kindergarteners love to visit.

Curriculum/State Standards
Math: Standard 1.M.4 (Recognize pennies, nickels, dimes and their values)
Social Studies: Interdependence (People rely on each other for goods and services; People make economic choices)
Science: The Living Environment Standard 5.3 (Describe the factors that help promote good health and growth in humans)
ESL/ELA: Standard 1 (Speak, Listen, Read and Write for Information and Understanding); Standard 4 (Speak, Listen, Read and Write for Classroom and Social Interaction)

Overview
In this center activity, children will visit a ‘restaurant’ during center time. During their time in the center, each child will use a menu to order a balanced meal and coins to pay for his/her meal. In its structured restaurant activity, the project reinforces the values of pennies, nickels, and dimes; gives children practice in identifying foods from five sections of the food pyramid; and reinforces the idea of interdependence (people rely on each other for goods and services; people make economic choices).

Objectives
The student will be able to sort, identify, and determine the amounts of pennies, nickels and dimes.
The student will identify foods from five sections of the food pyramid (grains, milk, meat/beans, fruits and vegetables) to create a healthy and balanced meal.
The student will practice curriculum related vocabulary in an authentic context.

Materials
plastic coins
money sorting cash registers
Melissa and Doug Food Groups – 3 sets
bundle of six Melissa and Doug carrots
bundle of six Melissa and Doug corn
Melissa and Doug Make and Serve Apple Pie Set
Melissa and Doug wooden doughnuts

Readiness Activity
Because this center activity is meant to reinforce math, science, and social studies understandings, children should be in the process of becoming familiar with pennies, nickels, and dimes; the idea of community needs and economic choices; and the food groups.

Strategies/Activities
In this project, students will visit a ‘restaurant’ during center time. Before the restaurant center opens, the teacher will make a set of menus. The menus will be divided into six sections:  grains; milk; meat/beans; fruits; vegetables; and desserts. Each section of the menu will have three choices. One choice will cost a penny, one will cost a nickel, and one will cost a dime. On the menu, the teacher will write how much each food item costs. For example: in the fruit section of the menu will be a banana (1¢), a watermelon (10¢), and an apple (5¢). In the vegetable section will be a piece of corn (5¢), a tomato (1¢), and a carrot (10¢).

Once the teacher has created the menus and prepared the materials for the restaurant, the restaurant will be open for business. Before opening the store

K

GRADE LEVEL

ARTS

LANGUAGE

MATH

SCIENCE

HISTORY

SOCIAL STUDIES

2-4

MONTHS

$185

TOTAL BUDGET

THIS WINNING PROJECT IDEA SUBMITTED BY:

Julie Jay
PS 249 – The Caton School
Brooklyn, NY
during center time, the teacher will model how the children ‘play restaurant.’ Depending on the needs of his/her class, the teacher may need to model the various roles of the cook and customers several times. For the purposes of this plan, what will follow is what will happen when the children go to the restaurant after appropriate modeling has taken place.

The restaurant will be open to four students at a time. There will be two ‘spaces’ of the restaurant - the customer seating area and the kitchen. The kitchen will have a bowl with three pieces of each food contained in the menu (for example, representing the fruit group, three bananas, three watermelons, and three apples). There will also be five empty baskets/buckets, labeled as follows: grains; milk; meat/beans; fruits; and vegetables. The dessert pieces (an unassembled apple pie and construct-your-own donuts) will be in a separate container. In the kitchen will also be three coin boxes (labeled 1¢, 5¢, and 10¢) on a small tray. On the customer table will be a bucket of coins on which a sign says, “Please take 2 pennies (with two pennies taped on), 2 nickels (with two nickels taped on), and 2 dimes” (with two dimes stamped on). Also on the table will be a menu and ordering sheet for each child. The ordering sheet will be a simplified version of the menu - like the menu, it will be divided into six sections, each section containing pictures of three food items. The prices of the food items will be next to the pictures of the food and there will be a check box next to each food choice so that students can mark which foods they have chosen. Located somewhere in the customer seating area will be a chart that shows each coin and how much money it represents.

Upon entering the restaurant, the customers will first each take two pennies, two nickels, and two dimes from the coin bucket. They will then use the menu and ordering sheets to make their orders. First, each child will write his/her name on the ordering sheet. Then she/he will choose one food from each of the six sections. Because she/he has only two of each coin to pay for his/her dinner, this will involve problem solving and decision-making as she/he makes his/her choices. The choices of each child must match the coins that she/he holds (there must be two 1¢ choices, two 5¢ choices, and two 10¢ choices). As the customers find their coins and make their orders, the cook will first sort the food pieces from the large bowl into their appropriate baskets/buckets (the strawberry goes in the fruit bucket, the bread goes in the grain bucket, etc.) The cook will also assemble the apple pie and construct the donuts.

When the customers are ready to order and the cook has made his/her food preparations, the cook will go collect the customers’ orders. She/he will use the orders to create each customer’s plate of food and serve it to the customers.

As the customers ‘eat’, the cook will return the sorted food into the food bowl and put away the desserts.

When the customers having finished ‘eating,’ the cook will return their food to the food bowls (and the dessert materials to the dessert baskets). She/he will then bring the coin boxes to the customer tables and present each child with his/her bill.

To present the bill, the cook will name each item the customer ordered and how much it costs. The customer will give the cook the appropriate coin and the cook will put the coin in . (For example: Cook: “The carrot was 10 cents”; Customer: (hands the cook a dime); Cook: (puts the coin in the coin box marked 10¢).

After the bills have been paid, a new cook will be appointed and the game repeated, as time permits.

Culminating Activity

The children will place orders from a limited menu of a nearby deli. They will visit the deli, pick up their orders, and pay for their meals individually.

Evaluation Method

First, before the restaurant center is open for use, assess the children’s knowledge of coin names and coin amounts. After the completion of the unit (two months - each student will get to go to the restaurant approximately four times), reassess the students, and compare their pre-test and post-test scores.
Second, at the end of each play session, check the coin boxes to see if they contain the correct coins. If they do not, note the children’s names as needing further instruction/practice.

Third, immediately following the children’s time in the restaurant, ask the children to fill out an Experience Sheet about their time in the restaurant. The sheet should be divided into six sections (grain, milk, meat/beans, vegetable, fruit and dessert). Each child should draw a picture and label what food from each food group she/he chose when ordering. Review the Experience Sheets, noting if the children were able to correctly categorize their ordered foods into the correct food groups.
Fruity Patterns

This fruity patterns activity is 100% effective because it makes learning fun.

**Curriculum/State Standards**

TEKS

(5) Patterns, relationships, and algebraic thinking. The student identifies, extends, and creates patterns. The student is expected to identify, extend, and create patterns of sounds, physical movement, and concrete objects.

(6) Patterns, relationships, and algebraic thinking. The student uses patterns to make predictions. The student is expected to:

(A) use patterns to predict what comes next, including cause-and-effect relationships; and

(B) count by ones to 100.

**Overview**

This project is an engaging way to explore patterns with your students. Rather than using manipulatives, using fruit makes doing patterns exciting, because your students will be able to eat the project. They also take accountability for their work, because they know they get to enjoy and keep the end project.

**Objectives**

The student will create an AB pattern.

The student will create an AAB pattern.

The student will recognize patterns.

The student will identify fruits.

**Materials**

strawberries
blueberries
blackberries
apples
grapes
kabob sticks
napkins
plates

Saran wrap
plastic gloves
plastic containers

**Readiness Activity**

Give each student shapes of triangles and squares. Each child will make an AB pattern and an AAB pattern to prepare for the “Fruity Pattern.”

**Strategies/Activities**

1.) Read literature on patterns. Patterns by Sarah Pistoia

2.) Guided practice. Using unfix cubes, students will practice how to make AB and AAB patterns.

3.) Independent practice. Students will create patterns using fresh fruit.

4.) Students will present their fruit pattern kabobs to class and explain their patterns. Students will describe if their patterns are an AB pattern or an AAB pattern.

5.) Students will enjoy their fruit kabobs.

**Culminating Activity**

The culminating activity is for the students to watch their classmates present their “Fruity Patterns” and then enjoy eating them.

**Evaluation Method**

• Students will have mastered objective if they are able to create an an AB or an ABB pattern using fruit.

• Students will have mastered objective if they are able to create and explain their fruity patterns, during class presentations.

THIS WINNING PROJECT IDEA SUBMITTED BY:

Margaret Botello
Collins Garden
San Antonio, TX

K
GRADE LEVEL

ARTS

LANGUAGE

MATH

MISCELLANEOUS

SCIENCE

HISTORY

SOCIAL STUDIES

1
DAY

$430
TOTAL BUDGET

kids in need foundation
Using algebra tiles allows students to build concrete models of algebraic problems and to manipulate them to solve algebraic problems.

**Curriculum/State Standards**

6th Grade: Adding, subtracting, multiplying, and dividing integers, solving expressions, solving one step equations, and applying the distributive property.

7th Grade: Adding, subtracting, multiplying, and dividing integers, solving expressions, solving two step equations, and applying the distributive property.

8th Grade: Applying the distributive property, adding linear expressions, solving linear equations, evaluating quadratic expressions, and multiplying binomials.

**Overview**

Students will use algebra tiles to represent and solve math concepts. Students will practice mathematical skills and concepts using Versatiles, a self checking program. As a culminating activity students will be teamed up in grade level groups, taking part in a competition where they race from classroom from classroom solving math problems using Versatiles and algebra tiles.

**Objectives**

The student will create concrete models of algebraic concepts using algebra tiles. The student will solve algebraic problems by manipulating algebra tiles. The student will receive instant feedback while solving problems using Versatiles. The student will problem solve while working in cooperative groups.

**Materials**

Versatile starters sets for 6th, 7th, and 8th grade
2 classroom sets of algebra tiles certificates

**Readiness Activity**

Students will be given time to explore algebra tiles by manipulating them and by being introduced to the name of each piece. Students will be introduced to Versatiles, and showed how they work.

**Strategies/Activities**

1. Pre-test on standards being targeted
2. Students are introduced to algebra tiles and Versatiles.
3. Students use algebra tiles to build concrete representations of algebraic concepts. They are able to solve the problems by manipulating the algebra tiles.
4. Students use Versatiles to practice skills and concepts they have learned and receive instant feedback because it is a self checking program.
5. In May students compete in the “Show Me the Math Race.” There will be six teams per grade level consisting of 5 students per team. All teams will meet in a large open area where they will be given a math problem to solve (clue). The answer will tell them what room to go to. Once they run to that room, they will solve math problems using Versatiles or algebra tiles, if they complete the activity correct they are given another math problem (clue) to solve that will lead them to the next classroom number. The first team to complete six activities per grade level will win the “Show Me the Math Race.”

**Culminating Activity**

“Show Me the Math.”

**Show Me the Math**

**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Marvin Soto
Los Alisos Middle School
Norwalk, CA

**6-8 GRADE LEVEL**

**ARTS**

**LANGUAGE**

**MATH**

**MISCELLANEOUS**

**SCIENCE**

**HISTORY**

**SOCIAL STUDIES**

**1 YEAR**

**$540 TOTAL BUDGET**
Show Me the Math

....continued....

**Evaluation Method**
Students will complete a pre-test before the activities and then a post-test after all the activities.
Mathematics Integration: Fibonacci Quilting, Recycled Glass Necklaces, Wooden Hexahedron Benches

Students are able to apply mathematics skills to create actual objects.

Curriculum/State Standards

<table>
<thead>
<tr>
<th>Mathematics</th>
<th>Measurement, Geometry, Fractions</th>
<th>Art Integration (principles of design)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem solving</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Language Arts</td>
<td>Oral speaking, Research (Technology, Reading, Writing, Analyzing)</td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td>(recycled materials and environmental study)</td>
<td></td>
</tr>
<tr>
<td>Service Learning</td>
<td>(creating benches, cards, necklaces for others)</td>
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</tr>
</tbody>
</table>

Overview

Students will apply grade 5 mathematics curriculum learning to create wooden benches (hexahedrons), a Fibonacci spiral quilt, and recycled glass necklaces. Students will discover how their mathematics objectives are transferred into real life projects. Students will discover how mathematics, art, language arts, technology, science, and social studies are linked to create products.

Objectives

The student will measure inches and cm using benchmarks 1/2, 1/4, 1/8. The student will write mathematically, including drawing diagrams, to explain strategies and skills used to create products. The student will apply problem solving skills to add 3/8 inch seam allowance, discover what size faces must be to create a 20 X 20 inch hexahedron made from 3/4 inch plywood, and discover the Fibonacci sequence spiral. The student will estimate and measure circumference, diameter, radius of a circle.

Materials

- Hexahedron benches: plywood, paint, brushes, saw, rulers
- Fibonacci quilt: fabric, needles, batting, rulers
- Circle necklaces: glass bottles, glass saw, rulers

Readiness Activity

Students created origami hexahedrons and measured many different rectangular prisms so they discovered a hexahedron has six faces, twelve edges, and eight vertex points. They then were ready to figure out how thickness of sides affects final size when using ¾ inch plywood.

For the quilt, students first figured out the Fibonacci sequence using graph paper, 1+1=2, 2+1=3, etc.

For necklaces, students helped collect bottles and measured circumference, diameter, and radius of many circles.

Strategies/Activities

Students will discover the pattern for the Fibonacci sequence as they color squares on graph paper, 1,1,2,3,5,8, etc. Then they will compute area and perimeter for each square. For example, a 3X3 cm square has an area of 9 square inches (kids can count them) and a perimeter of 12 cm. Then they will work in groups to create large Fibonacci squares, which they’ll use as the pattern for their quilt. Students will cut apart the completed Fibonacci spiral and then add a 3/8 inch seam allowance around each piece.

THIS WINNING PROJECT IDEA SUBMITTED BY:

Tracy Ajello
Doolittle School
Cheshire, CT

5G
GRADE LEVEL
5
ARTS
5 LANGUAGE
5 MATH
5 SCIENCE
5 HISTORY
5 SOCIAL STUDIES

$500
TOTAL BUDGET
Mathematics Integration: Fibonacci Quilting, Recycled Glass Necklaces, Wooden Hexahedron Benches

...continued....

They’ll choose fabric and sew the quilt together. Next, we will apply problem solving skills to figure out how to create plywood hexahedrons with faces of 20 inches. Students will discover that two faces will need to be 20 X 20, two will need to be 18 ½, etc., since the plywood is 3/4 inch thick. Then students will use meter sticks to discover the center of the circle and create circle holes on 4/6 of the faces so the hexahedrons may be used for storage benches. Finally, students will collect glass bottles, measure, and cut bottles into 1cm slices. They’ll measure circumference, radius and diameter of each slice. We will fire these in our kiln and create necklaces. We will use the recycled paper we’ve made to create tags for the necklaces showing the mathematics of the circle on each tag. Students will design the tags to share circumference, diameter, and radius. Throughout all mathematics activities, students will write articles for class newspaper to share learning with parents and members of the school community.

Culminating Activity
The benches are being used by our art teacher to store and dry work during the week. She’s even using them for the Townwide Art show to showcase student work. Students who come to Doolittle on weekends to play sports are using the benches to sit and change shoes and store coats on.

We used the photo we took of the quilt to create cards. Students wrapped a set of five cards with ribbons as a holiday present to their families. (This showed parents the quilt and led to conversations at home about mathematics learning).

We plan to send the necklaces home for Mother’s Day. Students will each bring home a photo of him or herself wearing the necklace with complete sentences explaining mathematics, (circumference, area, radius, diameter or circle) and how we reused bottles and created paper from recycled paper to create necklaces and nametags. This helps students understand connected aspect of learning and leads to discussions of learning at home.

Evaluation Method
Each student will create their own Fibonacci spiral using cm graph paper. They will be assessed with a rubric to determine if they understand and are able to extend the Fibonacci sequence and how they use operations skills to determine area and perimeter of each square. Then students will transfer the Fibonacci spiral to large graph paper (applying proportion skills). Each group will then add 3/8 inches to each piece. These pieces will be used as patterns to put together the quilt. The quilt will be evaluated by measuring squares that comprise the Fibonacci sequence. Students will write in journals to explain mathematics skills used and steps to complete the Fibonacci spiral quilt. For the hexahedrons, diagrams of dimensions of faces will be assessed. The finished hexahedrons must be 20 X20 inch on each face. For the circle necklaces, students will write in journals to explain the process. Each necklace will have a tag with circumference, radius, and diameter. The tags will be assessed with a rubric for how circumference, diameter, and radius were measured and diagrammed.
Economic Decisions – A Reality

Students learn how financial decisions might affect their lives for years to come.

Curriculum/State Standards
Uses real world problems with estimation, measurement, and percentages.
Uses statistical methods and formulas to make inferences and valid arguments about real world problems.

Overview
In order to better understand economic decisions that might need to be made in the future, students had to make three financial decisions for a family with a limited income. Based on prior knowledge and information obtained during a field trip, teams had to make final decisions and support these decisions with facts and mathematical computations.

Objectives
The students will measure quantities in the real world and use them in solving problems.
The students will solve real world problems involving percents and interest rates.
The students will develop critical thinking skills by defining, developing, and adjusting solutions to design or solve real world problems.
The students will better realize that education will afford them a better life and less economic restraints.

Materials
Students were provided $15/group of 2-3, three ring binders, dividers, clip boards, disposable cameras, and a variety of reference materials on nutrition and daily food requirements.

Strategies/Activities
Students worked in teams of 2-3 for the entire project, beginning with a one day field trip to a local car dealership, clothing stores at a mall, and the local supermarket. At the car dealership, teams kept notes on two cars of the teams’ choices. Notes included cost, mpg, and warranties. From there, the teams went to the mall and used disposable cameras to take pictures of clothes that could be mixed and matched (combinations) to provide enough professional outfits for a week. Finally, each team went to the supermarket and had $15.00 to purchase enough food to feed a family of six a nutritional, filling dinner.

Culminating Activity
The next day we used our home economics classroom to prepare the meals. No ingredients could be added that were not purchased the prior day. After this, each team did a study of each event and made decisions and analysis based on the information they had gained and mathematical calculations.

Evaluation Method
A team’s grade was based on the portfolio which included three sections. Teams had to list the information on the car of choice and why they chose a particular car, including mileage and loan cost/month. Pictures of the clothes

THIS WINNING PROJECT IDEA SUBMITTED BY:
Christine C. Neal
Orange Park Junior High School
Orange Park, FL
purchased had to be included in section 2, including cost of each item and a code to how the pieces would be mixed and matched. For the third section students included a receipt, food labels that included nutrition facts and number of servings, and the menu. Finally, the teams had to write a paper evaluating the project and explaining choices, what they learned, how it impacted them, and what would be done differently if they were to do this project again.
Building Blocks of Measurement

By bringing in a builder to show students how to plan a construction project, students were able apply the newly learned principles to their hands-on project.

**Curriculum/State Standards**

**Algebraic Thinking**

**Standard 1:**
The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions. (MA.D.1.3)

1. Describes a wide variety of patterns, relationships, and functions through models, such as manipulative, tables, graphs, expressions, equations, and inequalities.
2. Creates and interprets tables, graphs, equations, and verbal descriptions to explain cause-and-effect relationships.

**Standard 2:**
The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations. (MA.D.2.3)

1. Represents and solves real-world problems graphically, with algebraic expressions, equations, and inequalities.
2. Uses algebraic problem-solving strategies to solve real-world problems involving linear equations and inequalities.

**Measurement**

**Standard 1:**
The student measures quantities in the real world and uses the measures to solve problems. (MA.B.1.3)

1. Uses concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference, and volume of two- and three dimensional shapes, including rectangular solids and cylinders.
2. Uses concrete and graphic models to derive formulas for finding rates, distance, time, and angle measures.
3. Understands and describes how the change of a figure in such dimensions as length, width, height, or radius affects its other measurements such as perimeter, area, surface area, and volume.
4. Constructs, interprets, and uses scale drawings such as those based on number lines and maps to solve real-world problems.

**Standard 2:**
The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/customary). (MA.B.2.3)

1. Uses direct (measured) and indirect (not measured) measures to compare a given characteristic in either metric or customary units.
2. Solves problems involving units of measure and converts answers to a larger or smaller unit within either the metric or customary system.

**Standard 3:**
The student estimates measurements in real-world problem situations. (MA.B.3.3)

1. Solves real-world and mathematical problems involving estimates of measurements including length, time, weight/mass, temperature, money, perimeter, area, and volume, in either customary or metric units.

**Standard 4:**
The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real-world situations. (MA.B.4.3)

1. Selects appropriate units of measurement and determine and applies significant digits in a real world context. (Significant digits should relate to both instrument precision and to the least precise unit of measurement.)
2. Selects and uses appropriate
instruments, technology, and techniques to measure quantities in order to achieve specified degrees of accuracy in a problem situation.

Data Analysis and Probability

Standard 1:
The student understands and uses the tools of data analysis for managing information. (MA.E.1.3)
1. Collects, organizes, and displays data in a variety of forms, including tables, line graphs, charts, bar graphs, to determine how different ways of presenting data can lead to different interpretations.
2. Understands and applies the concepts of range and central tendency (mean, median, and mode).
3. Analyzes real-world data by applying appropriate formulas for measures of central tendency and organizing data in a quality display, using appropriate technology, including calculators and computers.

Standard 2:
The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics. (MA.E.2.3)
1. Compares experimental results with mathematical expectations of probabilities.
2. Determines odds for and odds against a given situation.

Standard 3:
The student uses statistical methods to make inferences and valid arguments about real-world situations. (MA.E.3.3)
1. Formulates hypotheses, designs experiments, collects and interprets data, and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range, mean, median, and mode) and tables, graphs, and charts.
2. Identifies the common uses and misuses of probability and statistical analysis in the everyday world.

Geometry and Spatial Sense

Standard 1:
The student describes, draws, identifies, and analyzes two- and three-dimensional shapes. (MA.C.1.3)
1. Understands the basic properties of, and relationships pertaining to, regular and irregular geometric shapes in two and three dimensions.

Standard 2:
The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed. (MA.C.2.3)
1. Understands the geometric concepts of symmetry, reflections, congruency, similarity, perpendicularity, parallelism, and transformations, including flips, slides, turns, and enlargements.
2. Predicts and verifies patterns involving tessellations (a covering of a plane with congruent copies of the same pattern with no holes and no overlaps, like floor tiles).

Standard 3:
The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically. (MA.C.3.3)
1. Represents and applies geometric properties and relationships to solve real-world and mathematical problems.
2. Identifies and plots ordered pairs in all four quadrants of a rectangular coordinate system (graph) and applies simple properties of lines.

Overview

Building Blocks of Measurement is intended to take students working in formal cooperative learning groups through the process of planning and constructing a three dimensional structure to scale. They will work cooperatively with our guest volunteer (independent building contractor) to interpret their blueprint, develop their timeline, and ultimately construct a three dimensional structure which will later be assembled to create the layout currently in place at the school.

Objectives

The student will calculate perimeter, area, and volume from a working floor plan. Transfer that information into constructing a scale model of the building using the principles of similar figures and proportion.
The student will identify geometric figures, calculate area and volume where required, and identify and use patterns to facilitate construction of the scale model.
The student will demonstrate the ability to visualize and realize that vision through collaboration, planning, implementation and sharing.
The student will use prior knowledge to enhance the understanding of problem solving, measurement and its applications, spatial thinking, and data analysis and probability.
The student will see what kind of impact they can make and already do make.
Building Blocks of Measurement

Materials
If possible a guest with experience in the field, if not, a documentary floor plan blueprints pencil eraser scale ruler scissors metal ruler for cutting foam board hobby kit w/glue gun extra blades glue sticks baton sticks cutting mats transparency film construction paper

Readiness Activity
Have the students measure and draw, to different scales, items that they are around every day. This step is to help the students visualize how they would represent a given object while still maintaining proportion. Assign different tasks such as finding the area for painting the object or how much air the container holds for the volume (cans of soda and blocks of chocolate works well for this section). Go over the floor plan and how to read it. Hopefully an expert will be available to lend some of their time and expertise for this step. Show students how to use the various tools for safety and accuracy.

Strategies/Activities
I would start this project by showing a documentary of the building process and relate the steps to the floor plan. Pair students into groups of at least two depending on the scope of the project. They would have an opportunity to assign jobs within their teams and what their responsibilities would be by developing rubrics to assess themselves, their peers, and the group. A great tool for this would be inspiration for organizing their thoughts.

The students will then brainstorm as to what this project means to them and what they hope to learn from it. They would put this in presentation form, be it PowerPoint, slide, or oral. Students will begin to compute from the floor plan how much material (foam board) is needed to construct their building. Students will put together the floor and walls including all openings for doors and windows. Calculate how much material is needed to cover the structure with siding and have the students cut and cover their structure with the baton sticks. Calculate the floor area and apply to the inside of the structure. This should be as detailed as possible and include windows and base boards. Calculate the materials needed to construct the ceiling and roof of the structure from the floor plan. Finally, the students will present their completed building.

Students have to be able to accept responsibility for their input, share their ideas, and collaborate with their peers on both a one to one, as well as, a group level. They will have to engage their ability to visualize their ideas, address problems in design and implementation, apply prior knowledge of algebraic thinking, measurement, number sense, data analysis and probability and geometry and spatial thinking.

Culminating Activity
Students will participate in a cross class project so they will need to determine how the pieces will be fitted together to create the final project.

As the students progress from finding the most suitable location to what materials to use, they will be scaffolding their ideas in the same way they will be building their sections and evaluating the final product.

Yes, the group needs to meet the building standards for that type of structure as well as plan for such peripherals as parking and delivery areas. In other words they need to understand the impact of the project on those working and living around it.

The students need to be able to transfer their ideas from paper to scale model. The participating students will be gathered together for the connecting of the five pieces. Each class will appoint a presenter, giving some of the background and inspiration for their design and how it fits together as a whole.

Evaluation Method
Steps to apply from project/group inception.
Rules need to be set up for this large-scale group project (try to have the students treat this as a real contract with a deadline and penalties).
Building Blocks of Measurement

....continued....

Setting up a survey on Quia for determining students’ strengths and interests could be an effective way of assembling teams.
Have the students set up rubrics for assessment of themselves, each other, and the group.
Allow the students to participate in scheduling and emphasize the consequences set up in the contract.
Periodically call a meeting for the teams to report their progress and use this as an opportunity to assess as well as redirect.
Cooking Healthy

This project allows students to use fractions, reading, and measurements in a real life scenario.

**Curriculum/State Standards**

Math: Students will be able to recognize and name common fractions; read and record temperatures on a thermometer.

Language Arts: The students will be reading directions; sequencing; vocabulary; follow multi-step directions; writing process.

Science: The students will understand all living things have basic requirements to maintain their existence; how living things acquire energy; classify substances; physical changes in matter; chemical changes.

**Overview**

This project is to engage students in learning of basic skills while showing the correlation between school and the real world. Students were responsible for researching recipes, planning menus, and inviting guests.

**Objectives**

The students will be able to make healthy food choices when presented with many different choices.

The students will gain a basic understanding of measurement concepts. This also supports our School Improvement Plan.

The students will discover there is a correlation between good table manners and healthy eating habits.

The students will understand how to plan healthy meals using categories from the Food Pyramid.

The students will read recipes to determine which they want to make for meals.

The students will use math concepts to assemble ingredients and cook the foods planned in the healthy meals.

The students will set the table for the appropriate number of guests.

The students will demonstrate their manners during the meals.

**Materials**

- measuring cups (1/4, 1/3, 1/2, 1)
- mixing bowls
- paper plates/bowls
- plastic forks, knives, and spoons
- toaster oven
- blenders
- computer with internet excess
- kid’s cookbook
- invitations
- foods for each prepared recipe
- 3 mixing bowls
- set of 4 measuring cups
- paper bowls
- plastic wear
- napkins
- kid’s cookbook
- sugar cones
- marshmallows
- caramels
- chocolate chips
- lemonade
- cantaloupe
- apples
- strawberries
- green grapes
- bananas
- pepperoni
- olives
- pizza sauce
- English muffins
- ham
- cheese
- strawberries

**K-5**

**GRADE LEVEL**

**ARTS**

**LANGUAGE**

**MATH**

**SCIENCE**

**MISCELLANEOUS**

**SOCIAL STUDIES**

10 DAYS

$140 TOTAL BUDGET

This winning project idea submitted by:

Danielle Willcock and Dianne Brown
Holly Academy
Holly, MI
Cooking Healthy

....continued....

peanut butter
bananas
spoons
ice cream
juice
pudding
yogurt
milk

cups

Readiness Activity
Students learned about the Food Pyramid. We discussed the difference between “healthy” and “unhealthy” food choices. This involved cutting pictures from magazines and doing word splashes on the board.

Strategies/Activities
Day 1: students will learn the different categories of the Food Pyramid and what common foods go into each category.

Day 2: students will cut out pictures of food from magazines and place them into their own Food Pyramids.

Day 3: Students will be presented with a “word splash” on the board. The word splash will be comprised of “healthy” and “unhealthy” foods. The students will sort them into two groups healthy/unhealthy.

Day 4: students will discuss appropriate manners that are used at the table.

Day 5: Students will see what a properly “set” table looks like. The different aspects will be discussed. Students will them cut and paste table settings to look like the Proper one.

Day 6: Students will be presented with three recipes that have potential to be made. The goal is that when the recipes are read, students will see that only one is a healthy choice.

Day 7: Students make a list of groceries that are needed to make the recipe and supplies needed to prepare the food. The grocery list will also have to stay within the budget of $25/meal.

Day 8: Students will fill out pre-made invitation with “What, When Where, Who, and Why” and then decorate the envelopes.

Day 9: Students will discuss as a group their healthy choices. They will then draw pictures of themselves making good choices and write sentences about the pictures.

Day 10: Students, with parent volunteers, will prepare the food (i.e.; cut, chop, measure, etc.).

Culminating Activity
At the end of the year, we made smoothies. The kids picked their recipes, assembled the ingredients, and had a tasty treat. This was a great fun way to wrap up the end of the year and enjoy what they had learned. The most exciting part was listening to the conversations about healthy and un-healthy ingredients that were going into the smoothies!

Evaluation Method
Staff members that attended filled out a rubric scoring the meal of the healthy food choices, manners of students, and table setting. Students were given a written assessment on the food pyramid and making healthy choices.
The Cookie Project

The Cookie Project helped students understand the “real” world relationships of fractions to their every day lives.

Curriculum/State Standards
Dry Measurement
Liquid Measurement
Division of Fractions
Multiplication of Fractions

Overview
Students are given a recipe that makes only three cookies. The students must then recalculate the recipe so that it will yield five dozen cookies.

Objectives
The student will show competency in multiplying fractions.
The student will show competency with dry and liquid measurement
The student will be able to take a recipe for three cookies, multiply the recipe so that it yields five dozen cookies, and will bake the cookies to share with the class.

Materials
20 lbs of flour
10 lbs of sugar
3 lbs of brown sugar
16 oz of vanilla extract
3 lbs of raisins
5 lbs of oatmeal
5 lbs of chocolate chips
5 lbs of butter
1 large can of shortening
2 dozen eggs
16 oz of baking soda
16 oz of baking powder
3 gallons of milk
24 gallon sized freezer bags
5 sets of mixing bowls
5 sets of measuring cups and spoons

Strategies/Activities
Over the course of three months students are taught the following skills
- dry measurement
- liquid measurement
- basic operations with fractions

Culminating Activity
The culminating activity was the making of the cookies, which began with the recipe that only yielded three cookies. Students had to use their accumulated skills to multiply the recipe (by 20) in order to make five dozen cookies.

Next, after calculating the larger recipe, the students then had to obtain the ingredients from the teacher before finally mixing the material. The finished dough was then taken to the school kitchen and baked.

Finally, after cooling, the cookies were evaluated by the assembled class using a Wong-Baker pain chart to graph the acceptability of the product.

Evaluation Method
Finally, after cooling, the cookies were evaluated by the assembled class using a Wong-Baker pain chart to graph the acceptability of the product.

THIS WINNING PROJECT IDEA SUBMITTED BY:

Eric Toguchi
Colbert School
Colbert, WA
My students can explain the representations of ones, tens, and hundreds through use of the blocks and through drawings.

**Curriculum/State Standards**

1.1.1 Understand different representations of whole numbers
1.1.5 Understand the meaning of subtraction
1.1.6 Understand and apply procedures for addition of whole numbers with fluency
1.1.7 Understand and apply strategies and appropriate tools for adding with whole numbers
1.3.3 Understand the locations of numbers on a positive number line

**Overview**

Through concrete experiences with the Digi-Block manipulatives, students gain knowledge and understanding of our base ten system. Students gain understanding of the link between the intuitive idea of counting and the abstract notion of place value; this link is a critical component of number sense. I found my implementation of the Digi-Block materials to be beneficial to the first graders that I teach. Because the Digi-Blocks model our base 10 system so accurately, my students could construct their own learning about place value, thereby building a strong foundation for future work next year. Also, my students stacked up favorably in assessments with the other first grades, which I attribute at least in part to the Digis.

By combining the grant with other grants I received, I am able to share two classroom bundles of materials with all four of our first grades next year. I will also be sharing information about Digi’s use with second grade. We could easily work out a system to share these materials.

Besides the Digis being all one pleasing color, they are fun to use and access the kinesthetic modality of learning. Everyone gained!

I’m excited about extending the use of the Digis in my classroom and beyond next year. I’m a National Boards Candidate. As such, part of the work I am taking on this summer is to better align my use of the Digis with Number Corner.

**Objectives**

The students will gain a deep understanding of whole numbers. The students will gain knowledge and understanding of our base ten system, especially the relationship between ones and tens. The students will gain concrete understanding of the link between the intuitive idea of counting and the abstract notion of place value; this link is a critical component of number sense.

**Materials**

First Grade Classroom Super Bundle
1 transparent 100 holder set
1 demonstration counter
24 student counters
24 plastic number lines
24 place value mats with 3 digit flip cards each
3400 blocks with holders 1 storage cart

**Readiness Activity**

Jump right in – If students don’t have the skills necessary for beginning first grade, these materials will enable them to be ready and grow.

![This winning project idea submitted by: Sue Tremonte
Chain Lake Elementary
Monroe, WA](image)
Strategies/Activities
The following are just some of the activities that will be repeated as necessary in the same and different formats as the students work with the digis as I incorporated them into my present math program:
- Pack the tenblocks (then later hundred blocks) as they count numbers from 1 to 1,000.
- Match with one-to-one correspondence on various digi displays on paper, then count the digis as they slide them off the paper, write number in box, pack the tenblocks, then count again from the train engine that is always on the left, write number in other box and compare numbers in the boxes to see if they wrote them the same way.
- Build numbers from 1-100 and more using the 3-D teacher-made train engine that can only be used from left to right because of the side that the engine is drawn –draw lines on paper matching numerals with pictures of various packed trains.

Culminating Activity
There is no final project. The work is ongoing all year long. It culminates in the knowledge they have built about Place value as noticed in the evaluation methods below.

Evaluation Method
Observation – The students will be observed as they build numbers, work with place value and on operations with the digi-block materials.

Representation – The students will represent their work on paper (draw what they build) and share out.

Pre- and post-screening tools as well as ongoing assessments will be administered and used to guide instruction.
# Classroom Store

Fast, quick, real assessment of students’ knowledge of coins, money amounts, and how to make coin combinations match a set amount.

<table>
<thead>
<tr>
<th>Curriculum/State Standards</th>
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<tbody>
<tr>
<td>meets standards and curriculum set forth by the Archdiocese of Detroit as well as the State of Michigan GLECs for 2nd and 3rd grade math and social studies</td>
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<thead>
<tr>
<th>Overview</th>
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<tbody>
<tr>
<td>By matching set coin amounts to objects found in their classroom, students will show their knowledge of money by “purchasing” these items with their “cash.” A real life situation assessment.</td>
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<table>
<thead>
<tr>
<th>Objectives</th>
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<tbody>
<tr>
<td>The student will identify current American coins – penny through one dollar. The student will add coin amounts in order to reach the specified amount. The student will distinguish between a need and a want. The student will experience consumerism with limited income. The student will learn to budget income in order to “buy” needs and save for the “wants.”</td>
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<thead>
<tr>
<th>Materials</th>
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<tbody>
<tr>
<td>gray, green, and brown/tan copy paper, envelope “wallets”, Post-It notes, marker, scissors, labels for ID’s</td>
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<table>
<thead>
<tr>
<th>Readiness Activity</th>
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<tbody>
<tr>
<td>Review and assess knowledge of American coins by using real coins, overhead coins, flashcards, etc. Play game: I have a coin that is worth... who has it? Review needs and wants.</td>
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<thead>
<tr>
<th>Strategies/Activities</th>
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<tr>
<td>Each child receives two sheets of gray paper that have the nickels, dimes, quarters, half-dollars, and dollar coins on them. Each child receives a sheet of brown paper with the pennies printed on them. All the coins should be printed with “heads” and some with “tails” so they recognize each coin each way. Each child receives a sheet of green paper with the dollar bill on it printed front and some with the back. Have them cut out each coin and bill. Make “wallets” from envelopes and put all their income into it. Make an ID card out of the label and stick it to the wallet. Using the Post It notes, label items in the room with amounts. For example: pencils, 25 cents each; crayons, 75 cents a pack, Kleenex, 5 cents each; getting a drink, 32 cents. Continue labeling as you wish, making sure amounts are within the students’ knowledge base. Also they will notice some items are needs (Kleenex, going to the bathroom), some are wants (markers, puzzles, colored chalk, etc.). Set your parameters and then the children will show you the correct amount of money (no change-has to be correct amount) to “buy” a pencil or to get a drink. Vary amounts to pay for items each day or week; increase amounts as the students are more knowledgeable.</td>
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<thead>
<tr>
<th>Culminating Activity</th>
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<tr>
<td>Have bankers act as the teacher collecting amounts for items.</td>
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<th>Evaluation Method</th>
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<td>Immediate observation as they pay.</td>
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**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Mary E. Stanko  
St. Mary Catholic School  
Royal Oak, MI
Students will learn to use a compass and contour maps in class through direct instruction and hands-on mapping activities.

**Curriculum/State Standards**
Math:
- Use scale and proportional reasoning to solve problems
  - Apply properties and relationships of geometric figures to solve problems.
  - Develop fluency in calculating with numbers
Geography:
- The learner will acquire strategies to analyze, interpret, create, and use resources and materials
  - National Geography Standard 1: The geographically-informed person knows and understands how to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective
Heath/PE:
- Demonstrate skills necessary for participation in non-traditional games and activities
  - Participates regularly in physical activities for the purpose of improving skill and health
  - Utilize safe and appropriate warm-up, pacing and cool down techniques
  - The learner will develop healthy and effective interpersonal communication and relationship skills
  - The learner will demonstrate competency in a variety of movement forms and proficiency in a few to gain competence towards lifetime physical activities
  - The learner will exhibit a physically active lifestyle
  - Exhibits responsible personal and social behavior that respects self and others at the same time as values physical activity for health, enjoyment, challenge, self-expression, and/or social interaction

**Overview**
The culminating project activity was fantastic fun for all! Every student can now competently use a compass to follow a course described in terms of degrees and directionality. All upper grade students can create a course using map locations and directionality. All students can identify what a topological map is and appreciate that such a map uses specific drawings to represent different types of land features. All of our students became more familiar with the state of North Carolina as we used state maps to learn about map elements and scale. In addition, students are now enthusiastic about this new activity, orienteering, and we know that we can build upon this skill in the future. We used five, sixty-minute classes to cover the basics. This included introducing state road maps, map legends, the meaning of scale and using proportions, introduction to topological maps and specific land form notation, how to use the compass for map bearings and trail bearings. Then we had a three hour culminating event in which teams covered a prescribed course of six checkpoints where students worked as teams to solve cross-curricular questions and challenges.

**Objectives**
The student will be able to travel from a given Point A to a final Point B by using alternative measurement units and the measure of angles.
The student will use indirect measurement and proportional reasoning.

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**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Joy G. Lautzenheiser
The Learning Center! Charter School
Murphy, NC
to determine the measure of objects found upon the given course.
The student will learn to interpret and use contour maps in order to determine their best path between specific locations upon the course. The student will learn to interpret and convey geographic characteristics on flat paper using contour lines and scale.

**Geography:**
The student will learn to identify different types of maps, i.e., road maps, contour maps. The student will learn how to use maps, including keys, directionality, and scale.

**Health Strands:**
The student will develop abilities to function in a group to identify, prescribe, and execute a plan to accomplish the orienteering course by using appropriate interpersonal communication skills.
The student will engage in physical activities that provide for challenge, problem solving, and decision-making with appropriate risk-taking choices, fair play, and sportsmanship.
The student will demonstrate effective use of stretching, warm-up and cool down time, and self-pacing during appropriate sustained aerobic activity.

**Materials**
road and contour maps, compasses, handouts of contour map symbols/symbols

**Readiness Activity**
Review directionality and history of maps/instruments used for navigation.

**Strategies/Activities**
Introduce and motivate students with interesting stories of navigation throughout history of mankind and with guest speakers who have experience with map design or usage, such as military personnel or U.S. geological personnel. Define orienteering and discuss the tools of orienteering.
Teach the difference between magnetic north and true north and that the difference between the two is called declination. (For an extension, students can learn how to calculate declination and to appreciate its importance in navigation and where to find it on a map.)

Obtain state maps to learn about the compass rose, map legend, and focus on the scale. With these maps, have students trace a path using highlighters which they will measure with yarn and a ruler then use proportion to find mileage and even gas cost. Maps are free from your chamber of commerce or state visitor centers. Talk about the known land features, such as mountains and flat areas and how things are drawn to scale. Experience scale by drawing something to scale, perhaps on paper or out in the parking lot with chalk.

Obtain contour maps and keys and teach students how and when these are used. Compare with road maps. It is especially fun and useful to get a contour map of an area that you can actually walk in order to experience the drawn landforms of that area. This helps students make connections between the real and the model/map.

Have students learn to use the compass. An easy way to start using magnetic north compass bearings is to take 10 paces 90o east, then 90 o south, then 90 o west, then 90 o north to return to start position. Have students follow a short sequence of bearings to go from one location to another. Then, have students create pathways for others to follow which utilize compass bearings. Next, use the state map to learn how to create a map-based path using compass bearings. Transfer that skill to making a map of school grounds, charting a path using compass settings on the map, then go out and following those bearings to see if students end up where they charted.

**Culminating Activity**
Students are put into teams which will follow an orienteering course designed and tested by teacher which uses compass bearings along with visual landmarks or maps. Checkpoints along the course help the students’ sense success and allow them to experience cross-curricular challenges. These challenges should be completed by all of the students on the team working together to share knowledge or skills in order to discover the challenge solutions. Each checkpoint will be staffed by an adult who will hand out and score the questions, problems, or activities to be done by the team members. Scores will be tallied and highest scores will
To What Degree?

....continued....

be recognized but all teams will be rewarded for completing the course.

**Evaluation Method**

Performance Based
Using state road maps, students plan three different routes to a chosen destination. They will calculate mileage and gas cost for the shortest route (time-wise), the most scenic (determined by points of interest along the way), and one other route.
Students identify key land formations on contour maps using legend.
Students complete an orienteering event.

**Observation**
Students will be evaluated for sportsmanship and team work.
Grizzly Ticket Store

The project is highly effective in developing the students’ communication and cooperative group skills.

Curriculum/State Standards
Communication Standards:
• The student uses listening and observation skills and strategies to gain understanding.
• The student uses communication skills and strategies to interact/work effectively with others.
• The student uses communication skills and strategies to effectively present ideas and one’s self in a variety of situations.
• The student analyzes and evaluates the effectiveness in communication.

Mathematics Standards:
• Fluently and accurately add and subtract whole numbers using the standard regrouping algorithms.
• Solve single- and multi-step word problems involving addition and subtraction of whole numbers and verify the solutions.
• Determine the question(s) to be answered given a problem situation.
• Identify information that is given in a problem and decide whether it is necessary or unnecessary to the solution of the problem.
• Select and use one or more appropriate strategies to solve a problem.
• Represent a problem situation using words, numbers, pictures, physical objects, or symbols.
• Analyze and evaluate whether a solution is reasonable, is mathematically correct, and answers the question.
• Summarize mathematical information, draw conclusions, and explain reasoning.

Objectives
The student will use communication skills and strategies to interact/work effectively with others.
The student will present his/her proposal using effective language.
The student will evaluate and reflect on the effectiveness of his/her group.
The student will select and use one or more appropriate strategies to solve a problem.
The student will summarize mathematical information, draw conclusions, and explain reasoning.

Materials
• catalogues from various companies (ex., Oriental Trading, S & S, etc.), paper, pencils, calculators, bookmarks, Mega Stamp Assortment, Funny Face Neon Pencil Top, Star Student Dog Tag Necklace, notepads, Design Your Own Spiral Notebook, Natural Canvas Pencil Cases, Rainbow Crayons

Overview
The students earn Grizzly Tickets/Bucks for demonstrating principles of the Endeavour Code (Be Safe and Kind, Be Responsible, Be Respectful, Be Positive, Do Your Best). Once a month they can spend these tickets at the Grizzly Ticket Store. Each class was responsible for ordering supplies and running the store each month. I believe that if this project was repeated on a bi-monthly basis (instead of only being able to do it once per class) the students’ presentations skills would have improved even more. The project was also effective in having the students to utilize their mathematical thinking in a “real world” situation.

THIS WINNING PROJECT IDEA SUBMITTED BY:
Laura Gill-Dale
Endeavour Elementary School
Vancouver, WA

GRADE LEVEL
3-4
ARTS
LANGUAGE
MATH
MISC
SCIENCE
HISTORY
SOCIAL STUDIES

3-4
GRADE LEVEL
3-4
ARTS
LANGUAGE
MATH
MISC
SCIENCE
HISTORY
SOCIAL STUDIES

2
WEEKS
$500
TOTAL BUDGET
Grizzly Ticket Store

...continued....

Readiness Activity
1. Discuss expectations of working with the group. Review past experiences of what to do when experiencing difficulties.

Strategies/Activities
1. The students are split into groups of four with each person having an assigned role – recorder (records items to be purchased and dollar amounts), accountant (in charge of calculator), presenter (presents proposal to the group), and coordinator (person in charge of catalogue).

2. Explain the goal – To purchase educational items for the Grizzly Ticket Store and to stay within a budgeted dollar amount.

3. The students work together for about 30-40 minutes. They create a proposal of the items that they would like to purchase as well as the cost. Their proposal may include pictures or illustrations of the items.

4. Once the students finish their proposal they fill out a reflection sheet of what went well, what was challenging, and some ideas on what they could do next time to improve the process.

5. Each group presents their proposal for spending the allotted amount of money.

6. The class votes on what they think was the best proposal.

7. In a community circle, the students discuss what went well, what was challenging, and how to deal with challenges the next time they are faced with a project such as this. They also give advice to the next group of what to do and how to work together.

Culminating Activity
1. The students run the store.

Evaluation Method
The students were evaluated on their presentation and how well they worked together as a group (reflection sheet).
Peer Cashier

This project holds the students’ interest and keeps them engaged.

**Curriculum/State Standards**

| 6.A. | Demonstrate knowledge and use of numbers and their representatives in a broad range of theoretical and practical settings. |
| 6.B.2 | Solve one and two step problems involving whole numbers, fractions, and decimals using addition, subtraction, multiplication and division. |
| 6.B.3a | Solve practical computation problems involving whole numbers, integers, and rational numbers. |
| 6.C.3b | Show evidence that computational results using whole numbers, fractions, decimals, percentages and proportions are correct and/or that estimates are reasonable. |
| 7.A.2b | Solve addition, subtraction, multiplication and division problems using currency. |
| 10.B.2a | Formulate questions of interest and select methods to systematically collect data. |

**Overview**
The classroom takes on the atmosphere of a store where students maintain a checkbook as part of the classroom management plan and learn about the concept of sales tax. Students rotate between consumer, cashier, and manager to experience the roles and responsibilities of each. Change back, estimating, budgeting, mental computation, multiple quantities (multiplication), and comparing different sales tax amounts are also explored. I did not introduce the cash register until late in the year and, consequently, I did not use it to its fullest potential. There are so many applications that we just did not have enough time to incorporate them all. Beginning next August, I will implement the entire plan.

**Objectives**
The student will estimate the cost of items using mental computation.
The student will verify the cost of items using technology or pencil and paper.
The student will apply basic math operations to real life situations.
The student will price items based on fair market value derived from personal experience, advertisements, or electronic research.
The student will make change using the fewest coins.
The student will construct multiple options for spending.
The student will compare a number of local tax rates.
The student will hypothesize why receipts are made in duplicate.
The student will hypothesize why receipts are numbered consecutively.
The students will work collaboratively.
The student will critique the roles and responsibilities of various positions.
The student will have opportunities to shop for real merchandise with checking account funds.

**Materials**
Sharp CE-A203 cash register
plastic utility cart

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**GRADE LEVEL**

**ARTS**

**LANGUAGE**

**MATH**

**Misc**

**SCIENCE**

**HISTORY**

**SOCIAL STUDIES**

**ONGOING**

*TOTAL BUDGET* $349

*** This Winning Project Idea Submitted By: ***

Mary Murphy
Noonan Elementary Academy
Mokena, IL
Peer Cashier

Money: currency and coin manipulatives
items to ‘purchase’ were previously purchased and will be replenished in August at sale prices.

Readiness Activity
Students need to be instructed which keys serve the necessary functions on the cash register and they need to be educated about sales tax, both in theory and application.

Strategies/Activities
The classroom takes on the look of a working environment where students rotate through a number of roles such as customer, cashier, and manager in order to learn necessary math skills. Students will have the opportunity to set up a mini store and price inventory, both empty boxes/cartons (manipulatives) and real merchandise. Each student will serve as a customer, cashier, and manager on a rotating basis. Students will use local ads to determine market value (prices) or value added strategies to establish prices otherwise unknown.

Real merchandise that the students can use in the classroom will be available for purchase with funds from the student’s checkbook. Deposits will be made to each account for good behavior and withdrawals will be made for real purchases, unacceptable behavior, and missing assignments (a great behavior management tool). Interest will accrue at the prevailing rates which we will seek together online, and is paid the last Friday of the month.

The students come from at least 3 different counties, so a discussion of varying tax rates will occur. Students are asked to compare the effect of each tax rate on their ‘props/manipulatives’ purchases. The cash register serves as an electronic manipulative as it can handle 3 different tax rates.

The cash register serves many purposes, all of which cannot be listed. Students practice making change from $1 and $10, making change using the fewest number of coins, estimating purchases with a given budget, problem solving when a disagreement exists, collaborating, and multiplicative connections to quantity purchases.

The following activities will also take place. Before beginning each project, students will be asked to predict or estimate the total cost of each:

- Thanksgiving: Students will create a guest list, plan the meal, generate a shopping list, and determine the cost of serving their typical Thanksgiving meal.
- Superbowl Party: Students will plan the food and decorations, create a shopping list, and determine the cost of hosting their typical celebration. If students don’t typically have a Superbowl party, they may opt to plan a birthday party. I emphasize typical because I want them to get a clear understanding of the real costs around them for seemingly simple functions.
- Memorial Day Barbecue: Students will plan the food, create a shopping list, and determine the cost of hosting a barbecue. By this time of the year, students will be able to figure out the average cost per person. The class will compare their costs per person by graphing the results.

Culminating Activity
Depending on the balances remaining in students’ checkbooks at the end of the year, they may be eligible for a dining experience where teacher will provide salad, pizza, and juice and determine a price for each. Students will be responsible for calculating their tab, including tip, before being served (to assure available funds). Students with low balances will serve their classmates in order to earn the tips/additional funds necessary for their own meals.

Evaluation Method
Students are evaluated by performance assessments and pencil and paper formats which initially include reference to a receipt. The accurate maintenance of a checkbook is a periodic ongoing assessment. Students are asked to write about their experiences as well. A rubric explains the scoring of the writing assignment. A portfolio is used to measure the progress of the party planning (Thanksgiving, Superbowl Party, Memorial Day Barbecue). Rubrics and reflections are included with each planning project and each increases in complexity.

Future evaluation may include downloadable information from the cash register to my computer; each student is assigned a clerk Peer Cashier
Peer Cashier

....continued....

number and can be assessed using electronic reporting tools.
The project helps students make connections among different content areas and their own heritage.

Curriculum/State Standards
Math: Use appropriate vocabulary to compare, describe, and classify two- and three-dimensional figures; also, fractions, estimation, measurement, geometry, patterns, congruence, symmetry, perimeter and area.

Overview
Students use weaving, individually and collectively, to demonstrate mastery of math skills. They also will explore the vocabulary and multicultural significance of weaving. Note: One of the most exciting parts of the project for me was the times when my students opted to weave during recess or free time, sitting together chatting and singing, they could have been in another land thousands of years ago. I will never forget it.

Objectives
The student will design weaving patterns demonstrating math concepts.
The student will create an individual woven piece and will contribute to a class piece.
The student will write descriptions of the finished pieces, demonstrating math skill and vocabulary mastery.

Materials
standing floor loom, twine, yarn, ribbon, indigenous materials such as feathers and grasses, recycled materials such as snack bags and juice pouches.

Readiness Activity
Show examples and photographs of weaving from different cultures. Brainstorm a list of math concepts in the weaving. Use books such as Annie and the Old One and Abuela’s Weave for building background, connections, and vocabulary.

Strategies/Activities
1. The teacher shows examples of weaving from a variety of time periods and cultures.
2. Students brainstorm a list of math skills, concepts, and features found in the weaving or that could be incorporated into weaving. Some ideas are listed above.
3. Students draw on graph or grid paper designs that demonstrate understanding of math concepts and label each with a sentence about the skill.
4. Students use small cardboard looms to learn weaving techniques as they replicate their designs.
5. Students collaborate to create on the floor loom tapestries that show mastery of the skills on the brainstormed list.
6. Students write “museum style” descriptions of the finished pieces.

Culminating Activity
Gallery of finished pieces

Evaluation Method
Standardized and teacher-created tests, portfolio, journal entries, finished products, and descriptions

THIS WINNING PROJECT IDEA SUBMITTED BY:
Amy Butler Barsanti
Pines Elementary
Plymouth, NC

GRADE LEVEL
2-5
MONTHS
$345
TOTAL BUDGET
# Triangles and Quadrilaterals Are More Than Elementary Shapes

Do students know that triangles and quadrilateral shapes can help us prove terms of higher-level formulas?

## Curriculum/State Standards

| Geometry and Spatial Sense – G4, G5 | Patterns, Functions, and Algebra – P6, P7, P13, P15 |

## Overview

Students will begin by using the geo-boards to perform transformations on triangles and quadrilaterals. This will lead to the white graphing board where students will plot points to find a missing coordinate and name the quadrilateral formed. By using the properties of these quadrilaterals, students will then discover and study such topics as slope, midpoint, and distance formulas.

## Objectives

The students will use the geo-boards to form initial shapes and then be able to construct the results of transformations including reflections, rotations, translations, and dilations. The students will determine what properties of transformed shapes have changed/remained the same. The students will locate the missing coordinate of a quadrilateral given three vertices and the type of quadrilateral. The students will derive the distance formula between two points using the Pythagorean Theorem.

## Materials

geo-boards, rubber bands, overhead, document camera, large white board graph, dry erase markers, magnetic strips

## Readiness Activity

Rules for using rubber bands
Set-up of a coordinate plane such as the x and y-axis and placement of the integers
Plotting points on a coordinate plane
Clockwise and counter-clockwise

## Strategies/Activities

Using the individual geo-boards with an overhead geo-board for a class visual, students will use rubber bands to replicate the shape on their geo-board.

Students will be directed to perform a transformation on the given shape. All four transformations will be given multiple times.

Using the large coordinate plane white board, students will graph a variety of triangles and quadrilaterals. A directive for a transformation will be given and students will need to construct the new shape (a prime shape). Directions could be, but are not limited to, reflect over the y-axis, rotate ¼ turn CW, translate 2 units up and 3 units left, or dilate the shape by ½. Students will be required to draw the prime shape in the correct location, give the new ordered pairs, determine if any of the initial properties of the shape have changed, and as a group determine if there is a rule that could be stated for each such stated transformation.

Using the large coordinate plane, students will construct a specified quadrilateral given 3 of its vertices. Students will use magnetic tape to construct the sides and then figure the coordinates of the fourth point to make the given quadrilateral. Using the large coordinate plane and

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**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Tonda North
Indian Valley Middle School
Enon, OH
magnetic tape, a variety of right triangles will be graphed. By using the legs and hypotenuse, students will derive the distance formula that is used to find the distance between two points.

**Culminating Activity**
Transforming given shapes on the large white board coordinate plane
Determining if any properties have changed from the pre-image and image
Discussion of how the Pythagorean Theorem is a useful tool to prove the distance formula

**Evaluation Method**
Geo-board activity was evaluated by teacher observation and by having students place their geo-board under the document camera. Transformations were evaluated one-on-one with teacher. I gave several directives and students were to complete the transformation; then I asked questions about property changes. A whole-class discussion with direct questions was used to determine if students were able to verbalize any thoughts about why the Pythagorean Theorem is a viable way to derive the distance formula.
Students had fun working with ratio and using scale to compare nutcracker soldiers to themselves.

<table>
<thead>
<tr>
<th><strong>Curriculum/State Standards</strong></th>
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<tbody>
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<td>5.6.I Summarize mathematical information, draw conclusions, and explain reasoning.</td>
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<tr>
<td>5.6.J Make and test conjectures based on data (or information) collected from explorations and experiments. Art- Component 1.2: Develops arts skills and techniques.</td>
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**Overview**
Give students the opportunity to experience real life ratio as it pertains to them. We study ratio and then make a nutcracker soldier with human proportions.

**Objectives**
The student will identify and express ratios in several forms and in simplest terms.
The student will use different ratios to show the same scale/proportion of an object.
The student will compare and contrast how different mathematical procedures could be used to complete a particular task.
The student will transfer mathematical vocabulary, concepts, and procedures to other disciplinary contexts and the real world.
The student will recognize and explain the meaning of the project presented using mathematics.

**Materials**
bricks, paint, buttons, pipe cleaner, hot glue, gems, felt, eyes, electrical tape

**Readiness Activity**
I have a photo copy of Michael Jordan’s hand. Students compare their hand to his, find the ratio, then see if the ratio holds if we compare height, shoe size, etc.

**Strategies/Activities**
Introduce ratio as a fraction.
Identify the numerator and the denominator (the numerator is me, the denominator is Michael Jordan).
Use ratio to compare self to Michael Jordan.
Work on ratio assignment in math book.
Introduce the nutcracker project.
  2 days of painting
  1 day of correcting ratio issues
  1 day of decorating soldier
  1 day recording results,
comparing weight and height, length of appendages, facial features, etc.

**Culminating Activity**
making nutcracker soldiers

**Evaluation Method**
Score ratio worksheet. Are proportions reasonable? Then give students a different kind of model (I used a matchbox car) and had students work out ratio using tires, bumper, and height of model car and compare to actual vehicle.

---

**Materials**
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**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Jackie Graue
Grass Valley Elementary
Camas, WA

**GRADE LEVEL**
4-5

**PERIODS**
4

**TOTAL BUDGET**
$429
This is a project in which math and science are taught in a fun, different way to get students’ attention and interest.

**Curriculum/State Standards**
Math: Producing patterns using tessellations, apply geometric properties, compare and contrast the basic characteristics of circle and polygons. Science: Describe characteristics of objects based on physical qualities such as size, shape, color, mass, and texture. Observe, describe, and measure physical properties using simple tools. Organisms in a community, interacting populations in a common location, depend on each other for food, shelter, and reproduction.

**Overview**
mainstream math and science lessons using unique objects as manipulatives to increase students’ interest.

**Objectives**
The student will form mathematical tessellations using a variety of different geometric shapes. The student will note the repetitions and geometric patterns formed by the tessellations. The student will observe, measure, classify, experiment, interpret, communicate, and make new inquiries about science materials. The student will read non-fiction books written about Strange, But True Stories and discuss the observations. The students will verbally explain why some occurrences are more fascinating than others. The students will make experiments, interpretations, communications, and inquiries about a variety of experiments including liquid/solid materials.

**Materials**
Fact-astic Journey Book set; Strange, But True Stories; tessellations; stencils; quicksand; and game.

**Readiness Activity**
Students learn the inquiry steps of science: observe, measure, classify, experiment, interpret, communicate, and inquire. Then they are given a variety of different objects and items to apply to steps of science to. They will also use a variety of mathematical functions to communicate their findings. Functions such as: graphs, fractions, percentages, decimals and pictures. They also learn how to compare and contrast items in written and verbal forms to present to their classmates.

**Strategies/Activities**
Once the students learn the inquiry steps of science, they learn how to think. Let them practice these skills on a variety of items and practice communicating through mathematics what they have learned. They will have a great time and will learn a lot. Students will begin to love math and science.

**Culminating Activity**
Students present findings to each other.

**Evaluation Method**
Students were evaluated by the tessellation drawings that were made. Their comparison/contrast lists of the stories they read. Students’ graphs and verbal reports are also evaluated by teacher.

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**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Terri Cloyde
Madill Elementary School
Madill, OK
Money: Everyday Situations

**Curriculum/State Standards**
The project meets the Ohio state standards of being able to count money and make change for math. It also meets the language arts standard for being able to write a letter of request.

**Overview**
Students earn “play” money throughout the year for bringing back homework and having good behavior. Students keep their money in a wallet and deposit their money in a classroom bank every other week. Students withdraw their money at the end of each quarter and use their money at a supply store, a restaurant, a book store, and an auction where we auction off items students have requested from famous people or sports teams. Students are always acting as the customer or the cashier/server.

**Objectives**
The student will be able to count money and make change using coins and paper bills to $10. The student will be able to write letters of request including date, proper salutation, body, closing, and signature.

**Materials**
- Bank books
- Food for the restaurant
- Fake money
- Books for the book store
- Envelopes for wallets
- Items to auction off at the auction
- School supplies for the supply store
- Envelopes and stamps

**Readiness Activity**
Students are shown what they can earn money for. They earn $.05 every time they bring their homework back.

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<thead>
<tr>
<th>STRATEGIES/ACTIVITIES</th>
<th>DESCRIPTION</th>
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<tr>
<td>Students will earn “play” money throughout each quarter during the school year. Students earn money through good behavior, homework return, and by being good citizens. Students keep their money in a wallet and put their money in the bank once every two weeks. They keep track of their money in bank books, which were donated through 5/3 Bank. At the end of each quarter, students can use the money they earned in various activities. Quarter One- Students will shop at a supply store where they can buy pencils, erasers, notebooks, crayons, scissors, etc. Students take turns acting as the customers and the cashiers. Students must determine how much the objects cost and how much change the customer should receive after their transactions. Quarter Two- Students eat at the class restaurant. Students design menus with the food that will be served and the cost of each item. Students are broken up into two groups. One group acts as the customers and has to figure out what they can buy at the restaurant depending</td>
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**Curriculum/State Standards**
The project meets the Ohio state standards of being able to count money and make change for math. It also meets the language arts standard for being able to write a letter of request.

**Overview**
Students earn “play” money throughout the year for bringing back homework and having good behavior. Students keep their money in a wallet and deposit their money in a classroom bank every other week. Students withdraw their money at the end of each quarter and use their money at a supply store, a restaurant, a book store, and an auction where we auction off items students have requested from famous people or sports teams. Students are always acting as the customer or the cashier/server.

**Objectives**
The student will be able to count money and make change using coins and paper bills to $10. The student will be able to write letters of request including date, proper salutation, body, closing, and signature.

**Materials**
- Bank books
- Food for the restaurant
- Fake money
- Books for the book store
- Envelopes for wallets
- Items to auction off at the auction
- School supplies for the supply store
- Envelopes and stamps

**Readiness Activity**
Students are shown what they can earn money for. They earn $.05 every time they bring their homework back.

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on how much money they have earned that quarter. The second group acts as the servers. The servers must take the orders, add up the total of the meal, take money, and make change.

Quarter Three- Students will shop at a book store. The students buy books which are purchased through Scholastic. Students again are broken into two groups where one group is the customers and one group is the cashiers and then the roles are reversed.

Quarter Four- Students will participate in a class auction. Students will write letters of request to celebrities, sports teams, and authors to request items to be used in the auction. The students will serve as bidders. They will have to keep track of their items and the money they have to make sure they do not outbid the money they have available.

Culminating Activity
Students write an entry about what they learned this year by participating in the Money: Everyday Situations Project. They write what they learned, their favorite activity, and how this will help them in real life.

Evaluation Method
Students will be evaluated through our checklist assessments. Our school district evaluates students each quarter in reading, writing, and math through having to meet certain skills which are aligned to the state standards for Ohio. Our goal is that students will increase their passage rates on these standards (79%-Counting Money and Making Change; 89% Letter of Request) by 10 percentage points on the final assessment.
Math Smart Tubs

All children involved are able to feel success with this hands-on math application, while using their strongest “intelligence.”

Curriculum/State Standards
The students will engage daily in activities that focus on specific standards such as counting, sorting, pattern extensions, problem solving, and measurement.

Overview
Math Smart Tubs are weekly, hands-on, multiple-intelligence, math activities. They allow students to have daily active math experiences in ways that invite their personal strengths to shine through.

Objectives
The student will apply kindergarten math benchmarks using active, hands-on methods. The student will discover the importance of math in all facets of life. The student will encounter enjoyment in math as they use multiple intelligence techniques to tap into their math strengths.

Materials
5 tubs to store weekly activities, labels for tubs, rotation chart, manipulatives for activities

Readiness Activity
Before starting Math Smart Tubs, discuss as a class the different ways students are “smart.” We talked about famous people and people in our school that excel in certain areas. We then examined the eight different intelligences through a picture book I created.

Strategies/Activities
Math Smart Tubs are on a daily rotation where students will work in small groups and experience one smart tub a day. By looking at a rotation chart, students find the Smart Tub they are responsible for that day. Each week, I change the tubs in order to engage students in as many different multiple intelligence activities as possible. Examples of Math Smart Tubs could be sorting nature items for Environmental Smart, using musical instruments to make patterns for Music Smart, tossing beanbags on a numbered shower curtain for Kinesthetic Smart, reading math poems for Linguistic Smart, or taking class surveys with tally marks and graphs for Interpersonal Smart.

Culminating Activity
At the end of the year, we revisit our discussion on ways we are smart. We talk about our strengths and areas we were surprised to find enjoyment and success in. We then create a class book where each student writes and draws about how they are smart. Next year, this book will be shared with incoming kindergartners to help them understand Math Smart Tubs as they are introduced.

Evaluation Method
Students were observed while completing Math Smart Tubs with weekly anecdotal records. A checklist was kept regarding students’ mastery of certain math benchmarks. Students also completed several self-evaluations that helped expose their feelings regarding strengths, enjoyment, and understanding of math.

This winning project idea submitted by:
Katie Zuehlke
Bendix Elementary
Annandale, MN

K
GRADE LEVEL
ARTS
LANGUAGE
MATH
MISC
SCIENCE
HISTORY
SOCIAL STUDIES
1
YEAR
$425
TOTAL BUDGET
Math! - Now we are BAKING!

The project allows students practice in real world math applications.

Curriculum/State Standards
The Math! - Now we are BAKING! project will reinforce the math standards for the state of West Virginia and address the “No Child Left Behind” initiative where it makes applicable and improves math principals. Additionally, this project will address home economics topics that are not currently part of the everyday school curriculum. This project will allow the instructors to reinforce math topics, respective to the grade level, for the students needing remediation in or simply needing reinforced to prepare for the Stanford-10 Test. The reinforcement will be done through baking recipes where the students solve mathematical equations and word problems to arrive at the required ingredients for the recipes.

Moreover, the project and the activities included in the project address the NCLB initiative by working to ensure that all students have the necessary math knowledge base in their given grade level, improving literacy skills, and seeing the practical application of reading, math, and science. The project will give students the opportunity to apply learned theoretical skills and reap the rewards of “correct answers” through a delicious prize.

Overview
The project “Math! - Now we are BAKING!” gives middle school students the opportunity to bake a selected dessert at four different times. The catch is, the students must first solve math problems in order to find the amounts of the ingredients for the recipes. After the students have compiled the recipes and baked the desserts, they get to enjoy their creations.

Objectives
The students will solve mathematical equations and word problems in order to solve the problem of the missing amounts on their recipe.

The students will learn to read and follow recipes (literacy and application).

The students will make and bake, using math concepts, 4 different recipes over the course of the school year.

The students will understand, through demonstration, the importance of kitchen safety and baking hygiene.

The students will participate in the cleaning up process after baking.

The students will enjoy their baked goods after baking.

Materials
recipe for banana nut bread
recipe for chocolate chippers
recipe for a cheesecake
recipe for a pumpkin pie
2 bowls for each baking group
measuring spoons for each baking group
measuring cups for each baking group
2 spatulas for each baking group
hand mixer for each baking group
wooden spoon for each baking group
paper towels
oven
cleaning supplies to clean kitchen and to clean dishes

Readiness Activity
The Math! - Now we are BAKING! project will be performed as 4 mini projects. Each of the readiness activities will be performed for each mini project. The

THIS WINNING PROJECT IDEA SUBMITTED BY:
Melissa Logsdon
Wheeling Catholic Elementary School
Wheeling, WV
Math! - Now we are BAKING!

...continued....

readiness activities for the project will be as follows:
On the day before baking:
1. Introduce a recipe to the students. (Project one: pumpkin pie; Project two: peanut butter chippers; Project three: cheesecake; Project four: banana bread).
2. Discuss what is missing from the recipe (the amounts of each ingredient).
3. Solve an example problem with the students. (For example: To find out how many eggs are in the pumpkin pie, solve: 5% of 40 is what. (Answer: 2).
4. Allow the students to work in teams to solve the remainder of the problems and complete the recipes.
5. Check the student’s recipe for accuracy. Review concepts that are not mastered.
6. Review the recipe and baking steps with the students to prepare them for baking day. As well, review kitchen safety procedures and baking hygiene procedures.

Strategies/Activities
The Math! - Now we are BAKING! project will be performed as 4 mini projects. Each of the activities will be performed for each mini project. The activities for the project will be as follows:
On the day of baking: (These steps assume that the instructors have all of the ingredients in stations and all equipment on hand for use. This also assumes that the students are paired in baking groups).
1. Once again, review the recipe and baking steps with the students to prepare them for baking day. As well, review kitchen safety procedures and baking hygiene procedures.
2. Model the steps in the baking process for the students and then have them perform the steps in their groups. (Students will be assisted by multiple faculty members). During the modeling of the steps, review basic math concepts with the students; to include, measurements, fractions, addition/subtraction, multiplication/division.
3. Work with the students to clean up the kitchen when the baked good is baking.

Culminating Activity
The Math! - Now we are BAKING! project will be performed as 4 mini projects. The culminating activity will be performed for each mini project. The culminating activity for the project will be as follows:
On the day of baking:
1. Enjoy the baked good! For each project, there will be enough for each student to eat and then take home 1 pumpkin pie, 1 dozen cookies, 1 cheesecake, and 1 loaf of banana bread.

Evaluation Method
The Math! - Now we are BAKING! project was evaluated both qualitatively and quantitatively:
The quantitative evaluation reflected the objectives of the project:
1. Were the students able to correctly solve the mathematical equations and word problems presented?
2. Did the students successfully follow the recipes?
3. Were the students able to verbalize with 100% accuracy the process of reading and following a recipe?
The qualitative evaluation included a simple survey. The students were asked if they have ever read a recipe and/or cooked at home. After they have completed the activity they used a Rickert scale to rate how much they enjoyed the activity and complete a follow-up: what I liked best, what I learned, how can I use what I learned, and would I like to do this activity again?
This project provides a fun, active way to follow up on classroom math assignments.

Curriculum/State Standards
The skills practiced with this project meet the fourth grade math curriculum requirements. It covers the state standards of number sense, measurement and geometry, algebraic thinking, and data analysis.

Overview
Using an answer case with numbered tiles, the students complete math problems. When the problems are complete, they flip the case over and check to see if the tiles make a pattern. Students use the designated materials as a follow up to class assignments and there is also a home component, which students will complete with parental supervision. The materials are checked out from our lending library.

Objectives
The student will describe and analyze a wide variety of patterns and relationships while becoming a more independent learner.

The student will learn to use expressions, equations, and graphs to represent and interpret situations in the real world.

The student will identify patterns and make predictions using probability and statistics.

Materials
Versatiles Math Lab level 4, Versatiles Starter sets levels 3 and 5, home lending library check out sheets, student management forms

Readiness Activity
Students are introduced to specific math skills and given time to practice with the whole class, partners, and on their own. They are then given tests to determine their level of proficiency and which skills need reinforcement.

Strategies/Activities
The teacher assigns the particular skills in which the student is weak. Then the appropriate workbook is chosen. The student needs that book and an answer case. In many activities they will need pencil and paper to work out solutions. Each answer case has twelve numbered tiles. The student will place the correct tiles in the case according to each math problem. When finished, student closes tile cover, flips case over, and opens it. If all answers are correct, there will be a pattern completed on the backs of the tile. This is a self-correcting activity. This enables students to redo incorrect problems.

Culminating Activity
Students who need more practice will check out workbooks and answer cases from the class lending library. They will keep track of the assignments completed at home. There is a form for parents to acknowledge their child’s progress and a form for the student to complete regarding which assignments were done.

Evaluation Method
There are post-tests for the student evaluation, along with conference time with the teacher. Students will not only write answers to problems, but explain them orally when in conference. The teacher can then determine if the process skills have been mastered.

THIS WINNING PROJECT IDEA SUBMITTED BY:
Barbara Lee
Claude Pepper Elementary
Miami, FL
Hurrah! Hurrah! It’s Estimation Day!

Estimation is a mathematical process that can easily be mastered by young children.

**Curriculum/State Standards**
- Exploring estimation strategies
- Recognizing when an estimate is appropriate
- Applying estimation in working with quantities, measurement, and problem solving

**Overview**
The students will visit different centers that will be facilitated by their 4th grade buddies. (We engage in a variety of activities with these buddies once a week throughout the school year.) An estimation activity will be set up at each center. The children will have an opportunity to visit each station and engage in a variety of estimation activities. They will have a booklet in which to record their estimations. It involves an “educated guess.” Students learn to make judgments and use math more powerfully in a learning activity that encourages them to explore, investigate, predict, solve, and discuss as they make use of manipulative materials to gain mathematical understanding.

It was well received at my school by faculty, parents, and children. The 4th grade buddies did a fine job guiding the kindergartners through the estimation stations. It was so exciting to observe the children’s enthusiasm as they thought, counted, and recorded. I will certainly initiate this activity next year.

**Objectives**
The student will have opportunities to articulate strategies with an emphasis on mathematical thinking and reasoning skills.

The students will actively engage in mathematical exploration strategies for estimating quantities, volume, and measurement. The student will record the estimate. The student will determine whether his/her estimates are too high or too low.

**Materials**
rice, scoops, and plastic containers
M&M’s
plastic bears,
plastic fish
Cuisenaire rods
spinning tops
estimation booklets

**Readiness Activity**
Throughout the year, students have “guessedimated” various items in containers that relate to the “Letter of the Week”, e.g. keys (k), gumballs (g), and pennies (p). They are familiar with the term and were excited to know that they would engage in estimation activities with their buddies acting as facilitators.

**Strategies/Activities**
- “What’s the Scoop?” – How many scoops of rice will fill two different size plastic containers
- “Plain or Peanut” – How many plain M&M’s will fill a container, followed by the number of peanut M&M’s
- “Bears in Squares” – How many plastic bears will fit into two different size squares
- “Let’s Go Fishing” – How many plastic goldfish can fit inside a goldfish bowl
- “Can You Top This?” – How many rotations a top will spin

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THIS WINNING PROJECT IDEA SUBMITTED BY:
Lorraine DelPercio
Immaculate Heart of Mary School
Wayne, NJ

![KINDERGARTEN](logo.png)

**GRADE LEVEL**
K

**ARTS**

**LANGUAGE**

**MATH**

**MISCELLANEOUS**

**SCIENCE**

**HISTORY**

**SOCIAL STUDIES**

1

**PERIOD**

$105

**TOTAL BUDGET**
Hurrah! Hurrah! It’s Estimation Day!

....continued....

- “Tall Tail” – Use Cuisenaire rods to determine how tall Little Critter, a popular Mercer Meyer book character is.
- Students will be given pencils and booklets in which to record their information.

Culminating Activity
Students will share their recording booklets with each other, the teacher will elicit feedback about the activity, and the class will write a group narrative.

Evaluation Method
- Student observation, recording booklets.
- Students will determine the accuracy of their estimations by comparing the actual number with the predicted amount.
What better way to learn graphs than to “get real” with them?

**Curriculum/State Standards**
1) Students will design a simple experiment and collect data. They will then examine the mean, median, and range of the whole 7th grade, male 7th graders and female 7th graders. Students will also examine their homeroom class and compare that to the whole grade.
2) Students will analyze and describe the impact of deleting a data point and its effect to the mean and median. Students will use a spreadsheet to show the change.
3) Students will display the data in the form of a histogram. One type will be a picture graph, the second will be using the Tinkerplots program and the final graph will be using the students themselves.

**Overview**
Students will have to decide how to measure their class’ height. Students will take pictures of each class member when they collect their data. They will then use technology to graph this data using two different programs. After students examine the measures of central tendency, they will construct a pictorial histogram that will be displayed. The final graph that students will make will be where they physically construct the data (we will use the gym or go outside). The teacher will take a picture of the students as they stand and form a human histogram. At the end of the year we will reconstruct the experiment and activities to document the physical change that 7th grade students go through.

**Objectives**
The student will design a histogram and develop strategies to collect data using technology based hands-on learning activities.
The student will analyze and describe the impact of deleting a data point and its effect to the mean and median and use a spreadsheet to show the change.
The student will effectively use technology to construct graphs and histograms.
The student will examine and compare pre and post data and make scientific conclusions regarding the changes that occur.

**Materials**
- Tinkerplots Software
- computers
- digital cameras
- meter sticks or tape measures
- photo paper
- posterboard
- tape and glue
- scissors

**Readiness Activity**
There are a couple of readiness activities that are needed for this project. Students must have a basic knowledge of the Tinkerplots software and how to manipulate the data. The Tinkerplots activity normally takes one class period. Students learn to enter their data and how to create different statistical graphs using that data. They must also have an understanding of graphs and the difference between a histogram and bar graph. This can be done with any graph unit that your curriculum implements.

**TOTAL BUDGET**
$560

**GRADES**
7-8

**DAYS**
3-4

**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Bryan Anderson
Cass Lake-Bena ISD #115
Cass Lake, MN
Strategies/Activities
Student design of their experiment begins with examination of the variety of methods to measure human height. After this initial exploration, students will select the measurement method they will employ. Data collection is next, with students collecting measurement data from each class member using the measurement method they have selected. Students will take pictures of each member of their class during this stage (the pictures will be used later). This data is collected by the individual classrooms so that comparisons between classrooms and grade levels can be made. When all classes have their data, a discussion will be raised about how to compare all classes’ measurement method.

After all classes collect their data, they will construct a histogram by graphing their picture to a grid. For this they will use pictures of themselves to make the different histogram intervals. This creates a visual display of the 7th grade and their teachers that is displayed in a main hallway. One fun adaptation to this graph is done by varying the height of the x axis to be the actual height of the students graphed above it. This allows a student to walk up to the graph and see where they measure up to other students.

Moving into the computer lab, students will create spreadsheets containing data for the whole grade. Students will then create circle graphs and histograms looking at the mean, median, and range for the whole grade and individual classrooms. A short paper about the similarities and differences between their class and the grade will be collected. Students will then return to the lab and examine the data in an interactive data program, Tinkerplots®. Tinkerplots® will allow students to create dynamic histograms and separate data into many different classifications, including gender, class, and date of birth. Project design continues as students determine which histograms to include in their experiment.

Continuing the innovative use of technology in hands-on learning, students will participate in a large group project as well. After printing out numbers representing the histogram intervals, students will graph their heights physically by standing at the correct interval. When the whole grade is graphed, a photo will be taken and posted by the histogram previously constructed. Phase 1 of the project concludes as scientists develop a hypothesis of what spring will reveal.

Phase 2 of Histogram I Am involves students in reconstructing their experiments and examining the comparison data/histograms in mid May. A final large group histogram photo and scientific paper detailing their findings will conclude their experiment.

Culminating Activity
After all this hard work, we get to have some fun! After printing out large numbers representing the histogram intervals, students will be able to graph their heights physically by standing at the correct interval. When the whole grade is graphed, a photo will be taken and posted by the histogram previously constructed. At the end of the school year, students will do this activity again to see the physical changes they undergo.

Evaluation Method
Histogram I Am is a Minnesota State Standards based project. In order to assess student performance on mastery of the standards, I will develop a rubric which measures student progress toward mastery. On a learning continuum, I will identify specific skills present at four different levels of proficiency, (significant gaps, partially proficient, proficient, and exceeds proficiency), for each of the standards addressed. As the project begins, I will share this rubric with students so that they are aware of what mastery looks like. Using the rubric as a discussion tool, I will meet with individual students during the project and discuss their progress towards mastery. At the end of the project I will meet individually with students and share my final analysis of their performance on the rubric.

I will use the student performance data from the rubric to assess success of the project, comparing the number of students who achieved mastery to those that did not, number of students showing significant growth to those that did not, and analyzing the effectiveness of the project in meeting the various standards which are embedded.
Underperforming students will take the lead in this project.

Overview
Students work in architecture teams to design their dream houses to scale as floor plan, calculate the cost to build with all basic materials, then create a rendering of the outside of the house on Google SketchUp on a netbook. Lastly, students build their houses to scale out of balsa wood and present their final projects to the class.

Objectives
The student will calculate area, perimeter, and volume of different shapes.
The student will demonstrate an understanding of similar figures by building a model.
The student will apply a common scale to all of his figures, checking that the scale is accurate for different dimensions using a proportion.
The student will learn the basics of Google SketchUp and building with balsa wood.
The student will work cooperatively in a group, where each member does his part to contribute to the common goal.

Materials
200 long sticks of balsawood
10 X-Acto knives
20 bottles of glue
32 large sheets of foam board
10 boxes of markers
cardboard, poster board, paint, construction paper

Readiness Activity
Before beginning this project, students learned about scale and proportion through a unit on similar figures. They looked back on their notes from this chapter, if needed, to remember how to create a floor plan, rendering, and model similar to the real houses they were designing.

Also the unit directly before this project was studying area, perimeter, surface area, and volume. Once they learned how to apply these skills to any shape given to them, they could create any form of house and know how to find the flooring or paint needs mathematically.

In addition to what we do in my math class, students who have very low math skills are in a support class. Before beginning our house project, they did a room project where their task was to draw a floor plan and find all of the same calculations of their classroom. This is a great readiness activity if you feel your students need a bit more scaffolding.

Strategies/Activities
1. Students form architecture teams of 3-4 students.
2. Students work together to design the rough draft floor plan of their houses on graph paper. Students include a key to their scale factor.
3. Teacher gives feedback on floor plans and students make any changes or improvements.
4. Students calculate the square footage of each room in their houses. They then research different types of flooring costs and choose the type of flooring they would like in each room, citing their sources. Students calculate the cost of flooring each room and the total cost of flooring as well as the total square footage of the houses.

THIS WINNING PROJECT IDEA SUBMITTED BY:

Amanda Lombard
Atascadero High School
Atascadero, CA

9-12
GRADE LEVEL
6
PERIODS
$495
TOTAL BUDGET
5. Students calculate the square footage of wall space in a few selected rooms. Students research paint colors and types, choosing a few for their selected rooms. Students calculate the cost of painting their selected rooms.

6. Once the teacher approves all of this, students get to use Netbooks and create a rendering of what their houses would look like. Using Google SketchUp, a program downloaded free from the Internet, students draw their three-dimensional models to scale, including walls, doors, windows, yard items, and anything else they have fun adding. They add color and texture and produce very professional looking house renderings. They may work on the inside, but only a few groups in my classes had time to do so.

**Culminating Activity**
Students build scale models of the homes they designed out of balsa wood, foam board, cardboard, paint, and other found materials. This house must reflect their floor plans, flooring choices, paint choices, and Google SketchUp models. It also must be mathematically to scale.

**Evaluation Method**
The teacher uses a rubric to grade each part of the process. Students are given the rubric for each part before they turn it in so that they are aware of how they are being graded. Students also graded each member in their group for participation points. At the end of the project, students presented their homes to the class and everyone rated their work and their presentations.
Students looked forward to math, and fractions became interesting.

**Curriculum/State Standards**

**TEKS**
4.2 Number, operation, and quantitative reasoning. The student describes and compares fractional parts of whole objects or sets of objects. The student is expected to:
(A) use concrete objects and pictorial models to generate equivalent fractions
(B) model fraction quantities greater than one using concrete objects and pictorial models
(C) compare and order fractions using concrete objects and pictorial models; and
(D) relate decimals and fractions that name tenths and hundredths using concrete objects and pictorial models.

**Overview**
The fractional hamburgers gave my students a strong visual to represent fractional parts. Each child was able to create a representation of a fraction. We then used these representations to analyze meanings and relationships of fractions. This project was of value because I saw my students’ understanding of the content grow but, mostly, because my students enjoyed the learning.

**Objectives**
The students will create a visual representation of fractions. The students will see the equivalence and inequivalence of different fractions. The students will compare and order fractions. The students will understand how the addends equal the sum when adding fractions.

**Materials**
- fractional hamburger set
- teacher overhead hamburger set

**Readiness Activity**
Day one: I will give students one cookie to share in groups of three or four. As students break the cookie we will discuss the importance of equal parts. I will ask students to explain the amount of the cookie they ate. We will discuss how it is less than one but greater than zero. I will then give each student a number line. With their partner, students will decide where the number representing the amount of cookie they ate belongs. As a class, we will discuss how fractions are parts of a whole.

**Strategies/Activities**
Day one: I will give students one cookie to share in groups of three or four. As students break the cookie we will discuss the importance of equal parts. I will ask students to explain the amount of the cookie they ate. We will discuss how it is less than one but greater than zero. I will then give each student a number line. With their partner, students will decide where the number representing the amount of cookie they ate belongs. As a class, we will discuss how fractions are parts of a whole.

Day two: I will show students one whole homework assignment. I will then divide it into two equal parts. I will write one half on the board, and we will discuss the different parts of the fraction and what they represent. I will then show the hamburger bun. This represents one whole. I will ask the students to find
what piece represents one half and so forth to one sixteenth. We will discuss shapes and the amounts they represent. I will then have students get into specific groups so I can differentiate. I will give groups a list of questions challenging each student at their levels about comparing and ordering fractions. For example, which piece is one half of the pickle, or, considering size, which piece is in between the cheese and lettuce?

Day three: I will ask the class to brainstorm other names for a shirt. We will talk about how synonyms are just different words for the same meaning. I will then have the students get out their hamburger pieces. We will do a sitting carousel in which I will give students one fraction. The first student in the group writes an equivalent fraction and then passes the paper to the next group member. Using the fractional hamburger pieces, students will decide if the fractions are equivalent, justify their answers, and then write a third equivalent fraction. The fractional hamburger pieces will allow the students to visually see equivalence.

Day four: We will look again at equivalent fractions. As a class we name a fraction and find the hamburger fractional piece. Then we will find the two hamburger fractional pieces that make an equivalent fraction. For example ¼ equals two 1/8 pieces. We will discuss what happens to the numerator and denominator. Basically we will dissect the process of finding equivalent fractions.

Day five: I will build a hamburger on the board with the teacher magnetic pieces. I will tell the students I love cheese and want to put more pieces of cheese on my burger. I will show the fractional pieces. I will ask how many pieces of cheese did I put on my bun and what fraction of the whole is the cheese. We will review what the numerator and denominator represent and then add the fractions together. As a class we will talk about why the denominators need to be the same. Students will then build a burger to specifications and “add” fractional parts to make the burger taste better. Then students will find the sum of the total fractional parts.

Day six: I will re-teach if my class is still grasping the concept. If students are ready I will use a formal assessment. Fractional parts will be available for those who need them, but I am hoping students can rely on the visual we created with the project.

Culminating Activity
Students will become workers in a hamburger restaurant. Their partners will write orders for hamburgers they would like to purchase. The orders will consist of a fraction descriptions of hamburgers. The workers will create the hamburgers to match the orders. I will then make some “adjustments” to test the students understanding of equivalent fractions.

Evaluation Method
I will assess all during all hamburger building activities. When we have finished a burger, I will ask groups to show and explain the make up of their burgers. This will allow me to assess if students fully understand fractions or are just putting pieces together. I will also assess during whole group discussion. When I present content, I will ask probing questions to see where I need to focus my attention and where I can reteach in the upcoming creations. I will also do a formal assessment at the end of all the activities.
Football Math

Both boys and girls get excited to use their math skills when talking about a truly American pastime—football!

**Curriculum/State Standards**
This project uses many different mathematical functions and relates them back to a real life experience.

**Overview**
Using the statistics of the NFL football teams students are able to work with statistics, change them to a fraction, change the fraction to a decimal rounding it to the hundredths place and change the decimal to a percent. After this process has been done on a conference the students go back to determine the mean, mode, median and range of each division.

**Objectives**
The student will be able to create a ratio of wins to games played.
The student will be able to change a ratio to a fraction and reduce the fraction if possible. (Introduce prime and composite numbers)
The student will be able to change the fraction to a decimal with a calculator by dividing the numerator by the denominator.
The student will be able to round a decimal to hundredths place.
The student will be able to change a decimal to a percent.
The student will recognize the words: mean, mode, median and range and know how to find them.

**Materials**
Monday’s and Tuesday’s newspapers board and markers
To make the setting for learning math through football more conducive I purchased banners of the NFL teams and rather than write the name of the team on the board I have purchased static cling helmets to put on the board and write the statistics behind the helmet. I have also purchased NFL team football pencils to use as a reward for paying attention and working through the activity.

**Readiness Activity**
The readiness activity usually includes a discussion of what happened to the home team (Buccaneers) in the football game. The first few times an explanation of each step is given. After a week or 2, some of the students are able to do the entire process.

**Strategies/Activities**
Making the ratio. On the board I write it as games won and the games lost. It takes some of the students awhile to remember to add the wins and loses for the number of games played. They try to make the ratio of games won over loses.
Changing the ration to a fraction: The numerator is always the first number and the denominator is the total games played. Many times this is difficult to remember, but under fraction write numerator-games won, denominator-games played.
Reducing the fraction; if possible fractions need to be reduced. Here introduce prime and composite numbers.
The students will also practice reducing fractions. This was taught in the 4th grade, but the students are not formally taught this until January in the 5th grade.
Changing a fraction to a decimal: The students are able to use a calculator

**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Nancy J. Komassa
Lincoln Elementary School
Plant City, FL

**GRADE LEVEL**
5
**MONTHS**
5
**TOTAL BUDGET**
$500

school supplies. changing lives.
and are instructed to divide the numerator by the denominator. Some of the more common (thirds, fourths, fifths, and tens) will be done without a calculator. They are also looking at the number patterns in some of the decimals; vocabulary words such as terminating and repeating are introduced. The bar for repeating decimals is taught. Rounding the decimal to hundredths place: The place value of decimals is repeated with each number and rules for rounding are constantly reviewed. Changing the decimal to a percent: The students are instructed to move the decimal point 2 places to the right to form a decimal. This process is done to all of the teams in a conference. My second class will do the other conference. Switch the conferences weekly so that everyone gets to look at their special team. This is also a good time to explain the BYE and Monday night football when you ask why they all haven’t played the same number of games.

Range: The range is the difference between the most games won and the least number of games won.

Mode: The mode is the number that appears the most often. This is done with the number of wins. Sometimes there may be a mode, a double mode or no mode at all.

Median: The median is the middle number. The divisions of the NFL are in groups of 5 so finding the median is always the middle number. You might want to find the median of 10 teams every now and then so that they are able to find the median for an even number of numbers. When I write the teams on the board, I already have them in order from most wins to the least. It is really important to remind them that the numbers for median must be in order.

Mean: Always remind them that mean is an average. I also say “Mean Mrs. Smith” Reminding them that this is how I get their grades. The mean is found by adding the wins of the division and dividing that total by 5.

**Culminating Activity**
The Super Bowl Game is the final activity. We had been predicting which teams will be going to the playoffs. Since the playoffs start during the winter break, each student will pick the two teams that they think will be going to the Super Bowl. When the Super Bowl is actually played the students will predict the score. I have a prize if anyone gets the actual numbers.

**Evaluation Method**
Throughout the year the different skills are taught and formally tested. We have topic tests on the different strands. The students will also get teacher made test with football teams and the win-lose record. They have to fill in all of the columns. One of the nice things about the program is that the kids will ask is that like what we did in football? They recognize the type of questions and then know how
Fast Facts Addition

Children embrace technology and these tools create enthusiasm among students for practicing their basic math facts.

**Curriculum/State Standards**

1. The student understands and applies the concepts and procedures of mathematics.

1.1. Understand and apply concepts and procedures from number sense—number and numeration; computation; estimation.

Washington State Grade Level Expectation

- Use strategies for addition and subtraction combinations through at least 18.
- Recall addition and subtraction facts through at least 18.
- Use mental math strategies to compute.

**Overview**

The students used Twist & Shout Electronic Toys and Electronic Flash Cards to practice their computational fluency and help them to memorize their math facts. We set aside 10 minutes per day to practice our math facts with these toys.

**Objectives**

The students will increase their computational fluency in addition facts. The students will recall addition and subtraction facts through 18. The students will use mental math strategies to compute.

**Materials**

- 7 Twist & Shout Addition Bundles (Leapfrog)
- 7 Leapfrog Electronic Flash Magic Flash Cards
- monthly CBM master for math fluency daily timed fluency pages (+1 through +10, -1 through -10)

**Readiness Activity**

Students will complete a two-minute timed test of assorted addition and subtraction math facts (CBM) as a base score. Their 2nd grade goal is to be able to compute 18 digits in two minutes by year-end. The CBM will be given monthly and students will graph their own monthly progress towards their digits per minute goal. Class will complete this graph together and students will be responsible for charting their own progress.

**Strategies/Activities**

- Students begin school year by completing a two-minute timed test of assorted addition and subtraction math facts (CBM) as a base score.
- Students graph their digits per minute on a personal chart.
- Three times a week students rotate through three different stations dealing with math fluency. The stations are: Twist & Shout, Electronic Flash Cards, traditional flash cards and math facts practice pages.
- Station time is about 10 minutes.
- At the end of stations, the whole class takes a timed test (two minutes). Each student starts the year working on +1’s. As they pass each fact, they move up to the next fact, +2’s, +3’s, etc.
- Each month, students are given a two-minute CBM math fluency test to complete and graph.

**Culminating Activity**

Students complete a final CBM in June and complete their graph showing growth. They are presented with a certificate of success and write a letter

**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Anne Bowling
Felida Elementary
Vancouver WA
....continued....

home to their parents explaining their progress.

**Evaluation Method**

- Daily math facts timed-test
- Monthly CBM test in math fluency
- Monthly charts
Constructing, Scaling, and Modeling a New Building Addition

Team communication, organization, problem solving and perseverance are emphasized and developed throughout the course of this project.

**Curriculum/State Standards**
This project enables all students the ability to compute and make reasonable estimates of two and three dimensional geometric shapes as well use of visualization, spatial reasoning, and geometric modeling to solve problems.

**Overview**
Students researched safety and handicap requirements for public buildings, developed a scaled 2-D drawing for the building addition they designed, and then built a 3-D model with Zome Geometry materials and “Young Architects” kits. Total building cost estimates were developed for the building. A letter to the Board of Education was also written to persuade the Board to adopt their plan.

**Objectives**
The student will accurately calculate area, volume, and perimeter of various geometric forms.
The student will accurately measure and scale a building using proportions.
The student will accurately estimate cost of materials and labor for a project.
The student will accurately and adequately communicate information among team members in both written and verbal formats.
The student will develop a realistic model from a diagram.
The student will research a project, secure the needed information, and incorporate it into a model of the project.

**Materials**
rulers, tape measures, poster boards, building supplies for models (I used Zome Geometry and Young Architects kits), plywood, various materials for landscaping, computer, calculator, pencil

**Readiness Activity**
The students studied various shapes prior to beginning the project. The project actually began with a class presentation from the superintendent and principal of their ideas of what they envisioned the new addition would house. The students then spent a couple of days with their group members debating and compromising on their visions.

**Strategies/Activities**
1. Brainstorming within group to generate general idea of their building and its contents.
2. Computer research to locate fire safety codes and handicap requirements for public school buildings.
3. Draw on paper a rough sketch of their building.
4. Scaling the rough sketch in preparation for drawing the foundation on the building board (plywood).
5. Building the 3-D model
6. Calculating the cost for materials and labor for construction-footers, concrete, blocks, bricks, flooring, etc.
7. Write letter to the Board of Education persuading them to adopt their design.

**Culminating Activity**
The final activity was an in-class speech about their project and why it should be chosen as the best design and most accurate out of all the others in their class.

THIS WINNING PROJECT IDEA SUBMITTED BY:

Vicki Parker
Fairview High School
Ashland, KY

GRADE LEVEL 10-12
ARTS
LANGUAGE
MATH
MISC
SCIENCE
HISTORY
SOCIAL STUDIES
4 WEEKS
$500 TOTAL BUDGET

kids in need FOUNDATION
Evaluation Method
The students received daily participation grades as well as grades on calculations of area, cost, and volume. They were also graded for accurate scaling of their model, letter to the board, speech, quizzes throughout the project on each aspect of geometry covered—scaling, area, perimeter, volume, cost calculations, and a final test over the total project with the major areas included.
Cement Patio Blocks

Students learn geometry and create a lasting project that inspires pride.

**Curriculum/State Standards**
This project incorporates problem solving, application of geometric principles, two and three dimension concepts, ratios, and proportions.

**Overview**
Students must sketch and plan a three-dimensional form that cement will be poured into to form patio blocks. They must then build this form using boards they cut themselves. The finished product is a patio block that is on display in our school courtyard.

**Objectives**
The student will sketch a three-dimensional geometric shape with design features. The student will build the geometric shape using two inch wide boards cutting angles correctly. The student will mix cement to fill the space (additional learning is computing volume). The student will work with another member of the class collaboratively. The student will complete the design and display the finished product in the school courtyard.

**Materials**
trowels, floats, boards, foam board, plywood base, mixing bowls or pails, cement, water, screws, screwdrivers, saws, PAM degreaser spray, and materials to decorate the blocks.

**Readiness Activity**
Students must understand geometric forms and be aware of form and function. They also need to be able to use measuring devices and cutting tools. They should also be introduced to two and three dimensional drawing. I also teach teamwork and planning skills before this activity. Construction skills can be taught during the activity.

**Strategies/Activities**
1. Introduce activity to class. Explain expectations. Discuss 2-D and 3-D drawing and construction.
2. Break into teams of two. Yes you can have one group of three. They make two projects.
3. Have each person in the class sketch on graph paper four possible designs.
4. Group decides on one design to build. Have each group decide the angles that need to be cut, size of finished frame (must be less that two feet square), materials needed, etc.
5. Teach size, proportion, construction techniques, and use of equipment as you go.
6. Have groups start cutting wood sections to assemble. Should have miter saw and box. Can use regular saws. You may wish to have a jigsaw or other saws to help with complicated cuts.
7. Supervise the construction, yes the kids can do it at home with parent supervision.
8. Help screw the boards together. I had a portable drill that I used and had some students use.
9. Once frame is complete set on plywood base and use PAM to spray wood for easy removal of cement.
10. Demo one project in front of the class for everyone to see. Have large mixing bowl for cement. Students have to either compute the volume of their

**GRADE LEVEL**
10

**WEEKS**
2

**TOTAL BUDGET**
$400

THIS WINNING PROJECT IDEA SUBMITTED BY:

David J. Jaroch
Ubly Community Schools
Ubly, Michigan

kids in need Foundation
forms and dry measure cement to have enough or estimate how much is needed. I use premixed concrete. I found that mixing gravel and cement caused a lot of dust and created another set of problems. You can decide if you want to teach mixing techniques.

11. Mix cement to a firm consistency. Too much water is just as bad as too little water.

12. Use trowels and other cement worker tools to mix cement. You may have easier ways, use them.

13. Trowel cement into form being sure to fill corners well. Smooth off top and then place designs and other items into the cement to personalize the patio block. Student should use their imagination and preplan their designs.

14. Once the cement sets you can stack the forms on top of each other to save space in the room.

15. The next day you can remove the form and set the projects aside for another day or two to cure.

16. We have a placement day where the students take their project to a designated display area.

17. The project is used to inspire others to attempt creating cement projects.

18. Clean up as you go. Put your supplies aside for next year. If you are careful all you will need next time is a few bags of cement and perhaps four linear feet of two inch wide board per team next year.

19. The project is fun to do and the students seem to enjoy doing the work together.

20. Call the press and put the project along with pictures in the local newspaper.

**Culminating Activity**

The project is complete when everyone has their designs on display in an area where they, their friends, and other classes walk past them every day. We invite the newspaper in to take a few photos and publish their projects in the local paper to cement their learning.

**Evaluation Method**

I evaluate the student by completing the assigned task on time according to instructions. Grades are only lowered for poor effort and non-completion of project steps. I grade 100% or nothing usually. Grades are not used to punish poor projects. Everyone learns even if his or her project is not perfect.
Blast to the Future Rocket Launch

Curriculum/State Standards
Name the possible outcomes of a probability experiment. (math) Measure a given object using the appropriate unit of measurement. (math) Record data in an organized and controlled manner. (science) Compare the results of the investigation to predictions made prior to the investigation. (science)

Overview
The students created model rockets. The students measured, predicted, launched, and recorded results of the launch. The students then compared the results of their rocket launches.

Objectives
The student will list at least four of the possible outcomes of a rocket launch. The student will measure the placement of the fins on the rocket to the nearest tenth of an inch. The student will record the results of his or her individual launch in a t-chart. The student will record the results of the class launch in a bar graph with 90 percent accuracy. The student will compare the results of his or her launch with the predictions made prior to the launch.

Materials
rocket kits with motors
rulers
charts and graphs
launch pads

Readiness Activity
Students attended an assembly about the history of rockets. This allowed them to learn about the rockets before they actively made the rockets.

Strategies/Activities
1. The students each received a model rocket from Estes Rockets. 2. In class, the students assembled the rocket using skills such as measuring and reading and following written directions (expository writing). Students often struggle with real life application in math, science, and reading. This gave them an opportunity to complete a hands-on math and science project. 3. After the assembly of the rockets, the students were instructed by one expert parent. This parent has his own rocket website and frequently launches his own rockets with his twin children. In this presentation, the students learned what results may occur when the rocket launches. 4. Following the assembly of the rockets, the students made predictions about their launches contingent upon how their rockets were assembled. 5. The students had a launch day. We went to the park behind our school and launched the rockets. Each child was responsible for recording the results of his or her launch. The students recorded their results in a t-chart.

Culminating Activity
The following day, we gathered each student’s results and each individual child recorded the class results in a bar graph. We discussed results as a class and determined what future investigation we could do and what could have made our experiment better.

Evaluation Method
1. The measurement of this portion was assessed by checking the students’
placements of their fins. They were recorded a grade based on his or her accuracy to the nearest 10th of an inch. 2. Each student had a launch card where he or she recorded the results of the launch. This card also included the students’ predictions for their launches. It was graded to evaluate objectives 2 and 4. 3. The back of the launch card included conclusion questions where the student compared his or her predictions with the actual results. 4. The students were evaluated on their comprehension of the class results by the individual bar graphs created to record the launch results.
Building 3D Structures with 2D Magformers

Kindergarten students use rich language as they explore geometry concepts in a playful way.

**Curriculum/State Standards**

Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). Analyze, compare, create, and compose shapes.

**Overview**

Students used 2D magnetic shapes to build 3D structures. They explored building a variety of nets that would create cubes and additional perfect geometric shapes.

**Objectives**

The student will create 3D structures using 2D magnetic shapes.

The student will participate as a class to collaboratively find a variety of nets to build cubes.

**Materials**

Magformers 42-Piece XL Cruisers Magnetic Building Set
Magformers XL Cruisers Set with Lights and Sound
Magformers Isosceles Triangles-16 pc
New Magnetic Magformer
Magformers Rhombus-10

**Readiness Activity**

Students will discuss and compare attributes of 2D and 3D shapes.

**Strategies/Activities**

Students freely explore the new manipulatives.

Students talk about their 3D structures using geometric vocabulary.

Students explore nets to build cubes.

Teacher records the nets on a chart.

Students explore nets to build additional perfect geometric shapes.

**Culminating Activity**

Students share and explain their 3D structures, taking photos of their favorite creations.

Students use the chart of recorded nets to reassemble cubes.

**Evaluation Method**

Do students build simple or complex 3D structures?

Do students use geometric terms to explain their 3D structures?

Did the class find 11 nets to build cubes?

**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Cinda Quinn
Glacier Edge Elementary School
Verona, WI

GRADE LEVEL
K

ARTS

LANGUAGE

MATH

MISC

SCIENCE

HISTORY

SOCIAL STUDIES

1-2

WEEKS

$320

TOTAL BUDGET
String Art

The students created a small scale string art project and a very large scale string art project that has been submitted to the Guinness Book of World Records.

Curriculum/State Standards
Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (CCSS 6.RP1). page 42

Readiness Activity
View clips about how math is used to create art and how symmetry and patterns are math concepts that enhance many forms of art.

Overview
Students created a symmetrical design using Cartesian coordinates as a framework for the design. They used nails/stakes as a way to string pieces of string/twine around the points of their design.

Objectives
The student will learn that on a Cartesian coordinate plane there are 4 quadrants and that each quadrant has different properties (+,+; +,-; -,+ and _,_) by playing a game in the cafeteria in which the entire cafeteria is turned into a “piece of graph paper” and we call out coordinates and the students have to physically step on that coordinate. The student will learn to create a circle using a point of origin and a piece of string tied that point to create points around the circle (radius).

Materials
string (30 packs)
twine (18,000 feet)
masking tape
nails (300 small finishing nails)
wooden stakes
30 feet of pine (12”x12” pieces)
spray paint

Strategies/Activities
1. View videos about math and art.
2. Writing research project – Write about a famous artist who incorporates math in their art.
3. Create a slideshow with the artists we all researched and present to the class about the artist.
4. Play Cartesian coordinate game in cafeteria (use dry erase markers and actually write on the floor!).
5. String art demonstration.
6. Use graph paper to plan individual string art designs.
7. Transfer design onto wood and begin to nail the points for individual projects.
8. Plan design for large scale string art sculpture (60ft diameter).
9. Review with students how to create a large scale of our group project using wood stakes and twine.

Culminating Activity
The 60 ft. diameter was the culminating project. We were attempting to set a world record. The staff at Guinness accepted our bid to set the world record for the “World’s Largest String art Project created by kids.” Two news channels came and dozens of community members. The fire department came and took an aerial photo of the event as well.

Evaluation Method
A post-test was given (exactly the same as pre-test).

THIS WINNING PROJECT IDEA SUBMITTED BY:
Amber Kilcoyne
Medfield Heights Elementary School
Baltimore, MD
So You Want To Be An Architect?

Students’ measurement skills showed tremendous improvement over the course of this project.

Curriculum/State Standards
Connecticut Mathematics Curriculum Framework:
. Examine the relationships between the measures of area of 2-dimensional objects and volumes of 3-dimensional objects.
. Solve problems involving measurement through the use of a variety of tools, techniques, and strategies.
. Use specific ratios to convert between measures of length, area, volume, mass, and capacity in the customary and metric systems.
. Make precise measurements and use benchmarks to estimate measures.

District Curriculum
. Area, perimeter, and the relationship between the two
. Measurement
. Different forms of persuasive writing

Overview
In this project, students design a house and create their blueprints of their house using a scale. Upon completion of the blueprints, students build a scale model of their home. These houses are presented at an “open house” along with a persuasive advertisement to “sell” their home.

Objectives
The student will design a house based on a budget.
The student will accurately calculate the various costs of a home, such as cost of building and flooring.
The student will calculate area and perimeter for all rooms and the house as a whole.
The student will measure accurately to create a scale model of their home.
The student will write a persuasive real estate listing to “sell” their home.

Materials
11” x 17” graph paper that has a 4 x 4 grid (squares should be ¼ inch), 30” x 40” foam board (4 sheets per student), glue, cutting knife, pins, squares, information packets to provide students with all of the information

Readiness Activity
Students had spent some time in class working on the concepts of area and perimeter in regards to what each is and how to determine these measurements. We then spent some time analyzing the relationship between area and perimeter (i.e., a square shape has more area than a rectangular shape with the same perimeter). This was necessary so that students could think about what the best shape for their rooms should be on their blueprints.

Strategies/Activities
1. Students were given an information packet that included building codes, symbols, the scale being used, sample floor plans, design space, and their rubric for the blueprints.
2. Students and I discussed the packet step-by-step. Building codes are as follows:
   • Your home must be between 1,400 and 2,000 square feet.
   • Square footage includes all rooms and hallways, but not closets.
   • No room can be smaller than 40 square feet.
   • You must have an attached garage that

THIS WINNING PROJECT IDEA SUBMITTED BY:
Lisa M. Heald
R.J. Kinsella School
Hartford, CT
So You Want To Be An Architect?

....continued....

is between 100 and 200 square feet.
- You must have 3 bedrooms, one kitchen, one dining room, one living room, and 2 bathrooms. You may add 2 additional rooms such as a 4th bedroom, playroom, office, or bathroom.
- There must be a closet in each bedroom, a linen closet (either in or next to a bathroom), and an entryway closet.
- All hallways must be 4 feet wide.
- You must have at least 2 windows in all rooms that run along the perimeter of the home. Windows can be 2 feet wide or 4 feet wide. This is part of your budget!
- There must be a door in every room. The doorway has to be at least 4 feet wide to match the hallway.
- You must put flooring in all rooms of the house and include this in your budget.
- The entire project may not cost more than $180,000!
- The scale you are using is 1 square (1/4” = 1 foot.)

3. Students and I looked at sample floor plans and talked about the different symbols used for doors, windows, and closets. We also looked at the costs worksheet, which included all the various costs.
4. Students worked on their rough draft of their house.
5. Upon completion of the rough draft, students were given graph paper to create their blueprints.
6. Students calculated the area and perimeter of each room and of the house as a whole. All computations were included on a measurement worksheet that had all the rooms listed. Students also decided what type of flooring they wanted and had to calculate the cost for each room. They calculated the cost of building the home as well and had to determine how much money was left over in their budget.
7. After the blueprints were completed, we spent some time as a class talking about how to build the model of our house. The scale for this process was 1 foot = 1/2”. I modeled how to cut out the floor of the house and several of the walls. I showed the class how to attach the walls to the floor using the glue and pins.
8. Students worked on their houses to completion. After this, they created a real estate listing to “sell” their house. The listing included a picture of their home, a brief persuasive paragraph giving a good description of the home, and certain key features were highlighted in a bulleted list.

Culminating Activity
Students hosted an open house for their parents. The model houses were displayed with the blueprints, as well as the real estate listings that the students created. At this open house, students were able to talk to their families about the different components of their homes and describe the process they went through. Refreshments were also served.

Evaluation Method
The students were evaluated on this project at three different points. Each section of the project (blueprints, model, and advertisement) had a rubric that outlined the criteria and possible points to be earned.
Measure Up

An effective project to convey the importance of mathematics in the community

<table>
<thead>
<tr>
<th>Curriculum/State Standards</th>
<th>Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fourth Grade Mathematics Content Standards and Objectives</td>
<td>recognize the changes that occur. TEC.4.3.3 create a multi-media project as a class group activity.</td>
</tr>
<tr>
<td>MA.4.4.1 estimate, measure, compare, order and draw lengths using customary and metric units.</td>
<td><strong>Overview</strong> Students measure mileage, temperature, and distances. They use formulas for perimeter, area, and volume to arrive at measurements for objects in City Park. They record the information and use Excel to assist with clinometer readings and Graph Club Deluxe for comparison of measurements.</td>
</tr>
<tr>
<td>MA.4.4.2 determine and compare areas of rectangles and squares by multiplying length and width.</td>
<td><strong>Objectives</strong> The student will understand the application of math in real life. The student will use measuring as a math process. The student will become aware of different units of measurement by using a variety of tools. The students will measure length, width, area, or volume as accurately as possible. The students will record their results in a math journal. The students will design a scale model of City Park. The students will create various graphs using some of the data collected in City Park.</td>
</tr>
<tr>
<td>MA.4.4.3 discover through modeling the formula for volume.</td>
<td><strong>Materials</strong> compasses, bus odometer, weather center, clinometers, trundle wheel, metric tapes, calculators, and software- Graph Club Deluxe, Excel</td>
</tr>
<tr>
<td>MA.4.4.4 understand appropriate grade level conversions within a system of measure.</td>
<td><strong>Readiness Activity</strong> To teach the use of measuring tools, we practiced on our school playground. This</td>
</tr>
<tr>
<td>MA.4.4.5 read temperature and select appropriate unit.</td>
<td></td>
</tr>
<tr>
<td><strong>Fourth Grade Science Content Standards and Objectives</strong></td>
<td></td>
</tr>
<tr>
<td>SC.4.2.4 use scientific instruments and everyday materials to investigate the natural world (e.g., hand lens, telescope, thermometer, balances, magnets, tuning forks, bulbs and batteries, graduated cylinders, calculators, computers).</td>
<td></td>
</tr>
<tr>
<td>SC.4.2.5 demonstrate safe and proper for handling, manipulating and caring for science materials.</td>
<td></td>
</tr>
<tr>
<td>SC.4.2.10 apply mathematical skills and use metric units in measurements and calculations.</td>
<td></td>
</tr>
<tr>
<td><strong>Fourth Grade Technology Standards and Objectives</strong></td>
<td></td>
</tr>
<tr>
<td>TEC.4.3.2 enter data into a prepared spreadsheet to perform calculations and recognize the changes that occur. TEC.4.3.3 create a multi-media project as a class group activity.</td>
<td></td>
</tr>
</tbody>
</table>

**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Ruth Patrick
Worthington Elementary
Parkersburg, WV
prepared students for the journal activities and provided review of formulas, as well as for the use of the equipment.

**Strategies/Activities**
1) Brainstorm problems that could be solved at City Park.
2) Record temperature start/finish in math journal. 3) Use a compass to record directions from school to the park. 4) Record beginning and ending bus odometer readings. 5) Use class generated problems to solve. 6) Use a variety of tools to measure the large pavilion, the cabin, the basketball court, one tennis court, the distance between horseshoe stakes, and the bandshell. 7) Record measurements and use formulas to solve the problems in their math journals. 8) Compare data upon return to the classroom. 9) Discuss differences. 10) Use Excel to convert clinometer measurements to height of the cabin. 11) Use Graph Club Deluxe to develop bar graphs to compare and contrast measurements. 12) Have students write a reflection in the back of the journal regarding this activity, how it relates to real life, and what they have learned.

**Culminating Activity**
Read reflections. Share graphs from each of the five groups. Discuss the conversion of angles to distances using the clinometers.

**Evaluation Method**
The math journal had class generated questions to pursue from the onset of the project.
Students create traditional Maori artifacts, enhance vocabulary skills by learning to speak some Maori phrases, and perform a ceremonial Maori stick-fighting routine.

**Curriculum/State Standards**
Students will solve equations using whole numbers.
Students will write expressively to convey information.

**Overview**
Students learn about the culture of New Zealand’s native Maori’s from a series of immersion activities designed to increase cultural awareness and tolerance. They engage in hands-on activities to solve mathematics problems, construct traditional Maori artifacts, and take an imaginary journey around the country of New Zealand. As a culminating event, students brought younger classes out for a performance of a Maori stick-fighting routine, and then taught those younger students how to perform that stick-fighting routine to traditional Maori chant music.

**Objectives**
The student will enhance mathematics skills by solving equations with whole number through hands-on activities. The student will study the diverse culture of New Zealand’s native Maori, constructing traditional poi balls from recyclable materials. The student will learn to write and speak a variety of Maori words and phrases.

**Materials**
*CD of Maori chant music and sound system, PVC pipe cut into 2.5-feet lengths for stick-fighting routines, polyester pillow stuffing, yarn, paper napkin, and slices of garbage bag to make poi balls, map of New Zealand, tTeacher-generated worksheets (geography, people, circumference, staff, poi), Beginner’s Maori – vocabulary text from Amazon.com, “The Art of Staff” and “The Art of Poi” – videos from homeofpoi.com, Maori Tattooing – book from Amazon. com*

**Readiness Activity**
Students enter the classroom to find teacher’s face decorated in a traditional moko – or Maori tattoo. Teacher explains that moko are unique to each family, and no two moko are exactly alike. A discussion of how the moko is applied ensues – no clean needles are used. Tribal chiefs chisel patterns into the skin, then rub soot into the designs to make them black. Obviously this is very painful! You have to have your entire living family’s permission to receive the moko – if you misbehave a lot, the Maori do not grant that family member the right to wear the moko, as they don’t want the rest of the world to know that misbehaving person belongs to them! We find New Zealand on a map, learn to say “kia ora” (hello), and learn the meaning of pukana (make a scary face while dilating the eyes). A short video segment on stick-fighting is viewed, with a discussion on body language and rhythm.

**Strategies/Activities**
Students measure 10-foot sections of PVC pipe into 2.5-foot sections and mark them so the teacher can cut them with a power saw. They sanded them down, applied duct tape grips and painted one end red, the other end black (Maori tribal colors). They complete cooperative learning task sheets on New Zealand’s geography, culture, language and...
people, and also on calculating the circumference, radius, and diameter of a circle. This is important because when they start swinging the poi and staff in a circle, they must know how much space they will need in order to keep from hitting their neighbors! We calculate these things, then put our calculations to the test using the staff and poi before venturing into the Maori leaf ceremony and the basic moves involved in stick fighting (after reviewing safety procedures, of course). Students master several moves on the poi before sitting down to construct their own out of recyclable materials, which they take home to practice. Students also create a moko for their family on a mask, and these items are on display during the culminating event, Maori Performing Arts Day, when participating students perform and display what they have learned for younger students in the school.

Culminating Activity
Students greeted younger visitors with “kia ora,” and gave short speeches detailing the culture of the Maori. They spoke sentences in English, and replaced one word with a Maori word, encouraging younger visitors to infer the meaning of the word through context. They performed a traditional Maori stick-fighting routine to wild applause, then broke into small groups and taught that same routine to their younger visitors. The combined group performed the routine at the end of the exciting but exhausting day!

Evaluation Method
Students were evaluated by journal entries, teacher-generated mathematics assessments, and ability to work cooperatively in small groups.
# Magnificent Math Students Make Super Scientists

If math and science are taught together for certain skills such as measurement, the knowledge is better learned and remembered.

## Curriculum/State Standards

<table>
<thead>
<tr>
<th>(MATH) TEKS 3.11</th>
<th>The student selects and uses appropriate units and procedures to measure length and area.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEKS 3.12</td>
<td>The student measures time and temperature. TEKS 3.13 The student applies measurement and concepts.</td>
</tr>
<tr>
<td>(SCIENCE) TEKS 3.4</td>
<td>The student knows how to use a variety of tools and methods to conduct science inquiry.</td>
</tr>
</tbody>
</table>

## Overview

Having a measurement kit ready to go is the key to being able to measure anytime. Using measurement in both math and science gives the students the opportunity to use their math skills to collect data in their science lab. Once measurement is taught in math, the skill will be reinforced in science and new skills will be learned in science. The importance of measurement in their everyday world is taught in an everyday situation. For example, learning about force and motion in science allows the student to use both their metric and customary measurement to determine the length a toy car will move after being pushed.

## Objectives

- The student will be able to estimate and measure lengths using customary and metric units.
- The student will be able to measure to find the perimeter and area of a shape.
- The student will be able to use a thermometer to measure temperature.

## Materials

*Measureworks Grade 3 Program*

## Readiness Activity

The students begin with basic measurement, such as measuring their desk, hands, or pencils using both customary and metric measurement. This is to make them familiar with a ruler and the idea of measuring. The students will measure many things in the classroom.

## Strategies/Activities

- The students will measure, using the rulers, for many things including perimeter. We measure around the room, as well as in the hall and on the playground. The students will learn to use a thermometer and be able to tell the temperature in the class, as well as the science lab and outside. The students will learn area by using the color tiles, be able to estimate the area, and actually tell the area of a given object. As force and motion are studied, the students will measure the length a toy car will roll after being pushed.
- Students will be able to measure the time a yo-yo will stay on the ground before rising back to the hand. Students will also measure the amount of time a ball will stay in the air. As matter is taught, students will be able to weigh objects to tell the mass of the object.

## Culminating Activity

Students will measure the entire year in the lab and in the class. There isn’t a culminating activity as this is an on-going learning process. They will never stop learning the measurement process.

## Evaluation Method

Assessment is made of their...
measurement skills by observation and written assessments.
The puzzle-like boards, tactile number tiles, and math problem strips make this game challenging, educational, and fun.

Curriculum/State Standards
California State Standards for Kindergarten:
Number Sense 1.0 - Students understand the relationship between numbers and quantities: 1.2 – Count, recognize, represent, name, and order a number of objects.
Number Sense 2.0 – Students understand and describe simple additions and subtractions:
2.1 – Use concrete objects to determine the answers to addition and subtraction problems.

Overview
The student puts the tactile number tiles on the math board and then chooses a math problem strip, which is placed on the bottom of the math board. The student then matches a number tile to the problem on the strip. The tile will only fit in the strip if it is the correct answer.

Objectives
The student will recognize numbers 0 – 25.
The student will sequence numbers 0 – 25.
The student will be able to match a number to a set of objects.
The student will be able to do simple addition and subtraction.

Materials
math boards and number tiles (Note: this company replaces lost tiles), math strip sets: rational counting, numeral names & sequencing, addition, and subtraction, storage containers for the boards, strips, and tiles

Readiness Activity
The math board manipulative activities are a great way to reinforce the math concepts taught in the daily math lesson and calendar activities concerning number recognition, number sequencing, and addition and subtraction.

Strategies/Activities
Order the math boards, tiles, and math problem strips. Code the back of the tiles with numbers or letters to help prevent students from mixing their tiles with another student’s tiles. Obtain a large container to store the math boards. Obtain containers for the number tiles (frosting containers work well too) and write the matching code on the container. Obtain containers for the math strips (single silverware baskets/container).
Teach the students how to put the tactile number tiles on the board first. I found it best to take out one tile at a time from the container and place it on the board. When all tiles are on the board, the student chooses a math problem strip and places a number tile on the strip that he/she thinks is correct. Only the correct answer will fit. You will also need to show the students how to clean up the board when it is time to put the activity away. I encourage them to mix up the tiles (one from the top row, one from the bottom row, one from the middle row) instead of taking them off the board in order. This gives the next student to use the tiles more of a challenge in placing the number tiles on the board.

K
GRADE LEVEL
ONGOING
$415
TOTAL BUDGET

THIS WINNING PROJECT IDEA SUBMITTED BY:
Pat Chase
Lorena Falasco Elementary School
Los Banos, CA
Culminating Activity
This activity is an on-going activity that is available to students daily. I have used it as an independent center to reinforce the math concepts. I have also used it with individual students as a teaching tool to make sure they feel the tactile number, name the number, and watch them count the objects. It provides the extra practice without requiring another paper/pencil activity. I feel it is very valuable because it is a hands on manipulative activity for a kindergartener.

Evaluation Method
I used teacher created tools (ex: random numbers on a page, number cards) to test the students mastery of the math standards. I also used the math boards as a testing tool, asking students to name the numbers as they were putting the tiles on the board or watch them count the objects, etc.
Cricket Cage Thermometer Project

Students gain experience working with live animals and using traditional hand tools to build something of lasting value from raw materials.

Curriculum/State Standards
1.) Standard and metric measurement
2.) Fraction concepts
3.) Recording, organizing, and graphing data
4.) Communicating mathematical knowledge
5.) Understanding functions and relationships
6.) Using one variable formulas
7.) Geometry concepts: area, perpendicularity

Overview
Students are given two blocks of wood, a handful of bamboo skewers, some basic hand tools, glue, and detailed instructions. With a little math, they build these into a traditional Chinese cricket cage. After some instruction and group work with recording and organizing data and working with formulas, they get to take a live cricket home to check their cricket’s accuracy on reporting the temperature.

Objectives
The student will learn how to use standard measurement as a tool to describe area and compare inch units with non-standard fractional amounts.
The student will gain practical experience in using common hand tools: ruler, hand drill, and wood glue.
The student will understand geometry concepts of area and perpendicularity.
The student will understand functions and relationships behind the timing of cricket chirps and the temperature, as well as understand how to use a one-variable formula.
The student will record data and communicate mathematical knowledge and understanding.

Materials
(for approximately 180 students) clean yogurt containers with holes punched in the top (for each student), various recordings of cricket chirps (easily downloaded from internet), flat “bull nose” wood molding (3” x 7/16”, and one foot per student), 15-20 hand drills, 50-60 drill bits (7/32”), 6 pints wood glue, sand paper, 3” bamboo skewers (cut from 6” skewers (75-100 per student)), 1000 live crickets (order as many as you need, but only the males will chirp), 2-3 hand saws, worktables suitable for woodwork or 15-20 scrap shelving wood, or lap vices, 10-15 6” C-clamps, cricket assembly instruction posters 1-4, worksheets

Readiness Activity
The teacher plays background music of crickets. The teacher then involves class in an open-ended discussion about crickets with questions like:
What do you know about crickets, or movies with crickets? (Some students may mention Walt Disney’s Jiminy Cricket or Mulan)
Have you ever heard the chirp of a live cricket?
What do you think the chirp means?
Do you think crickets would make good pets?
Did you know that in the Far East people keep crickets as pets in cages?

Show finished project cage as example. The teacher indicates that the students will be building their own cricket cages. If their cage passes the quality rubric,

THIS WINNING PROJECT IDEA SUBMITTED BY:
Douglas Avon
Henkle Middle School
White Salmon, WA
they will get to take home their very own live cricket! Then they will have another activity to do with the cricket at home with their parents. Students may start thinking of a name for their cricket.

**Strategies/Activities**

*Teacher Preparation:*
- Obtain cricket sounds from commercial recording or Internet
- Start a yogurt cup collection. Ask your colleagues to save some for you.
- Purchase the wood molding then take it up to your local high school woodshop teacher and beg for him to cut them up for you. First, rip a 1/2” strip off the side of each molding board. Use this thin strip to cut into cricket house “doors.” Pre-cut them into 2” sticks ahead of time. Then cross cut 2-1/2”x 6” uniform blocks from the remaining molding strips, enough for each student to have 2 blocks each.
- Purchase 6” thin bamboo skewers (2 mm thick) and tape bundles of 100 together with wide scotch tape, tamping the ends and wrapping securely in three places: bottom, middle and top of the bundles. At this point, it doesn’t hurt taking the sharp ends of one side and blunting them on a big disk sander, if you have one available. Then use a band saw to carefully cut the bundles of skewers in half (right through the tape) into 3” bundles. (Caution: rotate the bundles slowly toward you as you pass them through the bandsaw so that the saw does not “grab” and pull you into the blade!) They will stay taped together in neat little packages to distribute to students later.
- Locate worktables that can be used for sawing and gluing on or find some 1” x 10” scrap wood shelving, or use “lap” vices on your nice tables.
- Follow the directions below for making a cricket cage. The teacher will then have a working model and much needed experience in this project with which to help students with later
- Obtain the Cricket Assembly instruction posters 1-4, if possible, and make overhead transparencies. (I originally sent them as jpeg attachments) Better yet, make several models for each stage of the project for students to use as examples.
- Prepare handouts and worksheets:
  - Arrange for storage of project during the next couple of weeks—shoeboxes?
  - Decide how students will be organized for this project. Some activities are better suited for group work, so I will make suggestions for each lesson.
  - Start thinking about how to order your crickets (5 weeks old) and plan how to distribute them to your students within a week from receiving them. I ordered mine from www.reptilefood.com.

**Lesson 1: Work in groups**

*Teacher note: In addition to the working model, the teacher should also create a new cricket cage model along with the students, at their pace, so that they can see the various stages of the project as the work progresses.*

**Objectives:** Explore area of a rectangle in standard measurement

**Materials:**
- 2-1/2” x 3” molding blocks, 2 for each student
- 1” grid paper
- rulers
- pencils

**Method:** Teacher distributes 2 blocks to each student. These will become the ceiling and floor of their cricket cage. Students write their names in pencil on each block. Teacher leads a discussion about the concept of “area.” How do we find the area of our cricket cage? Let students explore this question. After a few minutes have individuals report to class...
their ideas. (Some students may use the grid paper; others may try a formula and use the rulers. Of course, the area will be an uneven amount of square inches, which makes this problem a bit challenging and interesting.) Students keep their blocks for further lessons.

Lesson 2: Individual work  
Objectives: Use standard and metric measurement  
Materials: (in addition to the blocks already distributed) rulers (with both standard and metric units) pencils

Method: Students will look at the working model (the teacher’s completed cage) and note that the floor area is less than the size of the block, due to the fact that the holes for the bamboo skewers (bars) in the cage take up some space from the edge of the blocks. They will need to make the drilling holes marks for their blocks.

Students will pick one of their blocks as the floor of their cricket cage. Then they will mark with a pencil a border 1/4” around the inside of the edge of the block. Teacher can give as much assistance as needed or let students work independently on this. Students may come up with an idea for a shortcut.

After a few minutes, have students share their ideas. Teacher will commend the students’ creativity. If one or more of their ideas works, the class can adopt it as the official system for marking their cages. But first, teacher can suggest the following: Have students mark off a couple of inches on scrap paper. Then have them look at the centimeter side of their rulers. Students may note that there are almost exactly 2-1/2 centimeters, or 25 millimeters in one inch. With a little more questioning like, “Is there any way we could divide 25 evenly into 5 sections?” Many students will readily agree that the answer is yes, 5 millimeters! After this discussion, students may want to use BOTH sides of their rulers to accomplish this task; first marking off whole inches, then turning to the metric side to mark off every 5 millimeters.

Review area concept, and ask students to reevaluate how much area the cricket will have, now that part of the edge has been designated for hole drilling. Spend as much or little time as needed on this.

Lesson 4: Work in pairs
Objectives: Understand concept of perpendicularity. Students will use proper drilling techniques and practice drilling holes perpendicularly into wood pieces before actually drilling on their cricket cages.

Materials: (in addition to the blocks already distributed) hand drills to share, with 7/32” inch bits (teacher may need to “tape” up the drill bits, or create a depth stop on each bit, so that the students don’t drill farther through the material than you want them to.) scrap wood 6” C-clamps

Method: Teacher demonstrates proper drilling technique. Clamps wood down securely with C-clamp. (Use scrap shelving wood.) Hold drill perpendicularly to the wood, showing students how to check in two directions to make sure drill is truly perpendicular. This is where it helps to have a partner check the side direction while you look straight ahead at the drill. If an individual tries to drill alone, a crooked hole may result. (You could mention that a drill press would be a nice tool to have, but there are not enough available for all the students today.) You could push the bit down slightly to make an indent in the wood (sort of like using a center punch.) This will make a little dimple to keep the drill from skipping around off your mark once you start drilling. Drill straight down, applying a small amount of pressure, keeping the drill straight (not wobbly) until the hole is finished. Important to stress: to remove the bit from the wood, simply unscrew the drill backwards and pull STRAIGHT up (not jerk or bend it towards yourself). If these procedures are followed, few drill bits will be broken.

Teacher has two volunteers from
class come up to front of room to demonstrate proper drilling technique.
One student can use the drill while the other checks for perpendicularity.

Groups of two work together, using a checklist, to practice drilling technique.

Teacher marks in gradebook those students who have been trained on the drill. Do not let untrained students begin drilling until they have gone through this lesson.

Lesson 5: Work in pairs (This lesson may last 2-3 days, depending on students’ abilities)
Objectives: Students will use proper drilling techniques and start drilling perpendicular holes in their cricket cages

Materials:
- students’ floor and ceiling blocks, pre-marked every 5 mm for hole drilling
- hand drills to share, with 7/32” inch bits
- masking tape
- scrap wood
- 6” C-clamps
- cricket assembly posters 1 & 2 (if available)

Method: Students will tape their floor and ceiling blocks together, like a sandwich, flush. Use one strip of masking tape for each of the four sides. Make sure the drilling marks are facing upward and visible.

Teacher and one student assistant demonstrate how to start drilling holes in cages.

Tape blocks together

Place scrap wood on table, then the taped up blocks, then one more piece of scrap (to protect the blocks). Sandwich clamp these down securely to the work table.

Teacher demonstrates drilling a couple of holes, while students look on. Assistant checks for perpendicularity from the side, while teacher looks straight on.

Students work in pairs and start drilling their own blocks.

Display a copy of cricket assembly posters 1 & 2 on an overhead projector, if available

Lesson 6: Work in pairs
Objectives: Students will follow directions and use proper drilling techniques to create the door of their cage

Materials:
- students’ floor and ceiling blocks, pre-drilled every 5 mm along the 1/4” border
- hand drills to share, with 7/32” inch bits
- masking tape
- scrap wood
- 6” C-clamps
- 2” x 1/2” x 7/16” pre-cut door pieces
- pencils
- cricket assembly poster number 3, if available

Method: Teacher demonstrates how to take the tape off the drilled floor and ceiling pieces, then slide the floor sideways about 1/2”, just far enough to let the door piece fit underneath it, right below the edge where the holes were drilled. The door should be in about the middle of a long side of the cage, centered right under the holes where it will eventually be installed. (This is where a picture really helps.) Then tape this new skewed “sandwich” together, so that the floor, ceiling and door will all stay relatively still. Mark a rectangle on the top piece where the door will be, so that you can line it up again later. Clamp down and drill the holes for the door piece. You will be re-drilling the holes in the floor right above the door, but that is necessary to align the door with the floor. Be sure to re-drill every hole that is above the door (which, of course, will be within the rectangle you drilled) and drill all the way through the door. (Some of the doors may split, so have plenty of “spares” on hand.) Let pairs of students begin drilling their doors.

Display a copy of cricket assembly poster number 3 on an overhead projector, if available. Still, many students will likely still need help on this tricky step.

Lesson 7: Individual work
Objectives: Students will follow directions and assemble their cricket cage

Materials:
- students’ floor, ceiling blocks and door pieces, pre-drilled
- scrap wood
- wood glue
- bundles of pre-cut 3” bamboo skewers
- cricket assembly poster number 4, if available

Method: Teacher demonstrates how to start assembling cricket cage. First, align the floor, ceiling, and door into a “sandwich” in the same way they were when originally drilled. You may have to look carefully at the hole patterns to see how to line things up. Then start pushing 3” bamboo skewers through the holes. You may need to give them a little twist. It should start looking like a pin cushion in a short while. Let the skewers stick out of both ceiling and floor. Don’t attempt to push them down flush yet, or else with one slip you may have to start all over with the skewers. (See poster 4, section “a”).

(The poster doesn’t show this step, but...) temporarily remove all the skewers that go through the door piece, except for the two outermost ones. These will serve as centering guides and will be glued in permanently. Later, when all the other skewers are glued, the door skewers will be
reinserted and glued in a special
way.
Allow students time to insert their
own skewers
Teacher demonstrates how to
glue the floor skewers in place.
(See poster 4, section “b”)
Smear some wood glue on the
protruding skewers (sticking out
from the bottom of the floor). Then
on a piece of scrap wood, place
the cage, floor side down, onto
the scrap. While pushing on the
corners of the floor (but not the
ceiling), carefully press the cage
down until the glued skewers
slide up flush into the floor. Now
the glue will need time to dry
before working on the ceiling.

Lesson 8: Individual work
Objectives: Students will follow
directions and assemble their
insect cage ceiling and door.
Students will evaluate their work,
using a rubric. Students will write
short reflection statements about
their experience with this project.

Materials:
students’ floor skewers glued in
place
scrap wood
wood glue
bundles of pre-cut 3” bamboo
skewers
cricket assembly poster number
4, if available

Method: After glue in floor
skewers has dried overnight, as
in lesson 7 repeat the process of
gluing the ceiling skewers, then
place the cage upside down and
press the skewers flush into the
ceiling.
Now insert the center door
skewers, being careful not to
get any glue on the top of them.
(These must remain free to slide
up and down.
Push the door skewers through
the door piece and out the
bottom about 1/2” in a similar
fashion like when assembling the
floor and ceiling.
Smear some glue on the skewer
ends sticking out from the bottom
of the door, and then push them
up flush into the door piece. It
may be easier to do this if the
door is suspended about half-way
closed. Allow to dry.
The cage is finished! If painting
is desired, DO NOT paint the
skewers or anywhere near the
door, unless you want the door to
be painted shut!
Teacher can hand out and explain
the self-evaluation scoring rubric
or evaluate cages however he or
she wishes.

Lesson 9: Work in groups (this
will take a couple of sessions)
Objectives: Students will record
and organize data into graphs

Materials:
various cricket sounds
tally sheet
graph paper

Method: Teacher tells students
that they have some cricket
visitors today. And they are going
to predict the temperature for us.
Hand out paper for tally sheets.
Have students number 1-10 along
the left side of the page. Teacher
says that research shows that
crickets can tell us something
about the temperature by the
way they chirp. Only the males
chirp, of course. Why? Ask for
guesses. It seems to be the way
they attract a mate.
Teacher plays the first cricket
sound (play for 15 seconds
exactly) I just pre-recorded
mine on a cassette tape off
of my computer, but you can
improvise here. If you have
to, you can even just imitate a
cricket yourself ahead of time
on a cassette recorder or have
students volunteer to do it! While
the cricket is chirping, students
are asked to tally how many
chirps they heard.
Whatever the number of chirps
in 15 seconds turns out to be,
teacher mentally adds 39 to that
figure, then tells the students
that the temperature the cricket
is telling us is ______degrees.
Repeat this process with several
“crickets” all chirping at different
speeds. Do replays, if necessary.
Now ask the students to look for
patterns and try to make some
statements about the relationship
between the chirps and the
temperature. Groups can be
assigned to try putting the data
on cards, then sorting them into
some kind of predictable pattern.
After a few minutes, have groups
share what they discovered. Most
will find that the temperature
increases as the chirps increase.
A few may even discover the
“secret” formula.
Have students create a graph
with the temperature on the y
axis and the number of chirps on
the x axis.
Place dots for each cricket,
then connect the dots. What
do students see? They should
see a relatively straight line.
Make some predictions about
the temperature if a cricket
chirped _____ many times. Or,
if the temperature were _____
degrees, how many chirps might
the cricket have chirped? The
graph can be used to make
generalizations here.
Introduce the idea of a formula,
how it could be used for various
applications. Have groups try
to come up with a formula for
crickets and the temperature.
Give them a starting point, like
assign the letter “C” to stand
for the number of chirps in 15
seconds, and “T” equals the
temperature. Then ask the
students how could they do
some mathematical process to
“C” to arrive at the temperature?
Look back at the data and the
graph. Teacher could make some
suggestions that don’t quite work,
like “C x 3 = T. This works for
20 chirps, since 20 + 39 is 59
or about 60, but does it work in
every instance? Let groups play
with this for awhile.
After a few minutes have students share their formulas. Some will have it close. Either 39 or 40 is acceptable.

Lesson 10: Individual and family work
Objectives: Students will record data at home with their families and apply it to a one variable formula
Students will write short answers to questions about their project, and synthesize some ideas for a hypothetical situation.

Materials:
live crickets
clean yogurt containers with holes punched in top
finished cricket cages
cricket homework and care sheet

Method: Teacher hands out and explains homework sheet, which contains a data recording section and application with the “formula,” and some questions which require a written response. Basically, students are to place their cricket in several different places at different times to see how many times it will chirp, and then check the temperature with a thermometer at home. Live crickets will be distributed in yogurt cups to students, who will then take them home and try out their cages. (Females can be identified by their long ovipositor—a long thin fishing pole shaped thing sticking straight out of their tale. Males have wings, but not ovipositors.) A cricket care sheet will be distributed and read together with the class. Students will return their homework after one week and share their discoveries about their cricket and how well it predicted the temperature.

Culminating Activity
Students were asked to use the following form to write thoughtful responses to these questions, after finishing the cage building segment:

Cricket Cage Thermometer
Questions for Reflection:
1. Describe what turned out well for you on this project?
2. What really surprised you as you built the cricket cage?
3. If you could do this project over again, what would you do differently next time and why?

Evaluation Method
Students did a self-evaluation of their cricket cage, using the teacher-designed rubric (see below). Since some parts of this project are harder for some than for others, I tell the students that the “effort” section at the bottom of the form counts for a large portion of their grade. The teacher then reviewed and validated their evaluations, making needed adjustments and providing feedback. For the most part, the students were fairly accurate in their judgements.

In addition, students took home an activity sheet to do with their parents and their live cricket. They were to record some chirping data and calculate the temperature, using the class generated formula. Then they answered some questions, including some higher order thinking, and were to return their “homework” the next week.
Classroom Store

Students become more open minded and appreciative of diversity through creating Character Cards that focus on the contributions made by people of different races.

**Curriculum/State Standards**
MA.A.1.1  MA.A. 2.1  MA.B.3.1

**Overview**
Students use hands on manipulatives to practice naming and counting coins and practice their value. Once the student can name and count money, they can come to the class store to purchase items.

**Objectives**
The student will be able to name the coins quarter, nickel, dime, and penny. The student will be able to name the value of each coin. The student will use coins to represent money amounts.

**Materials**
coin stamps, small group coin BINGO, coin/value matching cards, items for students to purchase, fake money

**Readiness Activity**
To prepare students for this activity, we learned poems to help remember the coin names and values.

**Strategies/Activities**
Students are exposed to the coin names and values. Once they have a fair knowledge of them, they complete some hands on activities and practice activities within a small group. The next step is to work independently to reinforce the skills and allow time for the teacher to complete some informal and formal assessment.

**Culminating Activity**
Students can begin to come to the class store once they can add coin values. The class store is open in the morning for 30 minutes and is run by student helpers.

**Evaluation Method**
Students were evaluated through formal and informal teacher assessment/observation. The ending evaluation was based upon their ability to add coins to buy items.

**THIS WINNING PROJECT IDEA SUBMITTED BY:**
Laurie Blackwell
Diplomat Elementary
Cape Coral, FL

**K**
GRADE LEVEL

**ARTS**

**LANGUAGE**

**MATH**

**Miscellaneous**

**Science**

**History**

**Social Studies**

1 WEEK

$155 TOTAL BUDGET
Circular Coasters

Students become more open minded and appreciative of diversity through creating Character Cards that focus on the contributions made by people of different races.

**Curriculum/State Standards**
MA.B.1.3.1—Students will use concrete and graphic models to derive formulas for finding perimeter, area, surface area, circumference and volumes of two and three-dimensional shapes.
MA.A.3.3.2 (1) – Students know the appropriate operations to solve real-world problems involving whole numbers, decimals and fractions.

**Overview**
This project was highly effective. It served as an enrichment lesson for students as they closed out the unit on circles. Students enjoyed the hands on aspect of the project and the incorporation of art spoke to those students who are artistic. It also showed teachers that math could be taught using a variety of materials and not just the traditional math manipulatives.

Students had to make circular coasters using molds, mosaic tiles, and indoor cement. Once they did this then they would find the area, circumference and diameter of their coaster.

**Objectives**
The student will find the area of a circle.
The student will find the circumference of a circle.
The student will find the diameter of a circle.

**Materials**
indoor cement, mosaic tiles, circular molds, paper, pencil, ruler, calculator

**Readiness Activity**
Students need to be familiar with the circle and how to find its area, diameter, and circumference.

**Strategies/Activities**
Day 1: Students will be introduced to the circle and be taught how to find the diameter and circumference.

Day 2: Students will learn how to find the area of a circle. Give the students opportunities to practice.

Day 3:
- Introduce Lesson
  - Discuss Circles
  - Explain Activity
- Students will make circular mosaic coasters out of indoor cement and mosaic tiles.
- Once students have finished this they will work on a worksheet about circles.

Day 4:
- Review circles.
- Students will receive their finished coasters.
- Students will find the radius of their coaster using a ruler. This will be done as a class as all coasters will have the same radius.
- On their own, students will complete a questionnaire about their coaster. (See appendix 1)
- Students will then be able to paint their coasters and take them home.

**Assessment**
If students are able to answer questions on their questionnaire correctly it will show understanding of the material.

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**THIS WINNING PROJECT IDEA SUBMITTED BY:**

Natasha Bell
Parkway Middle School of the Arts
Lauderhill, FL
This lesson is intended as enrichment for students as they have already been taught about circles in their regular math class.

**Culminating Activity**
Completing a questionnaire about the coasters and writing a letter in which they have to pretend they are their coaster and write to their teacher explaining how they were made and how to find their area.

**Evaluation Method**
Students will complete the worksheet created for this activity (see Appendix 1)
Appendix 1

Circular Coasters Worksheet
Answer all questions

Name: ___________________
Teacher: __________________
Date: ____________________

The radius of your coaster is 5.4 cm. Use this information to answer all questions

1. What is the diameter of the circular face of your coaster?

_________________________

2. What is the circumference of the circular face of your coaster?

_________________________

3. Find the area of the face of your coaster? ___________________

4. Pretend you are your coaster and write a letter to your teacher explaining how you were made. Also tell your teacher how the students can find the area of your circular face.

__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________
Taking Pictures of Ten

This project offers student environment exposure through technology.

Curriculum/State Standards
Count by ones to 20 (N-1-E) (N-3-E)
Use the ordinal numerals 1st through 10th to discuss positions in ordered lists (N-1-E)
Identify the numerals for the numbers 0 through 20 (N-1-E) (N-3-E)
Using a number line or chart, identify the numbers coming before/after a given number and between 2 given numbers (N-1-E) (N-3-E) (A-1-E)
Count forward and backward from a given number between 1 and 10 (N-3-E)

Overview
Students participate in a tens number hunt around our school. While identifying the numbers they took pictures of each ten until 0-100 was marked on their reporting sheet. Students worked together to produce a numeral line onto the interactive white board using the pictures from their hunt after completing a number line independently.

Project Objectives
• The student will recognize and identify numerals, 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100.
• The student will complete a number line of tens.
• The student will use problem solving skills to locate numerals.
• The student will use technology to produce a number line.
• The student will upload and arrange the numerals in order onto the interactive whiteboard.

Materials
2 kid cameras
2 lists of columned numerals 0, 10, 20...100
2 clipboards
2 markers (blue/green)
2 sets of numerals 0, 10, 20...100 (blue/green)
computer
camera adapter
interactive white board
sentence strips for every student
sets of stars (0, 10, 20...100) for every student in mixed order

glue

Readiness Activity
Students were placed in colored groups (blue and green) and were given directions for the activity after writing multiples of tens outside with chalk.

continued on the back...

K
GRADE LEVEL

Arts

Language

Math

Misc

Science

History

Social Studies

45
MINUTES

$170
TOTAL BUDGET

This Winning Project Idea Was Submitted By:

Krystal Boudreaux
Kaplan Elementary
8702 Westwood Dr., Abbeville, LA 70510
“Taking Pictures of Ten” project continued...

Strategies Activity
We formed 2 lines of students along with a teacher for each and gave jobs to the first two students of the line: reporter/photographer. The reporter was given a clipboard with a number column of tens and the appropriate colored marker for that group (blue/green). The photographer from each group was given the kid camera. We searched our school for numbered stars of tens up to 100. Each team looked for their appropriate colored stars: green or blue. Upon finding a star the line of students had to use their hands to show a flickering star. Then the line would stop and the line would tell the reporter what ten was located, and the reporter would mark it out on the list while the photographer would take a picture of it. As one student would have the opportunity to be a photographer or reporter, the camera and clipboard were passed down the line until all students completed every job.

Evaluation Method
Independent student number line
Teacher observation of collaboration with peers
Teacher observation of participation
Teacher observation of completed work

Culminating Activity
The students used their number lines to assist them in ordering the pictures.

After each group finished finding all their numerals, each group went back into the classroom and worked on completing a number line of stars. They had to glue star numerals 0, 10-100 in order onto a sentence strip. While the students worked to complete their number line, the teacher uploaded the pictures from each camera onto the computer using the camera adapter onto a flipchart page on our interactive promethean white board. (PowerPoint can be used also) The blue group’s pictures were on one page and the green group’s were on another one. Once everyone finished their number lines, all students worked together to preview the pictures taken on the hunt and to order them from 0-100 using an inserted number line of points. The students dragged the numerals to the correct points of the number line. Each group (blue/green) completed this using the pictures they took.
Carver Crafty Creations

The students learn about factory work by mass producing products.

Curriculum/State Standards
M.A.7A.3, Translate real-world problem situations into number sentences involving addition and subtraction.
M.A.7A.5, Express, represent, and use percents, including 50% and 100%, and decimals in the context of money.
M.A.8, Data and summarize data sets to solve real world problems

Overview
The students have created a retail store by making the items in the inventory that they will sell the week before Christmas break. The students learned about inventory control, quality control, advertising, how to count money.

Project Objectives
• The students will understand the concepts of profit and loss and marketability for items created for sale in the Carver Crafty Creations store.
• The students will calculate unit cost for each item sold in the store.
• The students will set prices for store items based on cost and marketability.
• The students will determine how many items will need to be sold in order to make a profit.
• The students will keep records of store sales.
• The students will analyze sale records.
• The students will comprehend and apply business math skills by counting money and counting change.
• The students will use calculator to add up items purchased.
• The students will give correct change after adding up purchases.
• The students will add up total of sales at the end of each day.

Materials
calculator, inventory sheet, craft and food supplies to make items to be sold in store

Strategies/Activities
• students painted bowling pins to resemble, Santa Claus, reindeer, snowmen, penguins, sports teams, etc.
• students glued candies to resemble cars, trucks and sleds
• students made bath salts, soaps, candles, etc.
• students sewed pillows and neck warmers
• students melted chocolate and made chocolate covered pretzels
• students made chocolate peppermint candies
• students painted terra cotta pots
• students strung beads and made lanyards
• students made note cards
• students made refrigerator magnets and necklaces using pottery plaster, paint, and ribbon

Culminating Activity
Students set up a table in the school cafeteria and sold the items to the rest of the school before school and during school lunches.

Evaluation Method
Teacher observation was used to evaluate the quality of the products being made. If the product was deemed inferior the students were required to repair or redo the product. Pretest and posttest for calculator skills

6-8
GRADE LEVEL

Art

Language

Math

Miscellaneous

Science

History

Social Studies

3
MONTHS

$500
TOTAL BUDGET

THIS WINNING PROJECT IDEA WAS SUBMITTED BY:

Karen Driesbach
Carver Middle School
1200 N. Beecher St., Leesburg, FL 34748
No Weigh!

Curriculum/State Standards
The student solves real-world problems involving weight.
The student uses direct and indirect measures to calculate and compare measurable objects.
The student solves real-world problems involving estimates of weight.
The student determines which unit of measurement to use with real-world problems.
The student uses appropriate instruments to measure in real-world situations.

Overview
This project engages students in a real world experience when they weigh objects. Students will be able to compare different weights in customary and metric units.

Project Objectives
• The students will explore with customary and metric weights and make estimations when finding the weights of various objects.
• The students will be able to compare the different weights of objects.
• The students will be able to explain which unit of measurement to use when finding the mass of objects in their environment.

Materials
5 student balance sets, customary & metric weights, various objects for weighing (marbles, clay ball, block, toy car, orange, apple, crayons...)

Readiness Activity
Make estimations of the weight of the objects.

Strategies Activity
First the students will explore the different weights (customary and metric will be separate activities). They will be given a variety of objects (clay ball, marble, crayon, box of crayons, orange, book, pencil). They will predict what the mass of each object will be. Then they will use the scale and weights to find and record each object’s mass. They will respond in their math journals: “Were your predictions accurate? If not, which predictions were you most surprised by?” Then the students will be asked to find objects that match a given weight (for example, find an object that is 1 pound). Finally the student will use the related knowledge to explain the weights of objects like a backpack or a puppy.

Culminating Activity
Weighing multiple objects at one time (1 orange & 2 apples).

Evaluation Method
Students’ knowledge will be assessed through their journal recordings. At the end of the measurement unit including “No Weigh!,” a test will be given including naming the correct unit of measurement.

Laura Kuenn
Orange Grove Elementary
10300 65th Avenue North, Seminole, FL  33772
Budgeting for a Birthday

Students had to work together in large and small groups to plan their portions of the party.

Curriculum/State Standards
Students will understand rational numbers, fractional parts, and decimals in the context of money.
Students will solve problems involving addition and subtraction with regrouping; the concept of multiplication; and addition or subtraction of decimals (in the context of money).
Students will make estimates, determine when it is appropriate to make estimates and determine the appropriateness of their estimates.
Students will organize and display data using tally charts to answer questions related to data, to analyze the data to formulate conclusions, and to solve problems.
Students will recognize the pervasive use and power of reasoning as a part of mathematics.

Overview
Students will plan a birthday party with their classmates. They will choose a theme and break into committees for the planning components like decorations, food, and drinks. The project will end with the actual party. While birthday parties can be so extravagant these days, it is nice to put the planning and responsibility in the kids hands so they understand the value of items.

Project Objectives
• The student will understand how to prioritize a budget and utilize math skills to add, subtract, and multiply in the context of money.
• The student will learn how to work cooperatively in a group.
• The student will utilize craft materials and technology programs to create products such as invitations for the party.
• The student will appreciate the value of items.

Materials
supplies deemed necessary by the students
computer access/Microsoft Excel and the Internet for product research

Readiness Activity
Before beginning the project, create or find a simple budgeting worksheet for committees. Obtain catalogs and flyers from local stores for students to shop for party food and decorations. Parent volunteers are useful for doing some of the shopping and for taking photos while students are enjoying the final party. (Students could also be responsible for taking photos if they assign students to a photo committee.)

continued on the back...

Holly Doe
Pelham Elementary School
61 Marsh Road, Pelham, NH 03076

3
GRADE LEVEL

378
TOTAL BUDGET
“Budgeting for a Birthday” project continued...

**Strategies/Activities**
Students will be presented with the challenge of planning a birthday party for their class with only $50.00. The class will begin by voting on a theme for the party such as mad scientist or zoo animals. The class will also decide as a group the schedule and committees needed to plan the party.

Students will sign up for a committee and break into groups to brainstorm their ideas. Each committee will consider a different focus like decorations, menu, games, favors, and invitations. Each group is responsible for creating a budget request. Budget requests include item requested, the store where item can be purchased, quantity, estimation of price, actual price, and total price for item. Technology will be used to research the prices of items using the Internet. The teacher will meet with each group to go over their budget requests and to assist with the math or help with estimations.

When committees have completed their brainstorming of ideas and budget requests the class will come back together and individual committees will have time to justify their requests. The class will discuss the various budgets and vote on any changes or decide percentage allocations for each groups. Students will go back to their committee budgets and make any necessary changes.

When the funds have been allocated, students will create the invitations, create games, favors, decorations, and menu. Students will have two forty-minute periods to plan the party and work on their committee. The teacher and parent volunteers will assist in locating the resources students need and have budgeted for.

Before the party, all committee budgets are combined into one class spreadsheet with a formula to add the items for a final total.

**Culminating Activity**
Students have their party!! Using the items they have purchased, each group sets up their part of the party. The food committee sets up the food table, the decoration committee decorates, etc. Students will also add their party photos to Mixbook and create a classroom book for their classroom library.

**Evaluation Method**
Students completed a cooperative group rubric to evaluate how their group made decisions and worked together. After the completion of the party, the students were orally assessed on what was difficult and what they learned. Most telling were students observations about how difficult it was to pay for a party for 26 children with only $50.00. Initially, they thought $50.00 was a lot but they learned quickly how easily the money could be spent on food and decorations.
Family Math Night/
Pi Night

This project provided extra challenges in math allowing students
to do math at a higher level than they normally would.

Curriculum/State Standards
Students worked on grade level fraction problems, grade level addition/
subtraction/multiplication/division problems, logic puzzles, word prob-
lems, calculations of Pi, several activities involving Pi and graphing.

Overview
It provided a chance for families to be involved in math education. It helped create enthusiasm for math. And it provided a chance for students to have fun learning math. We also had many activities than integrated math with other disciplines (language arts, French, art, music). Furthermore, many of the math activities were planned by and run by students and their families. Family Math Night also brought the entire school together in a fun night celebrating math.

Family Math Night was like a carnival focused on math. Students arrived at Math Night and received a Pi(e) Chart with a number for each activity. Middle school students received extra credit if they participated in at least nine events. Students moved around the gym and had a chance to play each game. Many of the games had prizes. There was also Pizza Pi(e) served in the lunchroom. The evening ended with a math competition between the middle school math team vs. Principal Andrews and Einstein.

Project Objectives
• Students will integrated math with other disciplines (French, language arts, art, music).
• Students will learn about the number Pi and have a chance to calculate it.
• Students will learn about the Cartesian grid system and play a game with it.
• Students will learn about scale and create a piece of artwork using scale and grids.
• Students will learn how to do logic puzzles (sudoku, pentominoes, tangrams) by other students.
• Students will be integrally involved with teaching other students about math.

Materials
poster board, markers, prizes, food, paper products, paper, construction paper, colored paper rolls, tables, chairs, tape, supplies for games.

Readiness Activity
Planning of games by students. We played the games in small groups to make sure they could be replicated and to figure out what materials and instructions were needed. A layout of the gym was made to figure out how many tables, chairs, volunteers, posters, etc. were needed.

Mark Hirsch
Marcy Open School
414 4th Avenue SE, Minneapolis, MN  55414

THIS WINNING PROJECT IDEA WAS SUBMITTED BY:
“Family Math Night/Pi Night” project continued...

**Strategies/Activities**

Planning began on the project six weeks before the event. This allowed for students in small math groups to begin planning games and figuring out how to explain their games to others. Many hours were also spent coordinating volunteers, planning each activity and making sure that each table had the necessary supplies, buying supplies, making signs, ordering tables and chairs, ordering food, setting up the event and cleaning up.

Entry table where students received their Pi Chart and a Fraction Hunt sheet.

**Math Bingo:** Students had to answer math problems in order to cover up numbers on their game card, rather than just having a random number drawn.

**Pi Walk (instead of Cake Walk):** Chairs were numbered with digits 0-9. When the music (with math songs) stopped, a digit of Pi was revealed to choose the winner;

**Cartesian Coordinates:** This game had a king sized sheet with a large grid drawn on it. Various prizes were placed at the grid intersections. Contestants stood on each corner and rolled two large dice. They moved according to their roll (i.e. if they rolled a 3 and a 5, they could move three spaces one direction and 5 the other, or the other way around). If they won a prize, their turn was over. Students could keep playing until they won a prize.

**Math Jeopardy:** Categories were created (fractions, geometry, word problems, logic problems, addition/subtraction). Each category had problems that were based on what grade the contestant was in.

**Math Bowling:** Game created by and run by a student.

**Math Hang Man:** Created by a student. The student made up math problems for different grade levels. The game was played like regular hang man except that each space was for one part of the math problem.

**The Art of Math:** an 8-1/2 x 11 black and white picture of Einstein had a grid drawn on it and then cut into small pieces (1 inch x 1 inch). Before being cut, the pieces were numbered according to a grid system. Larger pieces of paper also had a larger grid drawn on them. Students took a small square and enlarged it onto the large square. They wrote the number of the small square on the back of the large square. When they finished their drawing, they taped it onto a grid in the appropriate place. No one knew what the drawing was until the end.

**The Language of Math:** Word problems were written in French and middle school students taught other students and adults French math terms in order to help them work the problems.

**Logic puzzles** were written in rhyme (middle school language arts was working in poetry) and students had to solve them in order to win a prize.

**The Pi Table:** Various round objects were available so students could measure the diameter and circumference and try to calculate Pi. Other Pi activities also at this table (run by a retired engineer).

**Pi Chain:** The first 150 digits of Pi were printed out on a long poster. Each digit was represented by a different color. Students created a Pi Chain using the digits of Pi. (This chain is still hanging in the hallway.)

**Computer Math:** the computer cart was set up with many different math websites available for students to play math and science games. Students could take a sheet of math websites.

**Culminating Activity**

The event ended with a Math Counts type of math competition with the middle school math team competing against the principal and a special surprise guest. Math questions were written from Math Olympiad competition problems. Each team got a turn to answer a math problem. If they got the right answer they received a point. If they got it wrong, the other team had a chance to answer.

**Evaluation Method**

After the event, a team of people involved in running the event walked through the process and made notes of what worked, what didn’t work.
Show Me the Money

The A-Café school project has enabled our special education population to learn about life skills while interacting with general education students.

Curriculum/State Standards
Alternate Assessment Grade Span Expectations in Mathematics

Overview
Our special education students have a school store, the A-Café, which sells coffee, snacks and home-made popcorn to teachers and staff. The money students earn is used for community outings and field trips. Coinulators were needed so students could count, categorize, and organize the daily funds collected.

Project Objectives
• The student will use the counting sequence to demonstrate one-to-one correspondence between objects and counting words/symbols
• The student will identify bills. $1.00, $5.00, $10.00, and $20.00 bills
• The student with identify the value of coins (penny as 1 cent, nickel as 5 pennies, dime as 10 pennies, a quarter as 25 pennies.
• The student will find possible combinations to equal 25 cents or 50 cents.
• The student will add bills together.

Materials
coinulators, coins, bills

Strategies/Activity
We were fortunate enough to begin our Growth Opportunities Program in a classroom equipped with a kitchen and a donated coffee maker and popcorn maker. Our special education population learns daily life skills each day by setting up the school store and selling various drinks and snacks to teachers and staff.

Culminating Activity
The coinulators that were purchased allowed students to count the money earned in the store in a realistic way. This activity showed the culmination of all their hard work in preparing and selling the products in their school store.

Evaluation Method
Students have improved their math skills. By using a coinulator, they can identify coins, use one-to-one correspondence, identify the value of coins, give change to customers, add coins values, roll coins, and make deposits. Students have improved their ability to complete worksheets using symbols and pictures associated with money. These skills are reinforced through money games.

On-Going

$400
TOTAL BUDGET

Cheryl A. Lundh
Toll Gate High School
575 Centerville Rd., Warwick, RI 20886
MATHOPOLY - 
A Game of Exploration

This project is valuable and effective because it gets all students actively involved in the learning process.

Curriculum/State Standards
Mathematical Processes
   [Problem Solving, Estimation, Analyzing, Reasoning, Algorithms, and using Manipulatives]
Number and Operations
   [Place Value (writing numbers in standard, expanded, and written form), Fractions (adding, subtracting, ordering, converting, and comparing), and Multiplication]
Algebra
   [Equations, Function Tables, and Patterns]
Geometry
   [Solids, Perimeter, Area, Coordinates, Capacity, Volume]
Data, Probability, and Statistics
   [Probability, Mean, Median, Mode, Range, Graphs].

Overview
This project is a fun, game-inspired approach to learning state assessed mathematics standards. It gets students actively involved and excited about learning by allowing them to visit different “properties” and complete hands-on activities. These “properties” allow them to practice and extend all the skills they have learned in their daily whole group lessons.

Project Objectives
• The student will gain an understanding of place value by building numbers, then writing them in standard, expanded, and written form.
• The student will learn to add, subtract, compare, and order fractions by using a fraction balance.
• The student will gain an understanding of solids by building them using sticks/connectors and nets.
• The student will become fluent in their multiplication facts.
• The student will understand coordinates.
• The student will master algebraic functions and increase computational speed.
• The student will explore probability and graphing using dice.
• The student will experiment with capacity and volume as they estimate and measure water in different containers.
• The student will create and solve his/her own word problems.
• The student will use clues to solve a math mystery.
• The student will use tangrams to solve puzzles.
• The student will compare and balance equations.
• The student will use a geoboard to experiment with perimeter and area.
• The student will know and be able to use mathematics vocabulary.
• The student will become excited about mathematics.

Continued on the back...
“MATHOPOLY - A Game of Exploration” project continued...

<table>
<thead>
<tr>
<th>Materials</th>
<th>Strategies/Activities</th>
<th>Readiness Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Place Value Cards, Rainbow Fraction Math Balance, Fractions and Decimals Activity Chart, Build and Learn Geometry Kit, Fold-a-Shape Classroom Kit, Digitz Multiplication Game, Coordinate Plane Domino Game “Where’s Wilson?”, Magic Function Math Machine, Hundreds Board Combo Kit, Dice-in-Dice Tub, Liquid Measure Kit, Build-a-Story Problem Flip Books (Time, Money, Measurement), Tangram Pattern Cards, Equation Invasion Game, Compare and Learn Comparing Equations Kit, Read It!Solve It! Graphing Card Bank, geoboards (2), package of 800 rubber bands (for geoboards), math vocabulary pocket chart, Geometry Mystery Box, student timer, pawns (for game board), magnetic tape (for the bottom of the pawns), poster board and markers (for the game board)</td>
<td>These were the “properties” that students visited:</td>
<td>Students worked together to make a big MATHOPOLY Game Board for the bulletin board. On the first day of play, all students started on the “GO” space. They each rolled a die and moved their magnetic pawn that many spaces around the game board. There were 18 spaces on the board. (1) “GO”, (14) different properties (see below), and (3) “Free Choice” (they get to choose their favorite property). I also labeled places in the room so students would know where to go when they visited their “property.”</td>
</tr>
<tr>
<td>(1) “Park Place Value:” Here, students used place value card, i.e., 300,000; 20,000; 5,000; 100; 60; 7 to build numbers, i.e., 325,167. They then wrote them in standard, expanded, and written form.</td>
<td>(2) “Free Fraction Parking:” Here, students used a fraction math balance to demonstrate the relative size of fractions and practice adding, subtracting, and converting fractions. The balance allowed them to check their work as incorrect equations would not balance out. Students also compared and ordered fractions by placing them on a number line.</td>
<td>(1) “GO”, (14) different properties (see below), and (3) “Free Choice” (they get to choose their favorite property). I also labeled places in the room so students would know where to go when they visited their “property.”</td>
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<td>(3) “B &amp; O Build-a-Solid Railroad:” Here, students pieced together easy-fitting sticks and connectors to build geometric solids. They also identified and compared faces, vertices, and edges as they used nets to create solids.</td>
<td>(4) “Marvin Multiplication Gardens:” Here, students raced against the clock in this fast-paced game to master multiplication facts and identify missing factors. Students also used timers to do multiplication timed tests.</td>
<td>Students worked together to make a big MATHOPOLY Game Board for the bulletin board. On the first day of play, all students started on the “GO” space. They each rolled a die and moved their magnetic pawn that many spaces around the game board. There were 18 spaces on the board. (1) “GO”, (14) different properties (see below), and (3) “Free Choice” (they get to choose their favorite property). I also labeled places in the room so students would know where to go when they visited their “property.”</td>
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<tr>
<td>(5) “Connecticut Coordinates Avenue:” Here, students answered the question “Where’s Wilson?” by matching domino cards with hiding places and ordered pairs to build a pattern from the starting board.</td>
<td>(6) “Atlantic Algebra Avenue” Here, students drew number cards to create and solve equations. Then, they dropped the cards into the machine and the answers popped out below. They wrote the answers on the write and wipe function cards. Students also used the Hundreds Board to do Wade Sherard’s hundreds board activities and arrow paths.</td>
<td>Students worked together to make a big MATHOPOLY Game Board for the bulletin board. On the first day of play, all students started on the “GO” space. They each rolled a die and moved their magnetic pawn that many spaces around the game board. There were 18 spaces on the board. (1) “GO”, (14) different properties (see below), and (3) “Free Choice” (they get to choose their favorite property). I also labeled places in the room so students would know where to go when they visited their “property.”</td>
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<td>(7) “Pennsylvania Probability Avenue:” Here, students explored probability as they rolled these special dice (each translucent die has a smaller die right inside) and tallied the outcomes. Then, they graphed the results. Students also calculated the mean, median, mode, and range.</td>
<td>(8) “Mediterranean Measurement Avenue:” Here, students estimated and measured capacity and volume as they poured colored water into labeled containers from ¼ teaspoon to 1 gallon.</td>
<td>Students worked together to make a big MATHOPOLY Game Board for the bulletin board. On the first day of play, all students started on the “GO” space. They each rolled a die and moved their magnetic pawn that many spaces around the game board. There were 18 spaces on the board. (1) “GO”, (14) different properties (see below), and (3) “Free Choice” (they get to choose their favorite property). I also labeled places in the room so students would know where to go when they visited their “property.”</td>
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<tr>
<td>(9) “Problem Solving Railroad:” Here, students wrote and solved their own word problems by flipping through a spiral notebook split into thirds to choose the details of each word problem. Students built over many different story problems per book. The books covered money, measurement, and time. Students wrote and illustrated these in a class math journal.</td>
<td>(10) “Tennessee Tangrams Avenue:” Here, students used critical thinking skills while using tangrams to solve puzzles.</td>
<td>Students worked together to make a big MATHOPOLY Game Board for the bulletin board. On the first day of play, all students started on the “GO” space. They each rolled a die and moved their magnetic pawn that many spaces around the game board. There were 18 spaces on the board. (1) “GO”, (14) different properties (see below), and (3) “Free Choice” (they get to choose their favorite property). I also labeled places in the room so students would know where to go when they visited their “property.”</td>
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<tr>
<td>(11) “Electric Equations Avenue:” Here, students used cards and tiles to compare and balance equations.</td>
<td>(12) “St. James Geometry Place:” Here, students read clue card then reached inside the mystery box and searched for the matching shape. Students also used geoboards and rubber bands to build shapes with various perimeters and areas.</td>
<td>Students worked together to make a big MATHOPOLY Game Board for the bulletin board. On the first day of play, all students started on the “GO” space. They each rolled a die and moved their magnetic pawn that many spaces around the game board. There were 18 spaces on the board. (1) “GO”, (14) different properties (see below), and (3) “Free Choice” (they get to choose their favorite property). I also labeled places in the room so students would know where to go when they visited their “property.”</td>
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</table>

Continued on the back...
“MATHOPOLY - A Game of Exploration” project continued...

**Strategies/Activities (cont.)**

13) “Reading-a-Graph Railroad:”
   Here, students read and solved activity cards covering circle graphs, pictographs, bar graphs, line graphs, data tables, and plots. Students also used information gathered from class surveys (i.e., favorite food, subject, animal, etc.) to make graphs.

14) “Vermont Vocabulary Avenue:”
   Here, students used cards in a pocket chart to match math vocabulary words with their definition and illustration.

**Culminating Activity**

At the end of each game day class period, some students had the opportunity to win a “Chance” card. This card gave them a chance to earn a prize by explaining one thing they learned at their property.

**Evaluation Method**

I used teacher observation as the primary evaluation, because I floated around the room during this time. Some “properties” also had worksheets that were turned in to me for review. Also, at the end of each game day, some students presented to the class something they learned while at their “property.” At the end of the nine-weeks, I also gave a comprehensive skills test.
Capturing Math in the Real World

Students were using up-to-date technology, including digital cameras, laptops, photo software, and power point, in order to capture math concepts in their environment.

Curriculum/State Standards
This project focused on the algebra standards for recognizing the different types of slope and accurately calculating slope.

Overview
Students captured various examples of positive, negative, zero, and no slope throughout our school environment, as well as examples of parallel and perpendicular lines. Students measured the real lines to calculate the rate of change. These pictures and data were put into a PowerPoint presentation and presented to the class as a cumulative review of slope.

Project Objectives
• The student will demonstrate understanding of the categories of slope by recognizing each type.
• The student will demonstrate knowledge of calculating slope.
• The student will work collaboratively with classmates.
• The student will demonstrate technology skills throughout the creation of the project.
• The student will demonstrate speaking abilities during the presentation.

Materials
digital cameras, memory card, memory card readers, laptop with photo software and power point, our environment

Readiness Activity
Students would have already accomplished knowledge of slope and formula for calculating the rate of change.

Strategies/Activities
Students collect pictures from the environment (four pictures for each category: positive, negative, zero, no slope), as well as taking measurements of the lines.
1. Students transfer the pictures to the computer and make necessary edits.
2. Students input pictures and data into PowerPoint presentation, organizing into the four different categories.
3. Students present the slide shows to the class.

Culminating Activity
Presentations and sharing with school community

Evaluation Method
Students were evaluated on their PowerPoint presentation, particularly evaluated over the correct type of lines and correct measurements

Students were using up-to-date technology, including digital cameras, laptops, photo software, and power point, in order to capture math concepts in their environment.

Brenda Mescher
St. Joe Middle School
44 North 25th St., Battle Creek, MI 49015
Which Pumpkin Has More?

This project is effective in teaching estimation.

Curriculum/State Standards
N/A

Overview
Student estimate the circumference, weight, and amount of seeds inside two different size pumpkins. They will then collect accurate data of measurements and compare their findings.

Project Objectives
• The students will understand the meaning of estimation, circumference, and weight.
• The students will understand the difference between estimation and actual measurements of objects.

Materials
measuring tape, yarn, scale,
4 project boards, 4 small pumpkins,
4 large pumpkins, scissors, tape,
crayons, markers, computer, paper
digital camera.
How Many Seeds in A Pumpkin by Margaret McNamara

Readiness Activity
Read How Many Seeds in A Pumpkin and discuss what it means to estimate.

Strategies/Activities
Students will be put in groups of four or five and be given one large and one small pumpkin. Students will be given a ball of yarn with which they are to estimate the circumference of each pumpkin. They will guess the weight of each pumpkin. Then they will estimate how many seeds are in each pumpkin. Next they are to record their data. After they have completed their estimation, they are to perform each task of weighing, measuring, and counting the seeds inside each pumpkin. Students will record the actual data and compare their findings to their estimations. After students have completed their data collection they create a presentation board to display their findings.
• Estimate the distance around each pumpkin.
• Estimate the weight of each pumpkin.
• Estimate how many seeds are in each pumpkin.
• Measure the distance around each pumpkin using a new piece of yarn.
• Weigh each pumpkin.
• Gut each pumpkin and count the seeds inside.
• Answer the question of which pumpkin had more seeds.
• Compare the yarn of your estimations to the actual, use the measuring tape to get an actual measurement.
• Create project board to display data.

Continued on the back...
“Which Pumpkin Has More?”

project continued...

Which pumpkin had more seeds?
Were you correct in your estimations?
Were you correct in your estimation of weight?
Were you correct in your estimation of the distance around?
Now use your computer to type data and print it out for your project board. Use crayons, markers, colored pencils to decorate your board. Be sure to use your before and after photos on your board.
Be sure to include your yarn pieces on your board and label each piece. Be creative and add these sheets as proof to your data collection.

Culminating Activity
Students will take pictures, data, and yarn used to create a project board displaying their data. As a group they will create three sides to their board. The left side will represent their estimated data and pictures, the middle portion will show what their actual data was from both of their pumpkins, the right side of the board will display their differences of data. They will document how effective their estimations were and how accurate.

Evaluation Method
Present project boards to the class of their group’s findings. Student will share whether or not their estimated weights, circumference, and seed amount were accurate or incorrect. They will explain their results and share their differences between their estimation and actual data.
My Five Senses

This project integrates science and math.

Curriculum
Science standards: make observations, use cooperation and interaction skills, use senses to describe objects.
Math standards: sort objects, create graphs using real objects.

Overview
This project teaches children to observe and describe objects using their five senses. After making observations, they will put their observations in a graph.

Objectives
Students will participate in class discussion.
Students will use their senses to make observations.
Students will sort items into appropriate categories.
Students will complete graphs using information from class observations and discussion.

Materials
white board, swirling streamers, plasma ball, gathering drum, rainmaker, tactile pillow, wedgemat walkway, scented candle, lotion, starbursts, juice (sensory items can be substituted as needed).

Readiness Activity
Review the five senses with the class and have them name things that they see, hear, feel, smell, and taste.

Strategies/Activities
Day 1: Teacher will have 5 items, each of which is observed using primarily one sense. Teacher will present each item, one at a time, and let the students see, hear, touch, smell, and taste them as appropriate. He or she will then ask the students to use their senses to make observations. The class will discuss what sense was used most when observing each item. The students will have a piece of paper with a graph. In the first column, it will have a drawing of an eye, ear, nose, mouth, and hand. Students will draw each item presented in the row matching the sense that was used to observe it. If the class decides an item can fit into two columns, that is ok. Items: see - swirling streamers, hear - gathering drum, touch - tactile pillow, smell - candle, taste - starburst.
Day 2: Teacher will repeat the above activity with a different set of items. Items: see - plasma ball, hear - rainmaker, touch - wedgemat walkway, smell - scented lotion, taste - juice.

Culminating Activity
Review graph with the class

Evaluation
Each student will participate in class discussion. Students will use all five senses to observe the items (when appropriate). Students will choose the primary sense used to observe an item with 90% accuracy. Students will complete the graph with 90% accuracy.
Mouthwatering Graphing

Students become higher level thinkers in math because of graphing goodies.

Curriculum
Understand data analysis.
Collect, organize, and display data.
Math skills will be strengthened, which is a relevant skill to the "No Child Left Behind" initiative.

Overview
This project was a huge success. The students in my class were strong students in the graphing area, which lead to higher level thinking in their overall math skills. The students LOVED seeing the graphing items being pulled out for math. They especially LOVED eating their graphing items!

Objectives
The students will construct and use graphs of real objects to answer questions.

Materials
Graphing candy, sorting mat, graphing paper, and questions that pertain to the items graphed.
Different flavors of Teddy Grahams, Trix, Halloween Apple Jacks, Halloween gumdrops, candy corn, Valentine heart candies, Valentine gobstoppers, Lucky Charms, apples, Spring M&M's

Readiness Activity
The students first learn how to graph. They also need to know the words that they will be reading on their papers. Then they are ready to begin!!! If I notice a child having a particularly hard time with either the graph, or the reading I will pull them into small group and I can give that child/children more 1-to-1 help.

Strategies/Activities
All students will receive a cup full of "goodies." The students will pour out its contents and sort using a teacher made sorting mat for that specific item. Then, the children will place the food items onto the appropriate place on the graph. Once that is done, they will color the amount of spaces necessary for their items.

When their graph is done they will answer some questions relating to the items graphed. Some questions would be: What did you have the most of? What did you have the least of? And then later on in the year-I would ask for the difference of 2 items, and the total number of some items.
Once papers are checked for accuracy, the child may then eat the goodies!!

Evaluation
Teacher will check for accuracy of items graphed and questions answered correctly.

Cindy Bovey
Kamiah School
1102 Hill Street, Kamiah, ID 83536
Tesselate!

This integrated math project addresses the transformational geometry standard for grades 9-12

Curriculum
This integrated math project addresses the transformational geometry standard for grades 9-12. By the end of the project, students understand the different kinds of geometric transformations that can be applied to shapes within a plane, including rotations, translations, and reflections. They apply this knowledge in the creation of a tesselation pattern that is joined together with the tesselations of their classmates.

Overview
This standard is especially important in California because it is required knowledge to pass the California High School Exit Exam. Learning how to apply transformations and tesselations to geometric shapes is a difficult task for many students who have visual and spatial learning barriers. In addition, describing how to apply transformations and tesselations to my students is a difficult process because they are all recently arrived immigrants who are beginning to learn English. My students learn best by actively participating in collaborative, hands-on activities where they have to use mathematics to complete a project with each other.

Students create their own tesselation pattern on a square of cardstock. The pieces of cardstock are placed together to form a wall-sized quilt that is then framed and hung for each class.

Objectives
The student will learn how to apply transformations such as translations, rotations, and reflections to geometric shapes.
The student will learn how to create a tesselation, which is a pattern of repeated geometric shapes.
The student will learn how geometry applies to the real-world professions of art and design.

Materials
graph paper, chart paper, cardstock, frames, colored pencils, paint, and paint brushes

Readiness Activity
Introduce students to the four kinds of geometric transformations: slide, rotation, flip, and scale. Students work on sheets of graph paper to practice transforming regular polygons before moving to triangular dot paper for more complex shapes. Once students are familiar with transformations, begin studying pictures of tesselations to identify how shapes are transformed within each tesselation.

Continued on the next page...

THIS WINNING PROJECT IDEA WAS SUBMITTED BY:

Sailaja Suresh
Oakland International High School
4521 Webster St., Oakland, CA 94609
“Tesselate!”
project continued...

<table>
<thead>
<tr>
<th>Strategies/Activities</th>
<th>Evaluation</th>
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<tbody>
<tr>
<td>Prepare students for making tessellations by studying geometric transformations of regular and irregular polygons. After students are comfortable with transformations, introduce them to tesselating these same shapes. Have students practice drawing transformations and tesselations of predefined regular and irregular polygons on sheets of cardstock. Once students have become proficient in tesselating basic shapes, they are then ready to work together to create a tesselation quilt as a whole class.</td>
<td>Students were evaluated end-of-unit test and were given the opportunity to orally present their work during year-end portfolio presentations. All students will be expected to present their designs to their peers and to be able to explain how they created their design, using mathematical English. All students will also be taking an end-of-unit test requiring them to apply transformations to basic geometric shapes, ensuring that they understand the underlying mathematical ideas within the project so they can apply this knowledge in future situations.</td>
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</table>

**Culminating Activity**
Each student creates a square 10x10 inch tessellation pattern with their own colors and shapes. Students should make a rough draft on graph paper with colored pencils before moving to cardstock (or canvas) and paint. Once each student has completed their square, assemble them on a backing of colored butcher paper and frame for hanging.

To differentiate, more advanced students can be given two tessellations to create or they can be given more restrictions on what kind of polygon they are allowed to use. Students who have a more difficult time with tesselations can continue to work with basic regular polygons like rectangles, triangles, or hexagon.
Histogram I Am

What better way to learn graphs than to "get real" with them?

Curriculum
1) Students will design a simple experiment and collect data. They will then examine the mean, median and range of the whole 7th grade, male 7th graders and female 7th graders. Students will also examine their homeroom class and compare that to the whole grade.
2) Students will analyze and describe the impact of deleting a data point and its effect to the mean and median. Students will use a spreadsheet to show the change.
3) Students will display the data in the form of a histogram. One type will be a picture graph, the second will be using the Tinkerplots program and the final graph will be using the students themselves.

Overview
7th grade students will investigate histograms where they are the graph. Students enjoy seeing how they "measure up" to their classmates. This project will allow students to manipulate their own personal data to create a number of different graphs, leading up to the culmination of actually being a physical data point! Students are able to make different connections to the mathematics of data analysis when they actively participate in the mathematical process rather than use statistics that are supplied by their textbook.

Students will have to decide how to measure their class' height. Students will take pictures of each class member when they collect their data. They will then use technology to graph this data using two different programs. After students examine the measures of central tendency, they will construct a pictorial histogram that will be displayed. The final graph that students will make will be where they physically construct the data (we will use the gym or go outside). The teacher will take a picture of the students as they stand and form a human histogram. At the end of the year we will reconstruct the experiment and activities to document the physical change that 7th grade students go through.

Objectives
• The student will design a histogram experiment and develop strategies to collect data using technology based hands-on learning activities.
• Students will analyze and describe the impact of deleting a data point and its effect to the mean and median. Students will use a spreadsheet to show the change.
• The student will effectively use technology to construct graphs and histograms.
• The student will examine and compare pre and post data and make scientific conclusions regarding the changes that occur.

Materials
Tinkerplots software, computers, digital cameras, meter sticks or tape measures, photo paper, posterboard, tape and glue, scissors

Continued on the next page...

THIS WINNING PROJECT IDEA WAS SUBMITTED BY:

Bryan Anderson
Cass Lake-Bena ISD #115
15308 Hwy 371 N, Cass Lake, MN 56633

7-8
GRADE LEVEL

3-4
DAYS

$560
TOTAL BUDGET
"Histogram I Am" project continued...

Readiness Activity
There are a couple of readiness activities that are needed for this project. Students must have a basic knowledge of the Tinkerplots software and how to manipulate the data. The Tinkerplots activity normally takes one class period. Students learn to enter their data and how to create different statistical graphs using that data. They must also have an understanding of graphs and the difference between a histogram and bar graph. This can be done with any graph unit that your curriculum implements.

Strategies/Activities
Student design of their experiment begins with examination of the variety of methods to measure human height. After this initial exploration, students will select the measurement method they will employ. Data collection is next, with students collecting measurement data from each class member using the measurement method they have selected. Students will take pictures of each member of their class during this stage (the pictures will be used later). This data is collected by individual classroom so that comparisons between classrooms and grade level can be made. When all classes have their data, a discussion will be raised about how to compare all classes' measurement method.

After all classes collect their data, they will construct a histogram by graphing their picture to a grid. For this they will use pictures of themselves to make the different histogram intervals. This creates a visual display of the 7th grade and their teachers that is displayed in a main hallway. One fun adaptation to this graph is done by varying the height of the x axis to be the actual height of the students graphed above it. This allows a student to walk up to the graph and see where they measure up to other students.

Moving into the computer lab, students will create spreadsheets containing data for the whole grade. Students will then create circle graphs and histograms looking at the mean, median and range for the whole grade and individual classrooms. A short paper about the similarities and differences between their class and the grade will be collected. Students will then return to the lab and examine the data in an interactive data program, Tinkerplots®. Tinkerplots® will allow students to create dynamic histograms and separate data into many different classifications, including gender, class, and date of birth. Project design continues as students determine which histograms to include in their experiment. Continuing the innovative use of technology in hands-on learning, students will participate in a large group project as well. After printing out numbers representing the histogram intervals, students will graph their heights physically by standing at the correct interval. When the whole grade is graphed, a photo will be taken and posted by the histogram previously constructed. At the end of the school year, students will do this activity again to see the physical changes they undergo.

Evaluation
"Histogram I Am" is a Minnesota State Standards based project. In order to assess student performance on mastery of the standards, I will develop a rubric which measures student progress toward mastery. On a learning continuum, I will identify specific skills present at four different levels of proficiency, (Significant Gaps, Partially Proficient, Proficient, and Exceeds Proficiency), for each of the standards addressed. As the project begins, I will share this rubric with students so that they are aware of what mastery looks like. Using the rubric as a discussion tool, I will meet with individual students during the project and discuss their progress towards mastery. At the end of the project I will meet individually with students and share my final analysis of their performance on the rubric.

I will use the student performance data from the rubric to assess success of the project, comparing the number of students who achieved mastery to those that did not, number of students showing significant growth to those that did not, and analyzing the effectiveness of the project in meeting the various standards which are embedded.
Applying Mathematics to Enrich Society (AMES)

I think this project was effective in getting fifth graders to see beyond themselves, to feel they had valuable contributions to make to their community, and to engage their academic skills in meaningful public service.

**Curriculum/State Standard**

<table>
<thead>
<tr>
<th>Pennsylvania Academic Standards in Mathematics:</th>
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<tbody>
<tr>
<td>2.2.5 (Computation and Estimation)</td>
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<td>2.5.5 (Mathematical Problem Solving and Communication)</td>
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<tr>
<td>1.4.5 (Types of Writing)</td>
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<td>1.5.5 (Quality of Writing)</td>
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<tr>
<th>Pennsylvania Proposed Academic Standards in Citizenship:</th>
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<tr>
<td>5.2.6 (Rights and Responsibilities of Citizenship)</td>
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</table>

**Objectives**

- The student will be aware of his or her connection to other members of our community.
- The student will be able to know, define, and identify the term “needy child.”
- The student will write a friendly letter to a Pennsylvania child affected by the terrorist attacks of September 11, 2001.
- The student will add and subtract money amounts to the penny.
- The student will multiply a money amount times a decimal number.
- The student will demonstrate compassion for and awareness of other people by selecting, purchasing, and wrapping an age- and gender-appropriate gift for a child in need.
- The student will measure the girth of three-dimensional geometric shapes (the gifts) to ascertain the amount of wrapping paper needed for each gift.

**Overview**

Students selected, budgeted, shopped for and wrapped gifts to present to county families who lost loved ones in the September 11, 2001, terrorist attacks. Students held a remembrance ceremony on March 6, 2002, the six-month anniversary, to present these gifts to the invited families. The mathematics, language arts, and social studies skills learned in school were applied to a community act of generosity and compassion.

Continued on the back...
“Applying Mathematics to Enrich Society” project continued...

**Materials**

Sales circulars from the cooperating store, calculators, scrap paper, scissors, tape, plain and lined paper, envelopes, gift wrap, purchased gifts, oaktag for gift cards, crayons, markers or colored pencils.

**Readiness Activity**

Students in mathematics class used the sales circulars to first develop imaginary shopping lists and calculate their totals. They also calculated the change they would receive for a given amount of money. Students in language arts class reviewed the parts of a friendly letter. After students demonstrated ability to perform simpler tasks, the teacher described the actual project and solicited reactions and comments. Students universally wanted to participate and engaged in a lively discussion about the possible impact the terrorist attacks may have had on the families involved. They compared their own situations to those of the families in need. Very little emotional readiness was needed, since students had been contending with the September 11, 2001, attacks all year, both informally and through current events class.

**Strategies/Activities**

Select a community member or members in need. While the September 11, 2001, tragedy is a unique and terrible focus, many members of our community (foster children, children in poverty, homeless people, elderly people, veterans, burn victims, etc.) are in need of compassion, support and attention.

Contact a local charitable organization to act as liaison between the students and the needy community member(s). I used the American Red Cross, who knew the names and addresses of county families affected by September 11, 2001.

Identify a local business willing to work with you on allowing students to shop in their store. Using grant money or other financial resources, divide the available funds among the student groups (I used three students per group) and provide them with store circulars, calculators, and age and gender information about the needy neighbor(s).

Students develop a shopping list to fit their budgets and to calculate sales tax. They prepare a final list.

As a class field trip, students shop in the store. At this point they may need to make changes to their list, which entails recalculating totals, sales tax, and difference between item totals and available funds.

Students provide an estimated total cost, make the purchases, and compare their estimated and actual costs.

Students measure the packages’ girth to measure and wrap the gifts. Students wrap the gifts and compose small gift tags.

Students write friendly letters to the needy neighbor(s) demonstrating compassion, caring, and the ability to think beyond their own needs.

If possible, students plan a presentation ceremony and write invitations to the needy neighbor(s), school board members, district administrators, and charity.

Students present the gifts and letters to the needy neighbor(s) or their representative charity at the ceremony. This is done without publicity to protect the privacy of the individuals and to remind the students that the charitable act is reward enough.

**Culminating Activity**

On March 11, 2002, the six-month anniversary of the terrorist attacks, students held a one-hour remembrance ceremony in the school. The American Red Cross had passed our invitations on to the families affected by the attacks. The invitations stipulated that the families’ identities would be protected, they were welcome to come or not to come, and no one would take their pictures. Of five county families, one did come to the remembrance. This widow, with her three very small children, became a focus for the 120 fifth graders. The students quietly watched the children open their gifts, then encouraged the widow to open hers. She hadn’t realized she, too, would receive anything, and was deeply touched that fifth graders could think about the wants and needs of a grown woman, a stranger to them. The school superintendent, assistant superintendent, mathematics supervisor, and two school board members all attended. Even now, I get goosebumps thinking about the emotions of that morning.

**Evaluation**

In class, student groups had to present their preliminary shopping list, demonstrate the ability to calculate sales tax, calculate the estimated total cost, and calculate the difference between their budget and their estimated total. At the store they had to restate their estimate, receive the actual sales receipt, and justify the difference between estimate and actual total.

The students’ friendly letters were proofread, edited, and returned for corrections until each one was to the student’s best ability.

Students wrote self-evaluations of the project, to reflect on their achievements.
Island Getaway

This interdisciplinary project combines lessons in geography, English, life science and mathematics as students create an island and its geography, climate, agriculture and ancient mythology.

Objectives
• Students combine mathematics and art to construct a model of an island.
• Students use knowledge in life science to create climate and agriculture of the island.
• Students use imagination combined with English studies to create the island’s mythology.

Materials

Geography (maps and cultural poster)
• Paris craft
• Styrofoam products
• Foam board and foam cutter
• Modeling clay
• Wheat paste
• Papier-mâché
• Poster board
• Glue sticks and rubber cement
• Markers and colored pencils
• Rulers

English (gods/goddesses and collage frames)
• Tag board
• Colored pencils
• Mat Board Frames
• Craft glue
• Rubber cement
• Miscellaneous craft items (yarn, buttons, glitter, beads, etc.)

Math/Art
• Tag board
• Mat board
• All-purpose glue and tacky glue
• Scissors and X-Acto knives
• Masking and scotch tape
• Construction paper
• Miscellaneous craft items (tissue paper, felt squares, ribbon, small tiles, etc.)

Continued on the back...
“Island Getaway” project continued...

Procedure

Each step can be done by all students or distributed separately; however, the benefits of the interdisciplinary project requires that each student be involved in each step.

1. Students begin with physical map construction including a fault line, peninsula, volcano or plateau and a water form such as a gulf, bay, lake or swamp. This stage will take the longest as students are physically constructing models of the island.

2. Students then use a blank version of the physical map to make a climate map complete with ocean currents and the wind belt system.

3. Next students create a mineral and agriculture map discussing crops and their value to the island and other countries.

4. Students may begin city map construction and government creation.

5. Finally, students create the ancient beliefs of the island's inhabitants complete with stories and poetry of ancient mythology.

6. The entire project can be displayed throughout the school as a workshop for other students or a showcase for parents and teachers.
Mathematics & Science Materials

When the appropriate materials are available, this project is good for teaching the grade level standards in mathematics and science for the various grade levels and needs of students in special education.

Curriculum/State Standard
This project was used to meet the state standards in the areas of Mathematics and Science.

Overview
Students worked with a common object in their environment in a number of different ways, using math and science skills.

Objectives
• The students will collect information about objects and events in their environment.
• The students will pose information questions, collect data, and record the results using objects, pictures and picture graphs.

Materials
Classroom graph ready for students to use, Unifix Cubes, crayons, and paper

Readiness Activity
Read a story about pockets. I chose to read “A Pocket for Corduroy” by Don Freeman. Discuss the story. Generate questions about pockets from the students. Discuss the student generated questions and other questions like:
- what kinds of things might you keep in a pocket?
- what kinds of clothes have pockets?
- what shape is your pocket? etc.

Continued on the back...
Strategies/Activities

- Students decorate a pocket.
- Students take a Unifix Cube and put one cube in each of their pockets.
- Students take the Unifix Cubes out of their pockets and count how many they have.
- Glue or tape the pocket on the class graph under the appropriate number of pockets.
- Discuss the graph:
  - who has the most pockets?
  - who has the least pockets?
  - do any people have the same number of pockets?
  - how many more pockets does ______ have than ______?
  - how many fewer pockets does ______ have than ______?
  - how many pockets do ______ and ______ have all together?

This could also be done a second day and compare the results on the two graphs.

- Extension activities: take all the Unifix Cubes from people's pockets and count. Take all the Unifix Cubes and connect into tens and ones.

Culminating Activity

The culminating activities consisted of three things. One was the discussion of the graph. The second was the development of new original ideas for questions to explore through the collection, graphing and analysis of the graph. The third was the art activity of making their own bears without a pattern and dressing the bears in clothing with a pocket. These bears were then used for another math activity, size and ordering according to size.

Evaluation

Evaluation was based on the student's oral discussion of the activity.
Carnival Math

Students eagerly complete probability problems in order to play and win carnival games.

Curriculum
Algebraic Equations, Probability, Graphs, Decimals, Fractions and percentages.

Overview
Students played a variety of math games in a carnival setting. When they won a prize they figured probability of which prize they would win when drawn out of a bag without looking. Each time a prize was removed, the fractions, decimals, and percentages changed and students quickly became adept at these skills.

Objectives
The student will use the games, sights, and treats from the carnival and convert them to mathematical functions. The student will play arcade games after figuring the probability of each. The student will receive a sucker, ball or hacky sack after correctly devising fractions that tell the odds of drawing each color. Students will make graphs and tables to represent the games and how often a contestant won a game. The student will find games or prizes that match a variety of mathematical ideas and problems.

Materials
math games for carnival, prizes to use in probability draws (suckers, balls, and hacky-sacks), carnival decorations, music, and food.

Readiness Activity
Students prepare probability posters to put by each game and prize bag, balloons, crepe paper, and posters are hung to simulate a carnival. Games are set up to be played, balloons inflated, popcorn is popped, and fun music is played.

Strategies/Activities
This is a pretty easy project. We decorated the room to look like a carnival, put on carnival music, popped some popcorn, set up several different games around the room, including a banner for pictures, prepared probability posters with the total number of prizes in a container and the breakdown of each color or design and gave clipboards with scratch paper on it for the kids to figure information on. After figuring answers on the scratch paper, they then wrote it on the poster and took their prizes. They would then take one off the total and reduce the appropriate color by one. It was a lot of fun and a great motivator for the students. When the carnival was over, students made graphs showing how many games they won and what prizes they received.

Continued on the next page...
“Carnival Math” project continued...

**Culminating Activity**
The popcorn was eaten, the music listened to, the games played, the probability figured and the prizes won. We also collected some other prizes and invited a special needs class to go through the carnival. They didn’t have to figure the probability, but they played the games, got some popcorn, a balloon, and we let them guess what prizes they would draw after each game. The fifth graders hosted the games for these students and got an even bigger reward from the carnival. The special needs kids were ecstatic and had a blast!

**Evaluation Method**
Students made graphs to explain winnings and probability, they matched algebraic equations, fractions, and probability to games and prize winnings. Students verbalized real life applications for each of the math problems.
Attracting Women into Engineering for Employment Opportunities

Increasing access to education and career choice is the key to advancement and prosperity.

Curriculum
NJ 4-Mathematics, 5-Science, 8-Technology, 9-Career Education

Overview
The "Attracting Women into Engineering for Employment Opportunities (AWEEO)" is a program inspired by the "Attracting Women into Engineering" workshop held at Rowan University. The program is designed to propagate the upliftment of young women at East Camden Middle School. The higher rate of technology and engineering education provides an opportunity to possibly employ thousands and enable them to utilize technology to increase their marketability.

Objectives
The student will explore opportunities in the field of Engineering.
The students will discuss scientific and mathematical concepts linked to the workshop.
The students will perform complete pre-determined hands-on activities.
The students will journal their experience

Materials
Sports - tennis balls (other small balls), tennis rackets, tape measure / yard stick, painter / masking tape, clamps (secure racket to edge)
Chemical - small clean containers, essence, lanolin, bees wax, honey, coconut oil, Pyrex water bath apparatus
Bridges - foam board, card stock, Jenga, push pins
Robots - MindStorm Educational Kits, software, masking tape, dark/ light construction paper
Kites - paint, stamp/stamp pads, scissors, butcher paper, bamboo dowels, tape, brushes, string, streamers, corrugated cardboard (used boxes), foam plates (for paint)
Student Supplies - composition books (for notes), journals, pens/ pencils, folders (for handouts), technology projects, storage containers

Readiness Activity
Discussions about each component as it relates to engineering.
Determine what will be completed.
Identify materials needed.

Strategies/Activities
Physics of Tennis - Background
In tennis, the sweet spot is the area of the racquet which yields the most return and produces the best feel. "The sweet spot is the location on the racquet where the ball seems to fly off the strings with a little effort". Every racquet has three different sweet spots and these are the center of percussion, node of first harmonic, and the coefficient of restitution or best bounce. The concepts of energy can be used to explain the idea of sweet spots. By using kinetic and potential energy in conjunction with fun sports activities, students are introduced to the physics of tennis.

Continued on the next page...
“Attracing Women into Engineering”

Objective
The objective of this project is to use the concepts of energy to introduce students to physics by using fun sports activities such as bouncing a tennis racquet and analyzing the return of the ball.

Materials
Tennis racquet, Yard stick, Tennis balls (other types of balls), Masking Tape, Clamps, Handout

Procedure
Designate student roles to:
- Secure yardstick
- Drop tennis ball
- Take measurement
- Record results

Make 5 evenly spaced spots on the racquet with tape and mark accordingly.

Clamp the racquet handle to the table similar to how you would grip the handle.

Hold the yard stick on the table near the end of the racquet face.

Position the measurement taker and recorder near the end of the handle.

Drop the tennis ball from about 3 ft high over the first spot and record the return measurement.

Repeat 3 times to ensure that the data being recorded is accurate.

Repeat the same steps for each of the spots on the racquet.

Table:

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Questions
- Did the tennis ball bounce to at height greater, less or the same as its original release point?
- Explain.
- Did the tennis racquet shake / vibrate when it had impact with the ball?
- Do you think this in any way could have affected the rebound rate of the ball?
- Which spot(s) on the racquet yields the most return?

Math Problems
For the maximum height that the ball bounced on the racquet, what percent of the initial height was reached?
- What is the change in potential energy of a ball when it bounces up from 0 to 1.5 meter?
- Assume the mass of the ball to be 0.5kg and g=9.2m/s^2. (u=mgh)

Food for Thought
What change would you expect if you use a different ball? (proceed to test the theories using different types of balls)

Work Cited

Culminating Activity
See "Physics of Tennis"

Evaluation
Determined by the project rubric
Bead Counters

Students can easily manipulate numbers and see the relationship between addition and subtraction.

Overview
I shared this project with 33 teachers in the two schools where I am the math coach. This project reached approximately 660 students. The students were enthusiastic about creating a hands-on manipulative that they could use to cement their number sense learning. They continue to use the manipulative as they work on number sense and problem solving. Students created a bead counter with 20 beads of two different colors, 10 on each end, such that when the beads are pulled to the center work area they can see the relationship of numbers. For instance: pulling 3 beads from one color and 4 beads from another to the center workspace creates the number 7. Students can then see the relationship of the fact family represented.

Objectives
The student will be able to demonstrate the inverse relationship of addition and subtraction.
The student will be able to demonstrate the relationship of odd and even numbers.
The student will be able to compose and decompose numbers up to 20.

Materials
Per bead counter: 4 ft of nylon cord; 20 plastic pony beads in two colors, 10 of each color

Continued on the next page...

Curriculum
Kindergarten
K.1.C Fluently compose and decompose numbers to 5
K.1.E Count objects in a set of up to 20
K.1.F Compare two sets of up to 10 objects
K.2.C Model addition by joining sets of objects
K.5 Problem solving
First Grade
1.1.A Count by 1, 2, 5 and 10
1.1.F Fluently compose and decompose numbers to 10
1.1.I Classify a number as odd or even and demonstrate that it is odd or even
1.2.D Demonstrate the inverse relationship between addition and subtraction
1.2.F Apply and explain strategies to compute addition and subtraction facts to 18
1.6 Reasoning, problem solving and communication
Second Grade
2.2.A Quickly recall basic addition facts and related subtraction facts to 20
2.2.B Solve addition and subtraction word problems
2.2.F Create and state a rule for patterns
Third Grade
3.1.C Fluently and accurately add and subtract whole numbers
3.3.C Represent and identify equivalent fractions
3.6 Reasoning, problem solving and communication

THIS WINNING PROJECT IDEA WAS SUBMITTED BY:

Candi Talbott/ Math Coach
Eisenhower and Sarah J Anderson
9201 NW 9th Ave, Vancouver, WA 98665

K-3
GRADE LEVEL
ARTS
LANGUAGE
MATH
MISC
SCIENCE
HISTORY
SOCIAL STUDIES
1
HOUR
$160
TOTAL BUDGET
“Bead Counters”
project continued...

Readiness Activity
I conducted a conversation with the class about the difference between tools and toys. A tool is something that helps you work, helps you learn... a toy is something that you play with. I also talked about safety and why we use tools in an appropriate manner. I then modeled the math “tool” we would be creating and how we might be using it as a tool.

Strategies/Activities
• Students were each given a plastic baggie that had a 4 ft. piece of nylon cord that I had burned the ends on to prevent fraying and to ease the threading of the cord through the bead. The cord had been folded in half and tied into an overhand knot so that there was a loop on one end. In addition, there were 20 beads in the baggie, 10 of one color and 10 of another.
• While I demonstrated how to put on the bead, the teacher gave each student a piece of masking tape.
• The cord was secured by the loop in the center of the child's desk with the two loose ends coming down toward the student.
• Beads are put on in the following manner: All the beads of one color are put on first. Hold the bead between the thumb and the pointer finger and feed one of the strings from left to right through the bead. In the same hole feed the other string from right to left. As you pull the two strings the bead should easily slide toward the knot at the top of the string. All the beads are fed through the string in a similar manner with both strings going through each bead from opposite sides. Do all of one color first and then add the second color... do not create a pattern with the beads.
• When all 20 beads have been threaded through the strings tie an overhand knot as close to the bottom of the string as you can. Pull 10 beads to the bottom of the cord, in this way you will have a work area in the center where you can pull beads as you manipulate numbers.

Culminating Activity
• My culminating activity was to pull students together and demonstrate how to use the bead counters while demonstrating for teachers how to employ higher level questioning strategies. Students had put their name on the tape that had secured the string while they worked and then put the tape on their baggies for storage of their bead counters.
• Teachers in both of my schools are continuing to use the bead counters to build number sense during their math and calendar times.

Evaluation
• For me the project was a success because teachers have incorporated the project into their daily teaching of math and all of the students have a hands-on, ready-to-use manipulative.
• Teachers can use the manipulative for a quick assessment of math understanding as they glance around the room. If they say, put a 9 on your work space using two colors... they can assess quickly who can come up with a fact family for 9. If they then talk about the fact family of 4 +5, students who also have 4+5 must now come up with and demonstrate another fact family... thus creating flexible thinking in students. Because the beads are brightly colored it is easy to glance around the room and see which students are understanding the concept and who might need some clarification.
Math! - Now we are BAKING!

These are life skills!

**Curriculum/State Standard**
The project will reinforce the math standards for the state of West Virginia for the 2007-2008 school year and address the “No Child Left Behind” initiative where it makes applicable and improves math principals.

Additionally, this project will address home economics topics that are not currently part of the everyday school curriculum. This project will allow the instructors to reinforce math topics, respective to the grade level, for the students needing remediation in or simply needing reinforced to prepare for the Standford-10 Test. The reinforcement will be done through baking recipes where the students solve mathematical equations and word problems to arrive at the required ingredients for the recipes.

Moreover, the project and the activities included in the project address the NCLB initiative by working to ensure that all students have the necessary math knowledge base in their given grade level, improving literacy skills and seeing the practical application of reading, math, and science. The project will give students the opportunity to apply learned theoretical skills and reap the rewards of “correct answers” through a delicious prize.

**Overview**

*Math! - Now we are BAKING!* gives middle school students the opportunity to bake a selected dessert at four different times. The catch is the students must first solve math problems in order to find the amounts of the ingredients for the recipe. After the students have compiled the recipe and baked the dessert, they get to enjoy their creation.

**Objectives**

- The students will solve mathematical equations and word problems in order to solve the problem of the missing amounts on their recipe.
- The students will learn to read and follow a recipe (literacy and application).
- The students will make and bake, using math concepts, four different recipes over the course of a school year.
- The students will understand through demonstration the importance of kitchen safety and baking hygiene.
- The students will participate in the cleaning up process after baking.
- The students will enjoy their baked goods after baking.

**Materials**

- recipe for banana nut bread
- recipe for peanut butter chippers
- recipe for a cheesecake
- recipe for a pumpkin pie
- 2 bowls for each baking group
- measuring spoons for each baking group
- measuring cups for each baking group
- 2 spatulas for each baking group
- hand mixer for each baking group
- wooden spoon for each baking group

Continued on the back . . .
“Math! - Now we are BAKING!” project continued . . .

- paper towels
- oven
- cleaning supplies to clean kitchen and to clean dishes

**Readiness Activity**
The *Math! - Now we are BAKING!* project will be performed as four mini projects. Each of the readiness activities will be performed for each mini project. The readiness activities for the project will be as follows:

**On the day before baking:**
1. Introduce a recipe to the students. (Project one: pumpkin pie; Project two: peanut butter chippers; Project three: cheesecake; Project four: banana bread).
2. Discuss what is missing from the recipe (the amounts of each ingredient).
3. Solve an example problem with the students. (For example: To find out how many eggs are in the pumpkin pie, solve: 5% of 40 is what. (Answer: 2).
4. Allow the students to work in teams to solve the remainder of the problems and, therefore, complete the recipe.
5. Check the student’s recipe for accuracy. Review concepts that are not mastered.
6. Review the recipe and baking steps with the students to prepare them for baking day. As well, review kitchen safety procedures and baking hygiene procedures.

**Strategies/Activities**
The *Math! - Now we are BAKING!* project will be performed as four mini projects. Each of the activities will be performed for each mini project. The activities for the project will be as follows:

**On the day of baking:** (These steps assume that the instructors have all of the ingredients in stations and all equipment on hand for use. This also assumes that the students are paired in baking groups).
1. Once again, review the recipe and baking steps with the students to prepare them for baking day. As well, review kitchen safety procedures and baking hygiene procedures.
2. Model the steps in the baking process for the students and then have them perform the steps in their group. (Students will be assisted by multiple faculty members). During the modeling of the steps, review basic math concepts with the students; to include, measurements, fractions, addition/subtraction, multiplication/division.
3. Work with the students to clean up the kitchen when the baked good is baking.

**Culminating Activity**
The culminating activity will be performed for each mini project. The culminating activity for the project will be as follows:

**Evaluation**
The *Math! Now we are BAKING!* project was evaluated both qualitatively and quantitatively:

The quantitative evaluation reflected the objectives of the project:
1. Were the students able to correctly solve the mathematical equations and word problems presented?
2. Did the students successfully follow the recipes?
3. Were the students able to verbalize with 100% accuracy the process of reading and following a recipe?

The qualitative evaluation included a simple survey. The students were asked if they have ever read a recipe/cooked at home. After they have completed the activity they used a Rickert scale to rate how much they enjoyed the activity and complete a follow-up: What I liked best; what I learned; how can I use what I learned; and would I like to do this activity again?
Money: Everyday Situations

Curriculum/State Standard
The project meets the Ohio state standards of being able to count money and make change for math. It also meets the language arts standard for being able to write a letter of request.

Overview
Students earn "play" money throughout the year for bringing back homework and having good behavior. Students keep their money in a wallet and deposit their money in a classroom bank every other week. Students withdraw their money at the end of each quarter and use their money at a supply store, a restaurant, a book store, and an auction where we auction off items students have requested from famous people or sports teams. Students are always acting as the customer or the cashier/server.

Objectives
- The student will be able to count money and make change using coins and paper bills to $10.
- The student will be able to write letters of request including date, proper salutation, body, closing, and signature.

Materials
Bank books, food for the Restaurant, fake money, books for the Book Store, envelopes for wallets, items to auction off at the Auction, school supplies for the Supply Store, envelopes and stamps

Readiness Activity
Students are shown what they can earn money for. They earn $.05 every time they bring their homework back. They earn $.05 every time they have a good day. They can earn money for being good citizens and having their desk cleaned as well. Students make their wallets by decorating envelopes. The envelopes are then laminated so they last. Students are shown how to budget their money bank books which are donated from community banks. Students practice depositing and withdrawing money.

Strategies/Activities
Students will earn "play" money throughout each quarter during the school year. Students earn money through good behavior, homework return, and by being good citizens. Students keep their money in a wallet and put their money in the bank once every two weeks. They keep track of their money in bank books, which were donated through 5/3 Bank. At the end of each quarter, students can use the money they earned in various activities.

Quarter One: Students will shop at a supply store where they can buy pencils, erasers, notebooks, crayons, scissors, etc. Students take turns acting as the customers and the cashiers. Students must determine how much the objects cost and how much change the customer should receive after their transactions.

Continued on the back...
Quarter Two- Students eat at the class restaurant. Students design menus with the food that will be served and the cost of each item. Students are broken up into two groups. One group acts as the customers and has to figure out what they can buy at the restaurant depending on how much money they have earned that quarter. The second group acts as the servers. The servers must take the orders, add up the total of the meal, take money, and make change.

Quarter Three- Students will shop at a book store. The students buy books which are purchased through Scholastic. Students again are broken into two groups where one group is the customers and one group is the cashiers and then the roles are reversed.

Quarter Four- Students will participate in a class auction. Students will write letters of request to celebrities, sports teams, and authors to request items to be used in the auction. The students will serve as bidders. They will have to keep track of their items and the money they have to make sure they do not outbid the money they have available.

Culminating Activity
Students write an entry about what they learned this year by participating in the Money: Everyday Situations Project. They write what they learned, their favorite activity, and how this will help them in real life.

Evaluation
Students will be evaluated through our checklist assessments. Our school district evaluates students each quarter in reading, writing, and math through having to meet certain skills which are aligned to the state standards for Ohio. Our goal is that students will increase their passage rates on these standards (79%–Counting Money and Making Change; 89% Letter of Request) by 10 percentage points on the final assessment.
Math Smart Tubs

All children involved are able to feel success with this hands-on math application, while using their strongest "intelligence."

Curriculum/State Standards
The students will engage daily in activities that focus on specific standards such as counting, sorting, pattern extensions, problem solving, and measurement.

Overview
Math Smart Tubs are weekly, hands-on, multiple-intelligence, math activities. They allow students to have daily active math experiences in ways that invite their personal strengths to shine through.

Objectives
• The student will apply kindergarten math benchmarks using active, hands-on methods.
• The student will discover the importance of math in all facets of life.
• The student will encounter enjoyment in math as they use multiple intelligence techniques to tap into their math strengths.

Materials
5 tubs to store weekly activities, labels for tubs, rotation chart, manipulatives for activities

Readiness Activity
Before starting Math Smart Tubs, discuss as a class the different ways students are "smart." We talked about famous people and people in our school that excel in certain areas. We then examined the eight different intelligences through a picture book I created.

Strategies/Activities
Math Smart Tubs are on a daily rotation where students will work in small groups and experience one smart tub a day. By looking at a rotation chart, students find the Smart Tub they are responsible for that day. Each week, I change the tubs in order to engage students in as many different multiple intelligence activities as possible.

Examples of Math Smart Tubs could be sorting nature items for Environmental Smart, using musical instruments to make patterns for Music Smart, tossing beanbags on a numbered shower curtain for Kinesthetic Smart, reading math poems for Linguistic Smart, or taking class surveys with tally marks and graphs for Interpersonal Smart.

Culminating Activity
At the end of the year, we revisit our discussion on ways we are smart. We talk about our strengths and areas we were surprised to find enjoyment and success in. We then create a class book where each student writes and draws about how they are smart. Next year, this book will be shared with incoming kindergartners to help them understand Math Smart Tubs as they are introduced.

Evaluation
Students were observed while completing Math Smart Tubs with weekly anecdotal records. A checklist was kept regarding students' mastery of certain math benchmarks. Students also completed several self-evaluations that helped expose their feelings regarding strengths, enjoyment, and understanding of math.

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Maintaining Math Momentum

This project provides a fun, active way to follow up on classroom math assignments.

Curriculum/State Standard
The skills practiced with this project meet the fourth grade math curriculum requirements. It covers the state standards of number sense, measurement and geometry, algebraic thinking, and data analysis.

Overview
Using an answer case with numbered tiles, the students complete math problems. When the problems are complete, they flip the case over and check to see if the tiles make a pattern. Students use the designated materials as a follow up to class assignments and there is also a home component, which students will complete with parental supervision. The materials are checked out from our lending library.

Objectives
• The student will describe and analyze a wide variety of patterns and relationships while becoming a more independent learner.
• The student will learn to use expressions, equations, and graphs to represent and interpret situations in the real world.
• The student will identify patterns and make predictions using probability and statistics.

Materials
Versatiles Math Lab level 4, Versatiles Starter sets levels 3 and 5, home lending library check out sheets, student management forms

Readiness Activity
Students are introduced to specific math skills and given time to practice with the whole class, partners, and on their own. They are then given tests to determine their level of proficiency and which skills need reinforcement.

Strategies/Activities
The teacher assigns the particular skills in which the student is weak. Then the appropriate workbook is chosen. The student needs that book and an answer case. In many activities they will need pencil and paper to work out solutions. Each answer case has twelve numbered tiles. The student will place the correct tiles in the case according to each math problem. When finished, student closes tile cover, flips case over, and opens it. If all answers are correct, there will be a pattern completed on the backs of the tile. This is a self-correcting activity. This enables students to redo incorrect problems.

Culminating Activity
Students who need more practice will check out workbooks and answer cases from the class lending library. They will keep track of the assignments completed at home. There is a form for parents to acknowledge their child's progress and a form for the student to complete regarding which assignments were done.

Evaluation
There are post-tests for the student evaluation, along with conference time with the teacher. Students will not only write answers to problems, but explain them orally when in conference. The teacher can then determine if the process skills have been mastered.

This project provides a fun, active way to follow up on classroom math assignments.

Barbara Lee
Claude Pepper Elementary
14550 SW 96 St., Miami, FL 33186
Math-A-Magics: Sewing

This project conveys a practical, authentic, hands-on approach to learning, a program business that allows students to put standards to practical use in real world situations.

Curriculum/State Standards
Measurement Standard
- Use appropriate levels of precision when calculating with measurements.
- Describe formulas for surface area and volume and justify them using geometric models and common materials.
- Demonstrate understanding of the concepts of perimeter, circumference, and area by using established formulas for triangles, quadrilaterals, and circles to determine the surface area and volume of prisms, pyramids, cylinders, spheres, and cones.
- Determine when an estimate is sufficient and when an exact answer is needed in problem situations, and evaluate estimates in relation to actual answers; eg., very close, less than, greater than.

Overview
Math-A-Magics: Sewing is a community service project designed to meet the needs of the Barberton City Schools’ elementary buildings. Students will be challenged to operate a student-run business. They will shop for materials (cost analysis), get orders, measure material, sew, fill orders, etc., to make bean bags for the physical education department within the district.

Objectives
- The student will understand and display capabilities in the basics involved in using a sewing machine (parts, threading, stitch).
- The student will appropriately measure material and set supplies needed to complete the project.
- The student will determine when an estimate is sufficient and when an exact answer is needed.
- The student will use appropriate levels of precision when calculating with measuring.
- The student will follow directions and take a project to completion.
- The student will maintain positive academic standing that allows for project work.
- The student will verbally state the academic standing that allows for project work.
- The student will demonstrate the use of their products to the Board of Education, PTA’s, and visitors to gain support.

Materials
(1-2) sewing machines, material, beans, scissors, sewing machine needles, straight pins, measuring tape, marking pencil, thread, pin cushion, funnel, measuring cup

This project conveys a practical, authentic, hands-on approach to learning, a program business that allows students to put standards to practical use in real world situations.

Michelle Hance
U.L. Light
292 Robinson Ave., Barberton, OH 44203

Continued on the back...
Readiness Activity
Students will be challenged to draft an order form to receive orders for bean bags. I will provide a rubric with the following guidelines: neatness, colorfulness, appropriate information (name, school building, date, quantity, etc.). Order forms will be sent to the different elementary buildings throughout the district. Once we receive the order forms they will be put in order by date received.

While waiting for returning order forms, students will begin the "shopping" process. I will provide sale ads from different stores and the students will be provided a list of items needed for the project. They will list the items and prices. They will figure percent off, percent of increase, and cost analysis.

Strategies/Activities
There will be three stations for the students. The students will work at one station per week.

Station 1: Students will be challenged to organize and fill orders (record keeping). Once an order is filled the students will deliver to the pony system in the district.

Station 2: Students will work on measuring material to determine the maximum number of bean bags that can be garnered from a single piece of material. Once measured, they will cut and pin together to ready for sewing.

Station 3: Students will take the readied material and sew with the machines. Secondly, they will fill with beans and close small opening. These finished items will be given to station #1.

Culminating Activity
The students will be able to visit different physical education classrooms in the district to observe students using their bean bags.

Evaluation
There are records kept for logging student work time and products produced and distributed. The motivational factor in the student business is for students to WANT to work. By continuing the log, we will be able to document how many students had new interest with the addition of this recent sewing station. Students desire to work in "Math-A-Magics: Sewing" influences academic work and social behavior. Our documentation will also reflect whether or not we see an increase in academic work and school attendance. With practical use of state standards we will also reflect on whether or not student understanding increases. It has long been known that "doing" increases understanding. By putting standards to practical, "hands-on" use, our hope is that the written word takes on realistic, useful application with a better grasp of the conceptual meaning. This will be reflected in our achievement on state tests. The dual side is that the elementary students will also have a product to use and demonstrate concepts introduced in standards beyond paper/pencil.
Maori Math Mysteries

Students create traditional Maori artifacts, enhance vocabulary skills by learning to speak some Maori phrases, and perform a ceremonial Maori stick-fighting routine.

Curriculum/State Standards
Students will solve equations using whole numbers.
Students will write expressively to convey information.

Overview
Students learn about the culture of New Zealand's native Maori's from a series of immersion activities designed to increase cultural awareness and tolerance. They engage in hands-on activities to solve mathematics problems, construct traditional Maori artifacts, and take an imaginary journey around the country of New Zealand. As a culminating event, students brought younger classes out for a performance of a Maori stick-fighting routine, and then taught those younger students how to perform that stick-fighting routine to traditional Maori chant music.

Objectives
• The student will enhance mathematics skills by solving equations with whole number through hands-on activities.
• The student will study the diverse culture of New Zealand's native Maori, constructing traditional poi balls from recyclable materials.
• The student will learn to write and speak a variety of Maori words and phrases.

Materials
CD of Maori chant music and sound system, PVC pipe cut into 2.5-feet lengths for stick-fighting routines, polyester pillow stuffing, yarn, paper napkin, and slices of garbage bag to make poi balls, map of New Zealand, Teacher-generated worksheets (geography, people, circumference, staff, poi), Beginner's Maori - vocabulary text from Amazon.com, "The Art of Staff" and "The Art of Poi" - videos from homeofpoi.com, Maori Tattooing - book from Amazon.com

Readiness Activity
Students enter the classroom to find teacher's face decorated in a traditional moko - or Maori tattoo. Teacher explains that moko are unique to each family, and no two moko are exactly alike. A discussion of how the moko is applied ensues - no clean needles are used. Tribal chiefs chisel patterns into the skin, then rub soot into the designs to make them black. Obviously this is very painful! You have to have your entire living family's permission to receive the moko - if you misbehave a lot, the Maori do not grant that family member the right to wear the moko, as they don't want the rest of the world to know that misbehaving person belongs to them! We find New Zealand on a map, learn to say "kia ora" (hello), and learn the meaning of pukana (make a scary face while dilating the eyes). A short video segment on stick-fighting is viewed, with a discussion on body language and rhythm.

Strategies/Activities
Students measure 10-foot sections of PVC pipe into 2.5-foot sections and mark them so the teacher can cut them with a power saw. They sanded them down, applied duct tape grips and painted one end red, the other end black (Maori tribal colors). They complete cooperative learning task sheets on New Zealand's geography, culture, etc.

Continued on the back...

THIS WINNING PROJECT IDEA WAS SUBMITTED BY:

Jessica Fredricks
Bethune Academy
900 Avenue F, Haines City, FL 33844

$500
TOTAL BUDGET
Maori Math Mysteries” project continued...

language and people, and also on calculating the circumference, radius, and diameter of a circle. This is important because when they start swinging the poi and staff in a circle, they must know how much space they will need in order to keep from hitting their neighbors! We calculate these things, then put our calculations to the test using the staff and poi before venturing into the Maori leaf ceremony and the basic moves involved in stick fighting (after reviewing safety procedures, of course). Students master several moves on the poi before sitting down to construct their own out of recyclable materials, which they take home to practice. Students also create a moko for their family on a mask, and these items are on display during the culminating event, Maori Performing Arts Day, when participating students perform and display what they have learned for younger students in the school.

Culminating Activity
Students greeted younger visitors with "kia ora", and gave short speeches detailing the culture of the Maori. They spoke sentences in English, and replaced one word with a Maori word, encouraging younger visitors to infer the meaning of the word through context. They performed a traditional Maori stick-fighting routine to wild applause, then broke into small groups and taught that same routine to their younger visitors. The combined group performed the routine at the end of the exciting but exhausting day!

Evaluation
Students were evaluated by journal entries, teacher-generated mathematics assessments, and ability to work cooperatively in small groups.
### Hinks Hawks MicroSociety

**Students enjoy learning about the value of money especially when the "money" has their picture on it. Even kids with behavior problems rarely cause disturbances during Micro time.**

<table>
<thead>
<tr>
<th>Curriculum/State Standards</th>
<th>Strategies/Activities</th>
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<tbody>
<tr>
<td>Participating in this project directly teaches the economic benchmarks and standards set by the Michigan Department of Education.</td>
<td>Again, see the attached schedule.</td>
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</table>

**Overview**

MicroSociety is a project that gives students hands-on experience in learning economics. They become contributing members of a society that closely resembles the responsibilities of adult life, including paying taxes and rent, managing their money and earnings, and maintaining a personal savings account. They are employed by either a goods or a service industry.

**Objectives**

- The student will learn how to manage their own finances by maintaining savings accounts, earning weekly salaries, and by paying monthly bills.
- The student will learn real life skills by working at jobs, getting paychecks, and paying taxes.
- The student will learn how to manage a small business: advertising, stocking, reordering and/or creating products, counting back change for customers, maximizing profit by minimizing expenses.

**Materials**

Bank: hanging file folders, a few calculators, storage crates, clipboards, created forms for opening accounts, transaction registers, and paychecks

**Readiness Activity**

See the attached schedule of events. It gives detailed descriptions of the startup activities.

**Evaluation**

Students were evaluated primarily through classroom observations and discussions. They paid fines for various offenses: not completing homework, lost papers, overdue library books. They also paid rent once a month for the use of their desks and lockers. Each child can earn $1 per day for coming to school with his homework log signed by a parent. This is in addition to their weekly paycheck of $8 that they earn by working during Micro time. I have attached a student survey that we used as another form of evaluation.

**Strategies/Activities**

Again, see the attached schedule.

**Culminating Activity**

The culminating activity for this year is a live auction held at the school. The teachers will purchase prizes with the remaining money in our Micro account. We hired an auctioneer, and he is coming right to our building for the event. The kids can withdraw the remaining money in their savings account to purchase items at the auction. Those who planned ahead and saved most of their money will certainly have the advantage.

**Evaluation**

Students were evaluated primarily through classroom observations and discussions. They paid fines for various offenses: not completing homework, lost papers, overdue library books. They also paid rent once a month for the use of their desks and lockers. Each child can earn $1 per day for coming to school with his homework log signed by a parent. This is in addition to their weekly paycheck of $8 that they earn by working during Micro time. I have attached a student survey that we used as another form of evaluation.

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**Continued on the back...**

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**THIS WINNING PROJECT IDEA WAS SUBMITTED BY:**

Kris Wood  
Hinks Elementary School  
7667 U.S. 23 North, Alpena, MI 49707
Final Budget. (see attachment)
While most of our ventures used our special Micro currency, a couple (such as the snack shop and school store) had to charge customers real money. These two businesses paid for themselves after the initial start-up expenses. Again, your final budget really depends on the types of businesses you have (goods or services) and whether or not you charge real money at any of them. Try to balance your ventures that provide services with those that produce goods. Teachers need to keep close tabs on how much the parent volunteers are spending on supplies. Set limits in the beginning, and make sure they stick to them.
Hands on Math

The "puzzle-like" boards, tactile number tiles, and math problem strips make this game challenging, educational, and fun.

Curriculum/State Standards
California State Standards for Kindergarten:
Number Sense
1.0 - Students understand the relationship between numbers and quantities:
1.2 - Count, recognize, represent, name, and order a number of objects.
Number Sense
2.0 - Students understand and describe simple additions and subtractions:
2.1 - Use concrete objects to determine the answers to addition and subtraction problems.

Overview
The student puts the tactile number tiles on the math board and then chooses a math problem strip, which is placed on the bottom of the math board. The student then matches a number tile to the problem on the strip. The tile will only fit in the strip if it is the correct answer.

Objectives
• The student will recognize numbers 0 - 25.
• The student will sequence numbers 0 - 25.
• The student will be able to match a number to a set of objects.
• The student will be able to do simple addition and subtraction.

Materials
(ordered from: INSTA-LEARN By STEP, Inc., 1-800-225-7837, www.insta-learn.com) math boards and number tiles (Note: this company replaces lost tiles), math strip sets: rational counting, numeral names & sequencing, addition, and subtraction, storage containers for the boards, strips, and tiles

Readiness Activity
The math board manipulative activities are a great way to reinforce the math concepts taught in the daily math lesson and calendar activities concerning number recognition, number sequencing, and addition and subtraction.

Strategies/Activities
Order the math boards, tiles, and math problem strips. Code the back of the tiles with numbers or letters to help prevent students from mixing their tiles with another student's tiles. Obtain a large container to store the math boards. Obtain containers for the number tiles (frosting containers work well too) and write the matching code on the container. Obtain containers for the math strips (single silverware baskets/container).

Teach the students how to put the tactile number tiles on the board first. I found it best to take out one tile at a time from the container and place it on the board. When all tiles are on the board, the student chooses a math problem strip and places a number tile on the strip that he/she thinks is correct. Only the correct answer will fit.

Continued on the back...

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Pat Chase
Lorena Falasco Elementary School
310 Overland Ave., Los Banos, CA, 93635

On-Going

$145
TOTAL BUDGET
“Hands on Math” project continued...

You will also need to show the students how to clean up the board when it is time to put the activity away. I encourage them to mix up the tiles (one from the top row, one from the bottom row, one from the middle row) instead of taking them off the board in order. This gives the next student to use the tiles more of a challenge in placing the number tiles on the board.

Culminating Activity
This activity is an on-going activity that is available to students daily. I have used it as an independent center to reinforce the math concepts. I have also used it with individual students as a teaching tool to make sure they feel the tactile number, name the number, and watch them count the objects. It provides the extra practice without requiring another paper/pencil activity. I feel it is very valuable because it is a hands on manipulative activity for a kindergartener.

Evaluation
I used teacher created tools (ex: random numbers on a page, number cards) to test the students mastery of the math standards. I also used the math boards as a testing tool, asking students to name the numbers as they were putting the tiles on the board or watch them count the objects, etc.
Football Math

Both boys and girls get excited to use their math skills when talking about a truly American pastime—Football!

Curriculum/State Standards
This project uses many different mathematical functions and relates them back to a real life experience.

Overview
Using the statistics of the NFL football teams students are able to work with statistics, change them to a fraction, change the fraction to a decimal rounding it to the hundredths place and change the decimal to a percent. After this process has been done on a conference the students go back to determine the mean, mode, median and range of each division.

Project Objectives
• The student will be able to create a ratio of wins to games played.
• The student will be able to change a ratio to a fraction and reduce the fraction if possible. (Introduce prime and composite numbers)
• The student will be able to change the fraction to a decimal with a calculator by dividing the numerator by the denominator.
• The student will be able to round a decimal to hundredths place.
• The student will be able to change a decimal to a percent.
• The student will recognize the words: mean, mode, median and range and know how to find them.

Materials
• Monday and Tuesday's newspapers
• Board and Markers
To make the setting for learning math through football more conducive I purchased banners of the NFL teams and rather than write the name of the team on the board I have purchased static cling helmets to put on the board and write the statistics behind the helmet. I have also purchased NFL team football pencils to use as a reward for paying attention and working through the activity.

Readiness Activity
The readiness activity usually includes a discussion of what happened to the home team (Buccaneers) in the football game. The first few times an explanation of each step is given. After a week or 2, some of the students are able to do the entire process.

Strategies/Activities
Making the ratio. On the board I write it as games won and the games lost. It takes some of the students awhile to remember to add the wins and loses for the number of games played. They try to make the ratio of games won over loses.
Changing the ratio to a fraction. The numerator is always the first number and the denominator is the total games played. Many times this is difficult to remember, but under fraction write numerator-games won, denominator-games played.
Reducing the fraction. If possible fractions need to be reduced. Here introduce prime and composite numbers. The students will also practice reducing fractions. This was taught in the 4th grade, but the students are not formally taught this until January in the 5th grade.
Changing a fraction to a decimal. The students are able to use a calculator and are instructed to divide the numerator by the denominator. Some of the more common (thirds, fourths, fifths, and tens) will be done without a calculator.

Both boys and girls get excited to use their math skills when talking about a truly American pastime—Football!

Nancy J. Komassa
Lincoln Elementary School
1207 East Renfro Street, Plant City, Florida 33563
"Football Math" project continued...

They are also looking at the number patterns in some of the decimals; vocabulary words such as terminating and repeating are introduced. The bar for repeating decimals is taught.

Rounding the decimal to hundredths place. The place value of decimals is repeated with each number and rules for rounding are constantly reviewed.

Changing the decimal to a percent. The students are instructed to move the decimal point 2 places to the right to form a decimal. This process is done to all of the teams in a conference. My second class will do the other conference. Switch the conferences weekly so that everyone gets to look at their special team. This is also a good time to explain the BYE and Monday night football when you ask why they all haven't played the same number of games.

Range. The range is the difference between the most games won and the least number of games won.

Mode. The mode is the number that appears the most often. This is done with the number of wins. Sometimes there may be a mode, a double mode or no mode at all.

Median. The median is the middle number. The divisions of the NFL are in groups of 5 so finding the median is always the middle number. You might want to find the median of 10 teams every now and then so that they are able to find the median for an even number of numbers. When I write the teams on the board, I already have them in order from most wins to the least. It is really important to remind them that the numbers for median must be in order.

Mean. Always remind them that mean is an average. I also say "Mean Mrs. Smith" Reminding them that this is how I get their grades. The mean is found by adding the wins of the division and dividing that total by 5.

Culminating Activity

The Super Bowl Game is the final activity. We had been predicting which teams will be going to the playoffs. Since the playoffs start during the winter break, each student will pick the two teams that they think will be going to the Super Bowl. When the Super Bowl is actually played the students will predict the score. I have a prize if anyone gets the actual numbers.

Evaluation

Throughout the year the different skills are taught and formally tested. We have topic tests on the different strands. The students will also get teacher made test with football teams and the win-lose record. They have to fill in all of the columns. One of the nice things about the program is that the kids will ask... "Is that like what we did in football?" They recognize the type of questions and then know how to solve them.
Triangles and Quadrilaterals Are More Than Elementary Shapes

Do students know that triangles and quadrilateral shapes can help us prove terms of higher-level formulas?

Curriculum/State Standard
Geometry and Spatial Sense - G4, G5
Patterns, Functions, and Algebra - P6, P7, P13, P15

Overview
Students will begin by using the geo-boards to perform transformations on triangles and quadrilaterals. This will lead to the white graphing board where students will plot points to find a missing coordinate and name the quadrilateral formed. By using the properties of these quadrilaterals, students will then discover and study such topics as slope, midpoint, and distance formulas.

Objectives
• The students will use the geo-boards to form initial shapes and then be able to construct the results of transformations including reflections, rotations, translations, and dilations.
• The students will determine what properties of transformed shapes have changed/remained the same.
• The students will locate the missing coordinate of a quadrilateral given three vertices and the type of quadrilateral.
• The students will derive the distance formula between two points using the Pythagorean Theorem.

Materials
Geo-boards, rubber bands, overhead, document camera, large white board graph, dry erase markers, magnetic strips

Readiness Activity
Rules for using rubber bands. Set-up of a coordinate plane such as the x and y-axis and placement of the integers. Plotting points on a coordinate plane. Clockwise and counter-clockwise.

Strategies/Activities
Using the individual geo-boards with an overhead geo-board for a class visual, students will use rubber bands to replicate the shape on their geo-board.

Students will be directed to perform a transformation on the given shape. All four transformations will be given multiple times.

Using the large coordinate plane white board, students will graph a variety of triangles and quadrilaterals. A directive for a transformation will be given and students will need to construct the new shape (a prime shape). Directions could be, but are not limited to, reflect over the y-axis, rotate ¼ turn CW, translate 2 units up and 3 units left, or dilate the shape by ½. Students will be required to draw the prime shape in the correct location, give the new ordered pairs, determine if any of the initial properties of the shape have changed, and as a group determine if there is a rule that could be stated for each such stated transformation.

Using the large coordinate plane, students will construct a specified quadrilateral given 3 of its vertices. Students will use magnetic tape to construct the sides and then figure the coordinates of the fourth point to make the given quadrilateral.

Continued on the back...
“Triangles and Quadrilaterals Are More Than Elementary Shapes” project continued...

Using the large coordinate plane and magnetic tape, a variety of right triangles will be graphed. By using the legs and hypotenuse, students will derive the distance formula that is used to find the distance between two points.

**Culminating Activity**
Transforming given shapes on the large white board coordinate plane
Determining if any properties have changed from the pre-image and image
Discussion of how the Pythagorean Theorem is a useful tool to prove the distance formula

**Evaluation**
Geo-board activity was evaluated by teacher observation and by having students place their geo-board under the document camera. Transformations were evaluated one-on-one with teacher. I gave several directives and students were to complete the transformation; then I asked questions about property changes. A whole-class discussion with direct questions was used to determine if students were able to verbalize any thoughts about why the Pythagorean Theorem is a viable way to derive the distance formula.
Cricket Cage
Thermometer Project

Students gain experience working with live animals and using traditional hand tools to build something of lasting value from raw materials.

Curriculum/State Standards
1. Standard and metric measurement
2. Fraction concepts
3. Recording, organizing, and graphing data
4. Communicating mathematical knowledge
5. Understanding functions and relationships
6. Using one variable formulas
7. Geometry concepts: area, perpendicularity

Overview
Students are given two blocks of wood, a handful of bamboo skewers, some basic hand tools, glue, and detailed instructions. With a little math, they build these into a traditional Chinese cricket cage. After some instruction and group work with recording and organizing data and working with formulas, they get to take a live cricket home to check their cricket’s accuracy on reporting the temperature.

Objectives
• The student will learn how to use standard measurement as a tool to describe area and compare inch units with non-standard fractional amounts.
• The student will gain practical experience in using common hand tools: ruler, hand drill, and wood glue.
• The student will understand geometry concepts of area and perpendicularity.
• The student will understand functions and relationships behind the timing of cricket chirps and the temperature, as well as understand how to use a one-variable formula.
• The student will record data and communicate mathematical knowledge and understanding.

Materials
(for approximately 180 students)
clean yogurt containers with holes punched in the top (for each student), various recordings of cricket chirps (easily downloaded from internet), flat "bull nose" wood molding (3" x 7/16", and one foot per student), 15-20 hand drills, 50-60 drill bits (7/32"), 6 pints wood glue, sand paper, 3" bamboo skewers (cut from 6" skewers (75-100 per student)), 1000 live crickets (order as many as you need, but only the males will chirp), 2-3 hand saws, worktables suitable for woodwork or 15-20 scrap shelving wood, or lap vices, 10-15 6" C-clamps, cricket assembly instruction posters 1-4, worksheets

Readiness Activity
The teacher plays background music of crickets. The teacher then involves class in an open-ended discussion about crickets with questions like: What do you know about crickets, or movies with crickets? (Some students may mention Walt Disney’s Jiminy Cricket or Mulan)
• Have you ever heard the chirp of a live cricket?
• What do you think the chirp means?
• Do you think crickets would make good pets?
• Did you know that in the Far East people keep crickets as pets in cages?
Show finished project cage as example. The teacher indicates that the students will be building their own cricket cages. If their cage passes the quality rubric, they will get to take home their very own live cricket! Then they will have another activity to do with the cricket at home with their parents. Students may start thinking of a name for their cricket.

Continued on the back.

THIS WINNING PROJECT IDEA WAS SUBMITTED BY:

Douglas Avon
Henkle Middle School
P.O. Box 1309, White Salmon, WA 98672
“Cricket Cage Thermometer Project” continued...

**Strategies/Activities**

**Teacher Preparation:**
- Obtain cricket sounds from commercial recording or Internet
- Start a yogurt cup collection. Ask your colleagues to save some for you.
- Purchase the wood molding then take it up to your local high school woodshop teacher and beg for him to cut them up for you. First, rip a 1/2" strip off the side of each molding board. Use this thin strip to cut into cricket house "doors." Pre-cut them into 2" sticks ahead of time. Then cross cut 2-1/2"x 6" uniform blocks from the remaining molding strips, enough for each student to have 2 blocks each.
- Purchase 6" thin bamboo skewers (2 mm thick) and tape bundles of 100 together with wide scotch tape, taping the ends and wrapping securely in three places: bottom, middle and top of the bundles. At this point, it doesn't hurt taking the sharp ends of one side and blunting them on a big disk sander, if you have one available. Then use a band saw to carefully cut the bundles of skewers in half (right through the tape) into 3” bundles. (Caution: rotate the bundles slowly toward you as you pass them through the bandsaw so that the saw does not "grab" and pull you into the blade!) They will stay taped together due to the fact that the holes for the bamboo skewers (bars) in the cage take up some space from the edge of the blocks. They will need to make the drilling holes marks for their blocks.
- Start thinking about how to order your crickets (5 weeks old) and plan how to distribute them to your students within a week from receiving them. I ordered mine from www.reptilefood.com.

**Extension lesson:** Somewhere along the process in this project a few advanced students can be assigned to build you a cricket storage bin to keep your crickets temporarily while waiting to release them. Just take a big Rubbermaid storage bin, cut some holes in it (they can drill several holes close together with the hand drills in the shape they want, then punch out the "windows"), hot-glue some thin screen material over the holes, then place some upside-down egg cartons inside. The cricket salesperson can tell you how to keep them alive in there for a while.

Each lesson is designed to last about 35-40 minutes long, but you may need to extend some to another session.

**Lesson 1: Work in groups**

**Teacher note:** In addition to the working model, the teacher should also create a new cricket cage model along with the students, at their pace, so that they can see the various stages of the project as the work progresses.

**Objectives:** Explore area of a rectangle in standard measurement

**Materials:** 2-1/2” x 3” molding blocks, 2 for each student, 1” grid paper, rulers, pencils

**Method:** Teacher distributes 2 blocks to each student. These will become the ceiling and floor of their cricket cage. Students write their names in pencil on each block. Teacher leads a discussion about the concept of "area." How do we find the area of our cricket cage?

Let students explore this question. After a few minutes have individuals report to class their ideas. (Some students may use the grid paper; others may try a formula and use the rulers. Of course, the area will be an uneven amount of square inches, which makes this problem a bit challenging and interesting.) Students keep their blocks for further lessons.

**Lesson 2: Individual work**

**Objectives:** Use standard and metric measurement

**Materials:** (in addition to the blocks already distributed), rulers (with both standard and metric units), pencils

**Method:** Students will look at the working model (the teacher's completed cage) and note that the floor area is less than the size of the block, due to the fact that the holes for the bamboo skewers (bars) in the cage take up some space from the edge of the blocks. They will need to make the drilling holes marks for their blocks. Students will pick one of their blocks as the floor of their cricket cage. Then they will mark with a pencil a border 1/4" around the inside of the edge of the block. Teacher can give as much assistance as needed or let students work independently on this. Students may come up with an idea for a shortcut.

**Lesson 3: Work in groups**

**Objectives:** Review area. Use standard and metric measurement. Use non-standard fractional units with rulers

**Materials:** (in addition to the blocks already distributed), rulers (with both standard and metric units), pencils

**Method:** Teacher explains that, in order for the crickets to stay in their cage, there needs to be very close tolerances in the placement of the bars. They must be no wider apart than 5 bars per inch.

When all borders are completed (from lesson 2), students will continue marking the floor of their cage, this time trying to figure out how to make...
### “Cricket Cage Thermometer Project” continued...

| Lesson 4: Work in pairs | Method: Teacher demonstrates proper drilling technique. Clamps wood down securely with C-clamp. (Use scrap shelving wood.) Hold drill perpendicularly to the wood, showing students how to check in two directions to make sure drill is truly perpendicular. This is where it helps to have a partner check the side direction while you look straight ahead at the drill. If an individual tries to drill alone, a crooked hole may result. (You could mention that a drill press would be a nice tool to have, but there are not enough available for all the students today.) You could push the bit down slightly to make an indent in the wood (sort of like using a center punch.) This will make a little dimple to keep the drill from skipping around off your mark once you start drilling. Drill straight down, applying a small amount of pressure, keeping the drill straight (not wobbly) until the hole is finished. Important to stress: to remove the bit from the wood, simply unscrew the drill backwards and pull STRAIGHT up (not jerk or bend it towards yourself). If these procedures are followed, few drill bits will be broken.

Teacher has two volunteers from class come up to front of room to demonstrate proper drilling technique. One student can use the drill while the other checks for perpendicularity.

Groups of two work together, using a checklist, to practice drilling technique. Teacher marks in gradebook those students who have been trained on the drill. Do not let untrained students begin drilling until they have gone through this lesson.

| Materials: | students' floor and ceiling blocks, pre-marked every 5 mm for hole drilling, hand drills to share, with 7/32" inch bits, masking tape, scrap wood, 6" C-clamps, cricket assembly posters 1 & 2 (if available) |

**Method:** Students will use proper drilling techniques and start drilling perpendicular holes in their cricket cages.

| Lesson 5: Work in pairs | Materials: (in addition to the blocks already distributed), hand drills to share, with 7/32" inch bits (teacher may need to "tape" up the drill bits, or create a depth stop on each bit, so that the students don't drill farther through the material than you want them to.) scrap wood, 6" C-clamps |

**Objectives:** Students will follow directions and use proper drilling techniques to create the door of their cage.

**Materials:** students' floor and ceiling blocks, pre-drilled every 5 mm along the 1/4" border, hand drills to share, with 7/32" inch bits, masking tape, scrap wood, 6" C-clamps, 2" x 1/2" x 7/16" pre-cut door pieces, pencils, cricket assembly poster number 3, if available.

**Method:** Teacher demonstrates drilling a couple of holes, while students look on. Assistant checks for perpendicularity from the side, while teacher looks straight on. Students work in pairs and start drilling their own blocks. Display a copy of cricket assembly posters 1 & 2 on an overhead projector, if available.

| Lesson 6: Work in pairs | Objectives: Students will work in pairs and drill a hole for the cricket cage. |

**Objectives:** Students will use proper drilling techniques to create the door of their cage.

**Materials:** students' floor and ceiling blocks, pre-marked every 5 mm for hole drilling, hand drills to share, with 7/32" inch bits, masking tape, scrap wood, 6" C-clamps, 2" x 1/2" x 7/16" pre-cut door pieces, pencils, cricket assembly poster number 3, if available.

**Method:** Teacher demonstrates how to make a hole in the side of the cage for the cricket door.
“Cricket Cage Thermometer Project” continued...

Lesson 7: Individual work

Objectives: Students will follow directions and assemble their cricket cage

Materials: students' floor, ceiling blocks and door pieces, pre-drilled, scrap wood, wood glue, bundles of pre-cut 3" bamboo skewers, cricket assembly poster number 4, if available

Method: Teacher demonstrates how to start assembling cricket cage. First, align the floor, ceiling, and door into a “sandwich” in the same way they were when originally drilled. You may have to look carefully at the hole patterns to see how to line things up. Then start pushing 3" bamboo skewers through the holes. You may need to give them a little twist. It should start looking like a pin cushion in a short while. Let the skewers stick out of both ceiling and floor. Don't attempt to push them down flush yet, or else with one slip you may have to start all over with the skewers. (See poster 4, section "a"). (The poster doesn't show this step, but...) temporarily remove all the skewers that go through the door piece, except for the two outermost ones. These will serve as centering guides and will be glued permanently. Later, when all the other skewers are glued, the door skewers will be reinserted and glued in a special way. Allow students time to insert their own skewers. Teacher demonstrates how to glue the floor skewers in place. (See poster 4, section "b") Smear some wood glue on the protruding skewers (look carefully at the hole patterns to see how to line things up. Then on a piece of scrap wood, place the cage, floor side down, onto the scrap. While pushing on the corners of the floor (but not the ceiling), carefully press the cage down until the glued skewers slide up flush into the floor. Now the glue will need time to dry before working on the ceiling.

Lesson 8: Individual work

Objectives: Students will follow directions and assemble their cricket cage ceiling and door. Students will evaluate their work, using a rubric. Students will write short reflection statements about their experience with this project.

Materials: students' floor skewers glued in place, scrap wood, wood glue, bundles of pre-cut 3" bamboo skewers, cricket assembly poster number 4, if available

Method: After glue in floor skewers has dried overnight, as in lesson 7 repeat the process of gluing the ceiling skewers, then place the cage upside down and press the skewers flush into the ceiling. Now insert the center door skewers, being careful not to get any glue on the top of them. (These must remain free to slide up and down. Push the door skewers through the door piece and out the bottom about 1/2" in a similar fashion like when assembling the floor and ceiling. Smear some glue on the skewer ends sticking out from the bottom of the door, and then push them up flush into the door piece. It may be easier to do this if the door is suspended about half-way closed. Allow to dry. The cage is finished! If painting is desired, DO NOT paint the skewers or anywhere near the door, unless you want the door to be painted shut!

Teacher can hand out and explain the self-evaluation scoring rubric or evaluate cages however he or she wishes.

Lesson 9: Work in groups (this will take a couple of sessions)

Objectives: Students will record and organize data into graphs

Materials: various cricket sounds, pencils, tally sheet, graph paper

Method: Teacher tells students that they have some cricket visitors today. And they are going to predict the temperature for us. Hand out paper for tally sheets. Have students number 1-10 along the left side of the page. Teacher says that research shows that crickets can tell us something about the temperature by the way they chirp. Only the males chirp, of course. Why? Ask for guesses. It seems to be the way they attract a mate. Teacher plays the first cricket sound (play for 15 seconds exactly) I just pre-recorded mine on a cassette tape off of my computer, but you can improvise here. If you have to, you can even just imitate a cricket yourself ahead of time on a cassette recorder or have students volunteer to do it! While the cricket is chirping, students are asked to tally how many chirps they heard. Whatever the number of chirps in 15 seconds turns out to be, teacher mentally adds 39 to that figure, then tells the students that the temperature the cricket is telling us is ______degrees. Repeat this process with several "crickets" all chirping at different speeds. Do replays, if necessary.

Now ask the students to look for patterns and try to make some statements about the relationship between the chirps and the temperature. Groups can be assigned to try putting the data on cards, then sorting them into some kind of predictable pattern. After a few minutes, have groups share what they discovered. Most will find that the temperature increases as the chirps increase. A few may even discover the "secret" formula.
Have students create a graph with the temperature on the “y” axis and the number of chirps on the “x” axis. Place dots for each cricket, then connect the dots. What do students see? They should see a relatively straight line. Make some predictions about the temperature if a cricket chirped ____ many times. Or, if the temperature were ____ degrees, how many chirps might the cricket have chirped? The graph can be used to make generalizations here.

Introduce the idea of a formula, how it could be used for various applications. Have groups try to come up with a formula for crickets and the temperature. Give them a starting point, like assign the letter “C” to stand for the number of chirps in 15 seconds, and “T” equals the temperature. Then ask the students how could they do some mathematical process to “C” to arrive at the temperature? Look back at the data and the graph. Teacher could make some suggestions that don't quite work, like “C x 3 = T. This works for 20 chirps, since 20 + 39 is 59 or about 60, but does it work in every instance? Let groups play with this for awhile. After a few minutes have students share their formulas. Some will have it close. Either 39 or 40 is acceptable.

Lesson 10: Individual and family work
Objectives: Students will record data at home with their families and apply it to a one variable formula. Students will write short answers to questions about their project, and synthesize some ideas for a hypothetical situation.
Materials: live crickets, clean yogurt containers with holes punched in top, finished cricket cages, cricket homework and care sheet
Method: Teacher hands out and explains homework sheet, which contains a data recording section and application with the "formula," and some questions which require a written response. Basically, students are to place their cricket in several different places at different times to see how many times it will chirp, and then check the temperature with a thermometer at home.

Live crickets will be distributed in yogurt cups to students, who will then take them home and try out their cages. (Females can be identified by their long ovipositor—a long thin fishing pole shaped thing sticking straight out of their tale. Males have wings, but not ovipositors.)

A cricket care sheet will be distributed and read together with the class. Students will return their homework after one week and share their discoveries about their cricket and how well it predicted the temperature.

Culminating Activity
Students were asked to use the following form to write thoughtful responses to these questions, after finishing the cage building segment:
Cricket Cage Thermometer Questions for Reflection:
1. Describe what turned out well for you on this project?
2. What really surprised you as you built the cricket cage?
3. If you could do this project over again, what would you do differently next time and why?

Evaluation
Students did a self-evaluation of their cricket cage, using the teacher-designed rubric (see below). Since some parts of this project are harder for some than for others, I tell the students that the "effort" section at the bottom of the form counts for a large portion of their grade. The teacher then reviewed and validated their evaluations, making needed adjustments and providing feedback. For the most part, the students were fairly accurate in their judgements.

In addition, students took home an activity sheet to do with their parents and their live cricket. They were to record some chirping data and calculate the temperature, using the class generated formula. Then they answered some questions, including some higher order thinking, and were to return their "homework" the next week.
Economic Decisions – A Reality Check

Students learn how financial decisions might affect their lives for years to come.

Curriculum/State Standard
Uses real world problems with estimation, measurement, and percentages.

Uses statistical methods and formulas to make inferences and valid arguments about real world problems.

Overview
In order to better understand economic decisions that might need to be made in the future, students had to make three financial decisions for a family with a limited income. Based on prior knowledge and information obtained during a field trip, teams had to make final decisions and support these decisions with facts and mathematical computations.

Objectives
• The students will measure quantities in the real world and use them in solving problems.
• The students will solve real world problems involving percents and interest rates.
• The students will develop critical thinking skills by defining, developing, and adjusting solutions to design or solve real world problems.
• The students will better realize that education will afford them a better life and less economic restraints.

Materials
Students were provided $15/group of 2-3, three ring binders, dividers, clip boards, disposable cameras (for photos of clothes that they would purchase for $150.00), and a variety of reference materials on nutrition and daily food requirements.

Readiness Activity
Students had learned about exponential functions as related to compound interest and had also studied materials that explained how to read food labels, choose the healthy choices, and get the minimum daily requirements.

Strategies/Activities
Students worked in teams of 2-3 for the entire project beginning with a one day field trip to a local car dealership, clothing stores at a mall, and the local supermarket. At the car dealership, teams kept notes on two cars of the teams’ choice. Notes included cost, mph, and warranties. From there the teams went to the mall and used disposable cameras to take pictures of clothes that could be mixed and matched (combinations) to provide enough professional outfits for a week. Finally, each team went to the supermarket and had $15.00 to purchase enough food to feed a family of six a nutritional, filling dinner.

Culminating Activity
The next day we used our home economics classroom to prepare the meals. No ingredients could be added that were not purchased the

Continued on the back...
prior day. After this, each team did a study of each event and made decisions and analysis based on the information they had gained and mathematical calculations.

**Evaluation**

A team’s grade was based on the portfolio which included three sections. Teams had to list the information on the car of choice and why they chose a particular car, including mileage and loan cost/month. Pictures of the clothes purchased had to be included in section 2, including cost of each item and a code to how the pieces would be mixed and matched. For the third section students included a receipt, food labels that included nutrition facts and number of servings, and the menu. Finally, the teams had to write papers evaluating the projects and explaining choices, what they learned, how it impacted them, and what would be done differently if they were to do this project again.
# FCAT Wheel of Fortune

This project motivates students to do better on comprehensive tests.

## Curriculum/State Standards
This project meets the language arts, reading, and math standards for Florida.

## Overview
This project fostered healthy competition among students in grades 6-8. It served as a means to support test-taking skills and strategies. It also helped students gain self-esteem and confidence so that they could "Conquer the Test!"

## Objectives
- The student will review academic skills for test preparation
- The student will study prior to the competition and be prepared to answer questions
- The student will increase their academic knowledge by answering the questions correctly
- The student will gain confidence with test-taking skills and strategies

## Materials
Florida Comprehensive Achievement Test (FCAT) Wheel of Fortune, Incentives for prizes, Copier paper and art supplies for the newsletters and flyers to advertise the event

## Strategies/Activities
Every day a test-type question was asked on the morning announcements. The first ten students with the correct answers won prizes. Teachers were given materials with questions for the students to review. Students made index cards and studied the questions and answers.

## Culminating Activity
The event took place in the media center. It was taped for the closed circuit television broadcast. Two teams were selected per grade level. Each team would spin the wheel. The wheel had three kinds of questions. The point values determined the easy, moderate and difficult questions. The facilitator asked the first team. If they answered correctly they got the points. If they missed it the second team gets the chance to answer to get the points. It rotates back and forth. There is a designated scorekeeper. There are five rounds of questioning each class period. The event continues throughout the two days. The teams with the most points win special prizes. The winners are photographed and the pictures are placed on the scrolling school loop which is broadcasted throughout the school day.

## Evaluation
Students were evaluated by the number of correct answers. The winning points served as the evaluation. Standardized test scores will be compared.

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**This winning project idea was submitted by:**

Linda Reihs
Coral Springs Middle
10300 West Wiles Road, Coral Springs, Fl. 33076
# Geometry Across the Board

**Students learn the value of math in many different real-world professions using basic principles and practices of geometry.**

<table>
<thead>
<tr>
<th><strong>Curriculum/State Standards</strong></th>
<th><strong>Materials</strong></th>
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<tbody>
<tr>
<td>To use math in a variety of different settings and to collect and discriminate data, calculate mean values and the range, interpret data, make arguments based on data collection, graphing, understanding variables and equations, and applying all information learned in the classroom to real-world mathematical problems.</td>
<td>Tom Snyder's PrimeTime Math Series Productions (Stakeout!, Emergency!, Fire!), IBM-compatible 486 or higher with sound card (166 MHz Pentium processor or greater), Windows 95 or later; 32 megs, 640 x 480 Monitor with minimum displays 256 colors, speakers and large screen monitor is optional, photocopier and paper.</td>
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<tr>
<th><strong>Overview</strong></th>
<th><strong>Readiness Activity</strong></th>
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<tr>
<td>As a result of this project, the students were able to experience real-world situations within the classroom setting. It allows the students to go on a &quot;field trip&quot; without the leaving the campus—the community was brought to them.</td>
<td>The students should have already been working in cooperative groups for the purpose of learning that each member of the group has a vital role in the task that is necessary for the completion of the assignment.</td>
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<tr>
<th><strong>Objectives</strong></th>
<th><strong>Strategies/Activities</strong></th>
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<tr>
<td>• The students will use math and medical data to participate in the critical life-saving mission of hospital emergency departments as they learn to value the role of mathematics in emergency medicine.</td>
<td>Each workbook has a section called the &quot;Walkthrough&quot; that guides each step of the process.</td>
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<td>• The students will use math and crime scene statistics to help solve a case and defeat a comic store burglar on a citywide rampage.</td>
<td><strong>Culminating Activity</strong> The video series is divided into three Acts. The student had to complete the assignments for one act before proceeding to the next. However, the students had to solve the case or make the final decision before Act 3 because it gave the students the solution to the problem at hand. The students had to submit reports at the end of each activity.</td>
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<td>• The students will learn the value of mathematics in the profession of police work.</td>
<td><strong>Evaluation</strong> The students were evaluated on their individual contribution to their group, the way they interacted within the group and the written report composed by their team.</td>
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<td>• The students will develop an understanding for the structure, role, and the use of measurements and mathematics in firefighting.</td>
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So You Want To Be An Architect?

Students' measurement skills showed tremendous improvement over the course of this project.

Curriculum/State Standards
Connecticut Mathematics Curriculum Framework:
- Examine the relationships between the measures of area of 2-dimensional objects and volumes of 3-dimensional objects.
- Solve problems involving measurement through the use of a variety of tools, techniques, and strategies.
- Use specific ratios to convert between measures of length, area, volume, mass, and capacity in the customary and metric systems.
- Make precise measurements and use benchmarks to estimate measures.

District Curriculum
- Area, perimeter, and the relationship between the two
- Measurement
- Different forms of persuasive writing

Overview
In this project, students design a house and create their blueprints of their house using a scale. Upon completion of the blueprints, students build a scale model of their home. These houses are presented at an "open house" along with a persuasive advertisement to "sell" their home.

Objectives
- The student will design a house based on a budget.
- The student will accurately calculate the various costs of a home, such as cost of building and flooring.
- The student will create blueprints to scale.
- The student will calculate area and perimeter for all rooms and the house as a whole.
- The student will measure accurately to create a scale model of their home.
- The student will write a persuasive real estate listing to "sell" their home.

Materials
11” x 17” graph paper that has a 4 x 4 grid (squares should be ¼ inch), 30” x 40” foam board (4 sheets per student), glue, cutting knife, pins, squares, information packets to provide students with all of the information.

Readiness Activity
Students had spent some time in class working on the concepts of area and perimeter in regards to what each is and how to determine these measurements. We then spent some time analyzing the relationship between area and perimeter (i.e.: a square shape has more area than a rectangular shape with the same perimeter). This was necessary so that students could think about what the best shape for their rooms should be on their blueprints.

Continued on the back...
"So You Want To Be An Architect?"
project continued...

Strategies/Activities
1. Students were given an information packet that included building codes, symbols, the scale being used, sample floor plans, design space, and their rubric for the blueprints.
2. Students and I discussed the packet step-by-step. Building codes are as follows:
   - Your home must be between 1,400 and 2,000 square feet.
   - Square footage includes all rooms and hallways, but not closets.
   - No room can be smaller than 40 square feet.
   - You must have an attached garage that is between 100 and 200 square feet.
   - You must have 3 bedrooms, one kitchen, one dining room, one living room, and 2 bathrooms. You may add 2 additional rooms such as a 4th bedroom, playroom, office, or bathroom.
   - There must be a closet in each bedroom, a linen closet (either in or next to a bathroom), and an entryway closet.
   - All hallways must be 4 feet wide.
   - You must have at least 2 windows in all rooms that run along the perimeter of the home. Windows can be 2 feet wide or 4 feet wide. This is part of your budget!
   - There must be a door in every room. The doorway has to be at least 4 feet wide to match the hallway.
   - You must put flooring in all rooms of the house and include this in your budget.
   - The entire project may not cost more than $180,000!
   - The scale you are using is 1 square (1/4" = 1 foot.)
3. Students and I looked at sample floor plans and talked about the different symbols used for doors, windows, and closets. We also looked at the costs worksheet, which included all the various costs.
4. Students worked on their rough draft of their house.
5. Upon completion of the rough draft, students were given graph paper to create their blueprints.
6. Students calculated the area and perimeter of each room and of the house as a whole. All computations were included on a measurement worksheet that had all the rooms listed. Students also decided what type of flooring they wanted and had to calculate the cost for each room. They calculated the cost of building the home as well and had to determine how much money was left over in their budget.
7. After the blueprints were completed, we spent some time as a class talking about how to build the model of our house. The scale for this process was 1 foot = ½". I modeled how to cut out the floor of the house and several of the walls. I showed the class how to attach the walls to the floor using the glue and pins.
8. Students worked on their houses to completion. After this, they created a real estate listing to "sell" their house. The listing included a picture of their home, a brief persuasive paragraph giving a good description of the home, and certain key features were highlighted in a bulleted list.

Culminating Activity
Students hosted an "open house" for their parents. The model houses were displayed with the blueprints, as well as the real estate listings that the students created. At this open house, students were able to talk to their families about the different components of their homes and describe the process they went through. Refreshments were also served.

Evaluation
The students were evaluated on this project at three different points. Each section of the project (blueprints, model, and advertisement) had a rubric that outlined the criteria and possible points to be earned.
Construction, scaling, and modeling of new building addition

Geometry is made exciting through a group project based on the real world scenario of construction a building addition. Team communication, organization, problem solving and perseverance are emphasized and developed throughout the course of this project.

Curriculum/State Standards
This project enables all students the ability to compute and make reasonable estimates of two and three dimensional geometric shapes as well use of visualization, spatial reasoning, and geometric modeling to solve problems.

Overview
Students researched safety and handicap requirements for public buildings, developed a scaled 2-D drawing for the building addition they designed, and then built a 3-D model with Zome Geometry materials and "Young Architects" kits. Total building cost estimates were developed for the building. A letter to the Board of Education was also written to persuade the Board to adopt their plan.

Objectives
• The student will be able to accurately calculate area, volume, and perimeter of various geometric forms.
• The student will be able to accurately measure and scale a building using proportions.
• The student will be able to accurately estimate cost of materials and labor for a project.

Materials
Rulers, tape measures, poster boards, building supplies for models (I used Zome Geometry and Young Architects kits), plywood, various materials for landscaping, computer, calculator, pencil

Readiness Activity
The students studied various shapes prior to beginning the project. The project actually began with a class presentation from the superintendent and principal of their ideas of what they envisioned the new addition would house. The students then spent a couple of days with their group members debating and compromising on their visions.

Continued on the back...

Vicki Parker
Fairview High School
2123 Main Street, Ashland, KY 41102

10-12
GRADE LEVEL

4
WEEKS

$500
TOTAL BUDGET
“Construction, scaling, and modeling of new building addition” project continued...

**Strategies/Activities**
1. Brainstorming within group to generate general idea of their building and its contents.
2. Computer research to locate fire safety codes and handicap requirements for public school buildings.
3. Draw on paper a rough sketch of their building.
4. Scaling the rough sketch in preparation for drawing the foundation on the building board (plywood).
5. Building the 3-D model
6. Calculating the cost for materials and labor for construction-footers, concrete, blocks, bricks, flooring, etc.
7. Write letter to the Board of Education persuading them to adopt their design.

**Culminating Activity**
The final activity was an in-class speech about their project and why it should be chosen as the best design and most accurate out of all the others in their class.

**Evaluation**
The students received daily participation grades as well as grades on calculations of area, cost, and volume. They were also graded for accurate scaling of their model, letter to the board, speech, quizzes throughout the project on each aspect of geometry covered-scaling, area, perimeter, volume, cost calculations, and a final test over the total project with the major areas included.
Cement Patio Blocks

Students learn geometry and create a lasting project that inspires pride.

Curriculum/State Standards
This project incorporates problem solving, application of geometric principles, two and three dimension concepts, ratios, and proportions.

Overview
Students must sketch and plan a three-dimensional form that cement will be poured into to form patio blocks. They must then build this form using boards they cut themselves. The finished product is a patio block that is on display in our school courtyard.

Objectives
• The student will sketch a three-dimensional geometric shape with design features.
• The student will build the geometric shape using two inch wide boards cutting angles correctly.
• The student will mix cement to fill the space (additional learning is computing volume).
• The student will work with another member of the class collaboratively.
• The student will complete the design and display the finished product in the school courtyard.

Materials
Trowels, floats, boards, foam board, plywood base, mixing bowls or pails, cement, water, screws, screwdrivers, saws, PAM degreaser spray, and materials to decorate the blocks.

Readiness Activity
Students must understand geometric forms and be aware of form and function. They also need to be able to use measuring devices and cutting tools. They should also be introduced to two and three dimensional drawing. I also teach teamwork and planning skills before this activity. Construction skills can be taught during the activity.

Strategies/Activities
1. Introduce activity to class. Explain expectations. Discuss 2-D and 3-D drawing and construction.
2. Break into teams of two. Yes you can have one group of three. They make two projects.
3. Have each person in the class sketch on graph paper four possible designs.
4. Group decides on one design to build. Have each group decide the angles that need to be cut, size of finished frame (must be less that two feet square), materials needed, etc.
5. Teach size, proportion, construction techniques, and use of equipment as you go.
6. Have groups start cutting wood sections to assemble. Should have miter saw and box. Can use regular saws. You may wish to have a jigsaw or other saws to help with complicated cuts.
7. Supervise the construction, yes the kids can do it at home with parent supervision.
8. Help screw the boards together. I had a portable drill that I used and had some students use.

Continued on the back...

THIS WINNING PROJECT IDEA WAS SUBMITTED BY:
David J. Jaroch
Ubly Community Schools
2020 Union Street, Ubly, Michigan 48475
9. Once frame is complete set on plywood base and use PAM to spray wood for easy removal of cement.

10. Demo one project in front of the class for everyone to see. Have large mixing bowl for cement. Students have to either compute the volume of their forms and dry measure cement to have enough or estimate how much is needed. I use premixed concrete. I found that mixing gravel and cement caused a lot of dust and created another set of problems. You can decide if you want to teach mixing techniques.

11. Mix cement to a firm consistency. Too much water is just as bad as too little water.

12. Use trowels and other cement worker tools to mix cement. You may have easier ways, use them.

13. Trowel cement into form being sure to fill corners well. Smooth off top and then place designs and other items into the cement to personalize the patio block. Student should use their imagination and preplan their designs.

14. Once the cement sets you can stack the forms on top of each other to save space in the room.

15. The next day you can remove the form and set the projects aside for another day or two to cure.

16. We have a placement day where the students take their project to a designated display area.

17. The project is used to inspire others to attempt creating cement projects.

18. Clean up as you go. Put your supplies aside for next year. If you are careful all you will need next time is a few bags of cement and perhaps four linear feet of two inch wide board per team next year.

19. The project is fun to do and the students seem to enjoy doing the work together.

20. Call the press and put the project along with pictures in the local newspaper.

**Culminating Activity**

The project is complete when everyone has their designs on display in an area where they, their friends, and other classes walk past them every day. We invite the newspaper in to take a few photos and publish their projects in the local paper to cement their learning.

**Evaluation**

I evaluate the student by completing the assigned task on time according to instructions. Grades are only lowered for poor effort and non-completion of project steps. I grade 100% or nothing usually. Grades are not used to punish poor projects. Everyone learns even if his or her project is not perfect.
Classroom Store

This project helps kindergartners with recognizing and counting coins.

Curriculum/State Standard
MA.A.1.1  MA.A. 2.1  MA.B.3.1

Overview
Students use hands on manipulatives to practice naming and counting coins and practice their value. Once the student can name and count money, they can come to the class store to purchase items.

Objectives
• The student will be able to name the coins quarter, nickel, dime, and penny.
• The student will be able to name the value of each coin.
• The student will use coins to represent money amounts.

Materials
coin stamps, small group coin BINGO, coin/value matching cards, items for students to purchase, fake money

Readiness Activity
To prepare students for this activity, we learned poems to help remember the coin names and values.

Strategies/Activities
Students are exposed to the coin names and values. Once they have a fair knowledge of them, they complete some hands on activities and practice activities within a small group. The next step is to work independently to reinforce the skills and allow time for the teacher to complete some informal and formal assessment.

Culminating Activity.
Students can begin to come to the class store once they can add coin values. The class store is open in the morning for 30 minutes and is run by student helpers.

Evaluation
Students were evaluated through formal and informal teacher assessment/observation. The ending evaluation was based upon their ability to add coins to buy items.

This project helps kindergartners with recognizing and counting coins.

Laurie Blackwell
Diplomat Elementary
1115 NE 16th Terr, Cape Coral, FL 33909
Perfect Puili Patterns

Students not only master Hawaiian drum and dance chant routines using traditional Hawaiian puili sticks, they also create their own routines and learn how the musical rhythms can be written as mathematical equations.

Curriculum/State Standard
The student solves equations using whole numbers.
The student writes expressively to convey information.

Overview
Students worked with the music teacher to understand sounds-per-beat notation and how the Hawaiian dance and drum rhythms can be written in this mathematical form. They explored the diverse culture of Hawaii and broke into cooperative learning teams to create their own routines - which they performed for the class - using locomotor, non-locomotor, and traditional Hawaiian puili techniques to tell a story. We also learned Hawaiian songs, numbers, colors, and recreated Hawaiian cultural artifacts like the state flag, totem poles, leis and hula skirts - all from recyclable materials!

Objectives
• The student will enhance mathematics skills by solving equations with whole numbers through hands-on activities.
• The student will study the diverse culture of native Hawaiians, constructing traditional puili sticks from recyclable materials.
• The student will learn to write the rhythms of Hawaiian dance chants as mathematical equations.

Materials
The most important thing is to have enough wooden dowels to construct the puilis. We used grant funds to purchase these - more than 600 dowels with different thicknesses: 1/4 of an inch, 3/16 of an inch, and 1/8 of an inch. Students measured the four-foot long dowels, making a mark in the exact center, and I cut them with my power saw. To make the leis and hula skirts, we used old newspapers, tempera paint, and duct tape. Totem poles were made from old coffee cans, stacked and duct-taped. Flags and maps of Hawaii were made from paper.

Continued on the back . . .

This winning lesson plan was submitted by:
Jessica Fredricks, Darrell Venable
Bethune Academy
900 Avenue F, Haines City, FL 33844
“Perfect Puili Patterns” project continued . . .

**Readiness Activity**
Readiness activities included counting basic rhythms (quarter notes and sets of eighth notes) in common time while looking at music notation and then introducing sounds-per-beat (SPB) notation. We then added plus signs and equals sign between the SPB numbers, asking students if $1 + 1 + 1 = 1$, and they discovered that by putting a minus sign in front of one of the first 1’s, the equation would balance. We then introduced eighth notes (2’s in SPB) and quarter rests (0’s in SPB) and took the equation experience further before clapping the rhythms in SPB and then playing them with puili sticks.

**Strategies/Activities**
After the readiness activity, students listened to traditional Hawaiian dance and drum chants, picking out an ostinato rhythm to accompany the piece, and writing that ostinato in SPB. They completed a series of task sheets designed specifically for this project and then used their knowledge to create their own puili patterns on the PE field. Teachers coached and encouraged them, finally picking the top three cooperative learning groups to perform during the school-wide luau at the end of the project. Students made leis/hula skirts, learned Hawaiian numbers and colors, and made totem poles with the classroom teachers as a complementary activity.

**Culminating Activity**
The culminating activity was a school-wide luau. During the luau, the student body was introduced to the unit that the second grade had been working on for the past 11 weeks. Hawaiian cultural artifacts were on display: students wore the hula skirts and leis they had worked so diligently on; parents created a 10-foot by 15-foot mural featuring a Hawaiian beach as a backdrop for the stage, and totem poles framed the stage. The school’s Ukulele Troop and Steel Drum band performed, accompanied by the puili stick players, and the top three cooperative learning ensembles gave the world premiere of their puili stick routines. All students and teachers in attendance were presented with leis and it was a fantastic experience!

**Evaluation**
Students were evaluated on their puili pattern task sheets, journal entries that documented their experiences, and a teacher-generated math test.
Abacus Cadabracus

This project is extremely effective and invaluable in helping students visualize the math concepts at the application level.

Curriculum/State Standard
Students understand and apply concepts and procedures for number sense, including: addition, subtraction, counting on, counting back, regrouping, and place value (with advanced students).

Effectiveness
This project is extremely effective and invaluable in helping students visualize the math concepts at the application level.

Overview
Using craft shop supplies, clothes hangar wires and wire clips, teacher assists students in making a modified, personal beaded abacuses roughly in the shape of a human figure. The abacus consists of two rows of color-coded finger and toe beads grouped by fives. Students use the colors to pull out groups of five or ten in determining the addends, minuends, and subtrahends prior to calculating the actual problem and again in determining the final answer to the problem. Students note the relationship of 10 beads in each row with the student’s own 10 fingers and visually understand that the number 11, for example, is one row of 10 beads plus 1 bead in row two. (By placing the abacus vertically, the left column beads become the tens place value and the right column the ones for advanced students.) By placing the teacher abacus on the overhead projector, the teacher sequentially demonstrates the procedures for the processes of addition and subtraction by asking students to emulate exactly the steps to those procedures.

Objectives
• Students will learn to manipulate a modified abacus as a counter to add and subtract.
• Students will learn to “count on” and “count back.”
• Students will learn to group and count by fives and tens.
• Students will learn to pull apart and regroup numbers in a variety of ways.
• Students will learn the history of the abacus and the relationship of 10 beads to the base 10 system.

Materials
small, round, colored wood beads for the legs; a large round bead for the head; a spool or oblong bead for the base; any decorative beads for feet or craft materials for face, hair, etc.; pre-cut and pre-bent clothes hanger wire in form of an upside down, block letter U for stringing beads.

Continued on the back . . .
The hook holds the head bead and the excess hook wire is bent into a curl. Students thread the wires with the beads. Teacher bends lower wire into to hold beads in place. Feet wire is threaded through spool and curled to hold the entire abacus together.

**Readiness Activity**
I will introduce the abacus as early man’s first computer, designed to allow him to continue to add and subtract easily to 20 (or 110 for advanced students). Literature such as Cave Boy and Cave People initiate dialog and discussion about early man. Discuss man’s many inventions over time and how things were so different 100, even 50 years ago. Give background information on the abacus as invented by the Chinese. Tell students that they will be making modified abacuses and learning how to use this ancient tool for computing math problems. If possible, bring in a knowledgeable guest to do a demonstration with a real abacus.

**Strategies/Activities**
1. To clear abacus before each problem, hold the abacus man’s feet (spool) in your left hand and stand him on his head to allow the beads to fall to the opposite direction.
2. Sample addition problem: to add 7+4, push 5 red beads, “count on” two more to make 7, then count out 4 more to complete the problem. The fourth bead will fall on the second row.
3. Now student counts 5 red beads + 5 green beads (or 10 for the row) and counts on 1 more bead to make 11. Thus, the student has the visual representation that the number 11 can be represented by 5 + 5 + 1 or 10 + 1 or 7 + 4. As the child works regularly with the abacus, he/she visualizes and devises a variety of ways to pull numbers apart and put them back together. Encourage and discuss these methods.

**Culminating Activity**
When students have a good grasp of manipulating the abacus, parents will be invited in for an abacus classroom party where students will demonstrate and teach the parents about the abacus and the teacher will stress the importance of practicing daily homework.

**Evaluation**
Evaluation can be by timed test as teacher circulates and observes student understanding and/or through the student demonstration to parents at classroom abacus party.
Math Poster Project

The poster project, by teaching how to represent math problems and concepts in multiple ways, is helping students on the path from novice to expert math problem solvers!

Curriculum/State Standards

- Students will express mathematical ideas using mathematical language, models, charts, tables, graphs, and symbols.
- Students will explain or describe mathematical information for the purpose of informing or persuading.
- From the state Connections process standards: Students can represent information in multiple ways.
- Students can use previously learned information in new contexts.
- Students can recognize mathematics in everyday situations.

Overview

Although the idea of making the posters is quite exciting and motivating, it is important to realize that students’ skills in presenting math ideas in a compelling visual fashion is a growth area for many of them. First, they need a lot of work on the math concepts, and they also need to understand many different ways of approaching a math idea. Next, they need specific training in design concepts, so that they can be successful in commun-

cating their math ideas visually. The poster project is just one small step to begin to address the huge question of how we effectively integrate families and parents in the circle of schools and classrooms.

Objectives

- The students will communicate math concepts in a visual way.
- The students will make connections between different areas in math, and between math and real-life situations.

Materials

With students helping to photograph, digital cameras are an obvious choice. Students take many more pictures than you will finally print, and this is great reason to go digital. Here again, the firm yet patient teacher can encourage while helping students to develop a critical eye.

Ink cartridges are expensive, and you go through more than you might think, especially when you are printing photos big enough to fit on a poster. For a project of any size, you should figure at least $200.00 for color ink, and around $100.00 for QUALITY photo paper.

Continued on the back . . .
Readiness Activity
Project activities focused on students working on multiple representations for a given math topic. In fractions, for instance, we looked at: pie graphs, block graphs, arrays, and discrete models (one third of a group of twelve people, for instance).

Strategies/Activities
As a group, we then discussed which models would make the most compelling additions to our poster. Then students in small groups were assigned to make their part. This way, we could work on three or four component parts at the same time. Most of the photo chores went to the teacher, at least on the editing and printing end.

Evaluation
Students evaluated the posters in a fairly straight-forward way. They gave compliments to each group for something they liked about their work and also offered one suggestion for improvement.
A Vision for the Future of New York City

The students developed a sense of what is involved in creating architectural designs, and the importance of listening to others and working as a team.

Curriculum/State Standard
measurement, creating graphic and scale models, using formulas, creating scale drawings, problem solving using measurement and estimation, proportion, percents, and working with various forms of number

Overview
Students made models of their designs for a building to stand where the World Trade Center stood.

Objectives
• The student will work cooperatively to create design ideas for the model. The scale will be determined by the students (a consensus of 1 in = 20 ft).
• The students will work on a specific aspect of the model, creating it to design specification.
• The student will use measurement and unit conversion in their construction of the buildings, and will describe the actual dimensions of the buildings using proportionality.

Materials
The buildings and foundations consisted mainly of foam board. Various design papers and contact papers were used to enhance the exterior features. Glue guns were used for adhesion, and flowers, rocks, and wood dowels were also used for detail.

Readiness Activity
We looked at the actual design proposals on the Internet and discussed the features the real architects were using. I also gave the students written information and aerial maps showing the area before the attacks, and we calculated percentages for those areas.

Continued on the back . . .
Strategies/Activities
We began the project by looking at the real proposed design plans for the World Trade Center area. We then looked at the percentages of office, public, parking space, etc., that were lost in the attack in an effort to realize what the new models would need to incorporate. Each group of four in each class developed a design plan consisting of an aerial view, memorial idea, and architectural ideas. Members of each class then voted on their favorite entry for each category, and, by class, we began planning our design for the model. Each class worked on a different model idea, and two months later we finished the projects.

Culminating Activity
We displayed the models in our school’s media center and had classes come through and vote for their favorite model.

Evaluation
Throughout the planning phase, individual work was required to be turned in. During the construction phase, a participation grade was awarded to those on task and productively contributing to the project. Students were tested on their ability to do measurement conversion and proportional reasoning at the end of the project.
Economics and Home Needs
Math Discovery

This project was held at Jo-Ann Stores with content and an instructor provided by them.

Curriculum/State Standard
Math and Communication

Overview
We were able to make and decorate dragons from clay that were made individually by each student attending. The personalized teacher, Diane Pollard, demonstrated step-by-step to the students as the project progressed to completion.

Objectives
- The student will use and apply concepts for measurement and design.
- The student will use designs as demonstrated by the teacher.
- The student will work in cooperative, multi-age teams.

Materials
10 cookie sheets for baking, 2 rolls of paper towels, 4 containers of hand lotion, 20 packets of sculpting clay

Readiness Activity
I explained the project with art and homemaking teachers. Teachers explained the principle of art in determining what the project would accomplish.

Strategies/Activities
We acted as “designers” for our project. I explained to the students that with working and sculpting, we would actually have a project to take home. Students were expected to work in teams to give one another creative ideas and calculate parts of the sculpture according to scale. The art teacher and homemaking teacher both participated to teach the students about brainstorming. I taught the portion about estimating the cost of the project, supplies, and budgeting. Students learned vocabulary, measurements, and textures fitting the project to be created.

Culminating Activity
Students went to Jo-Ann’s to participate in a class for sculpting clay with personal teacher who models a dragon that the students replicated using their own creativity. Each student uses a multi-pack sculpting material to develop his/her project. Our students actually made “dragons,” and the class was in session from 9:00 a.m. to 12:00 noon. Each student worked on their individual dragon throughout the class until it was ready to be fired.

Continued on the back . . .
“Economics and Home Needs Math Discovery” project continued . . .

Evaluation
Each student shared his/her dragon and how the design was chosen. Presentations were given individually to the other classes in the third and fifth grades to encourage them. Results were shared with the local store manager, parents, and administrators. Computer skills were used to record information and make journals with pictures and finished handbook demonstrating processes used. Students in this way did a self-assessment of their work. These became their formal assessment at the end, along with journals of how the process was accomplished.
Graphing Made Fun and Easy!

This project allows students to discover concepts through hands-on, fun methods.

**Curriculum/State Standard**
New York State Key Idea 4-Modeling/Multiple Representation. The students use the coordinate plane to explore geometric ideas. There is also integration of other subject material - language arts. The students will be using real world models of Venn Diagrams with the attribute circles purchased.

**Overview**
We started off the week just talking about why we need to graph things and we read *Stellaluna* as introduction to this discussion. Next we learned about Venn Diagrams. Finally, the coordinate plane was introduced on the large pull-down diagram. The students then on dry-erase boards explored graphing linear and quadratic functions.

**Objectives**
- The student will construct a Venn diagram on their Mats using Attribute blocks.
- The students will be able to plot coordinate values in a coordinate plane.

**Materials**
*Stellaluna* by Janell Cannon, coordinate grid marker boards for each student, pull-down classroom graph chart, graph mat of Venn Diagrams, and Attribute Circles purchased.

**Readiness Activity**
The students had no prior introduction to graphing before reading *Stellaluna*.

**Strategies/Activities**
1. Discuss the necessity of graphs in the real world.
2. Read *Stellaluna*.
3. Talk about Venn Diagrams.
5. Introduce Coordinate Plane using pull-down chart.
6. Let the students graph ordered pairs, linear and quadratic equations on their dry-erase coordinate plane.

**Culminating Activity**
Students made a mystery-graph art design. They had to come up with the order pairs that when plotted correctly created a piece of graphic art such as animal, holiday themed design, etc.

**Evaluation**
The students were evaluated by looking at their man made Venn diagram and scoring it using a rubric of 1-3. The linear and quadratic equations were scored as well. Finally, the graphic art received a grade, also.
“No Sew” Fleece Blankets for Neinas School

This project develops respect for the students themselves and for others. The emotional rewards are tremendous for children at both the project school and the partner school.

Curriculum/State Standard
In math, the curriculum standards included are: measurement, formulas for perimeter and area, converting between different forms of measurements and calculating costs and supplies. In social studies, the project covered the CORE Democratic Values of Diversity and Public or Common Good.

Overview
Part 1: Introduce the project by having a speaker visit the children and tell them about the children from the partner school (Neinas). Second, show the children a sample “no sew” blanket and explain how they are going to help make them. Part 2: Give the students the math lessons. Relate them to the costs and amounts of fabric needed for the whole project and the individual blankets. Part 3: Help the students measure the blankets, cut and tie the fringe around the edges, and package the blankets to give to the partner school students.

Objectives
• The students will be able to measure given amounts accurately with rulers and yardsticks.
• The students will understand and be able to calculate perimeter and area.
• The students will be able to convert between inches/feet/ yards.
• The students will be able to calculate supplies and costs for the project.

Materials
prepared math worksheets related to the project, pre-cut fabric for the blankets, scissors, and templates for cutting the fringe around the blanket edges

Continued on the back . . .
“No Sew” Fleece Blankets for Neinas School” project continued . . .

**Readiness Activity**
Our readiness activity included having a parent who represents Bridgepoint talk to our students about Neinas School and the needs of the children who attend the school. The parent talked about the many ways Novi Meadows students can help. After that I introduced the “no sew” blanket project and showed the students a sample of a finished blanket.

**Strategies/Activities**
In order to duplicate the project, a school would have to decide on committing to a community service project and then find a group of children or adults who would benefit from getting blankets. Once this has been decided, the teacher would have to price the fabric and then figure out how many blankets he/she would want the children to make. It takes 1.25 yards of fleece per blanket for a child sized or lap sized blanket. Directions for making the blankets are available at most fabric supply stores.

**Culminating Activity**
Our culminating activity was to roll the blankets up like a sleeping bag and tie a big bow around each of them. We also included donated Beanie Babies with each blanket. The blankets were packaged with many other gifts our entire school donated for the children at Neinas School.

**Evaluation**
The math worksheets were corrected and the grades were averaged in with their other math grades on assignments. Some students were given a chance to go to Neinas School when the blankets and other items were delivered. When they came back, they shared what they had experienced. All the children then wrote reflection sheets on what they learned from this project. We talked about continuing to do more community service for Neinas and other causes.
$School = Work$

This project connects the world of employment with school activities. It provides an incentive for students to attend school and behave properly in the classroom.

**Curriculum/State Standard**

Students will apply the knowledge and thinking skills of mathematics to address real-life problems and make informed decisions.

**Overview**

Students are paid (teacher credits) to attend school and do their work without disruption. ‘Pay’ is ‘deposited’ into their account and they write checks against their account for ‘room and board’ to their parents. Any extra ‘funds’ may be used to purchase treats, rewards, and school supplies.

**Objectives**

- The students will learn how to write checks and keep a checkbook register.
- The students will learn to connect their attendance, behavior, and performance in school with potential monetary rewards.

**Materials**

colored paper for checks, folders for ‘checkbooks,’ folders, notebooks, binders, dividers, notebook paper, pencils, sharpeners, pens, erasers, markers and colored pencils, snacks, cans of soda, and occasional ice cream, popcorn, pizza, or movie rentals for the students to purchase

**Readiness Activity**

Students are read their job descriptions and the method of payment is explained. Class rules and procedures are reviewed and practiced. A math class is devoted to the process of recording deposits and checks in the register.

**Strategies/Activities**

Rate of Pay (class bucks): Passing = $7.50/hr.; D’s and trying hard = $5.00; Failing = Fired! All ‘pay’ is by direct deposit into student’s classroom account bi-weekly.

Benefits: Sick Days = 10/academic year (Student must bring in note with legal excuse.); ‘Health insurance’ allows student to visit nurse for up to 15 min. without use of sick time; Chill Time - games/ free time = 10-15 min. at end of morning/day; Fridays = 30 minutes at end of day for games and snacks (purchased w/ class bucks); Once-a-month = party (purchased with earned class bucks). Friday 30 min. and

Once-a-month party attendance is dependant upon completion of assignments and funds available in student’s account.

Continued on the back . . .
“School = Work!” project continued . . .

Student Job Description = Be on time and pay attention in class. Work on and complete class assignments. Treat all other people and their belongings with respect. Keep your work and work area neat. Remain in your seat unless given permission to leave it. Follow school rules for appropriate dress and acceptable language.

Regular pay is earned by following student job description. Pay will be docked (lowered) for:
- Lateness = each 1/2 hour or part thereof
- Cursing / disrespect = 1/2 hour for each infraction
- Disregarding school guidelines = 1/2 hour for each infraction
- Referrals = each 1/2 hour or part thereof absent from room
- Suspensions = no pay for those days and hours
- Illegal absence = paid sick time requires a parent note

Overtime pay will be earned for:
- Homework completion - 1 hour OT for the entire week’s
- Behavior - $1.00 Tip for each check on chart
- Classroom Jobs - (rotation switches every 2 weeks)
  - Sweeping floor - PM = 2 hrs. OT / 2 weeks
  - Attendance = 1 hr. OT / 2 weeks
  - Calendar (ABCD) = 1 hr. OT/2 weeks
  - Put up/take down chairs of absent students = 2 hr. OT/2 weeks
  - Pass out books = 2 hr. OT/2 weeks
  - Collect books = 2 hr. OT/2 weeks
  - (Fill-in for assigned person gets the proportional OT pay)

Culminating Activity
All students filled out an evaluation of the project. Students who had adhered to school and class rules earned enough ‘class bucks’ for an end of year banana split party.

Evaluation
Students received a math grade every two weeks as they were ‘paid’ based on the accuracy with which they maintained their checkbook register and wrote checks. They evaluated their own behavior based on their paychecks.

Teachers reviewed the current year’s attendance, grades, and disciplinary record for each student to compare it with data from the previous year. For those students who are still invested in school, there was an increase in academic performance and decrease in disciplinary measures/ suspensions. Even the students who are no longer interested in an education protested if their ‘pay’ was ‘docked.’
Students Picturing Geometry

Many students learn through “hands-on” experience, and all students need to experience geometry and geometrical terms in their everyday life.

**Curriculum/State Standard**

1. Students will cover/review Grade 6 - Mathematics Standard 4 in Geometry.
   Students identify, describe, and classify the properties of plane and solid geometric shapes and the relationships between them.

2. Students will cover/review Grade 7 - Mathematics Standard 4 in Geometry.
   Students deepen their understanding of plane and solid geometric shapes by constructing shapes that meet given conditions and by identifying attributes of shapes.

3. Students will cover/review Grade 8 - Mathematics Standard 4 in Geometry
   Students deepen their understanding of plane and solid geometric shapes and properties by constructing shapes that meet given conditions, by identifying attributes of shapes, and by applying geometric concepts to solve problems.

**Overview**

Students are pre-tested on geometrical terms and the terms and attributes are then described in class. The students take pictures of the various terms in the hallways of the school setting, print the pictures, and then outline and label the pictures in their project booklet. Students are then given a post-test and writing assignment involving the geometrical terms.

**Objectives**

- The student will be able to identify and define the following terms including, but not limited to: point, line, ray, angle, vertex, line segment, acute angle, obtuse angle, right angle, straight angle, triangle, scalene triangle, equilateral triangle, isosceles triangle, right triangle, obtuse triangle, acute triangle, vertical angles, complementary angles, supplementary angles, quadrilateral, square, rectangle, rhombus, trapezoid, parallelogram, perpendicular lines, skew lines, parallel lines, pentagon, hexagon, heptagon, octagon, nonagon, decagon, circle, radius, diameter, chord, center, circumference, perimeter, prism, sphere, cube, pyramid, and cylinder.

*Continued on the back . . .*
“Students Picturing Geometry” project continued . . .

• The student will be able to identify specific attributes of geometric shapes, describe relationships between geometric shapes, and apply geometrical concepts to solve problems.

Materials
digital cameras (I used 1 per 2 students) and a computer/printer capable of printing the pictures of geometric shapes

Readiness Activity
Students must have at least a list of the geometrical terms and definitions. I had my students write the terms and definitions in their notebooks. Students must be instructed in the use of the digital camera.

Strategies/Activities
1. Students will be pre-tested over geometric terms.
2. For each topic of geometry, students will write in notebooks the appropriate vocabulary and definitions learned through lecture, research, and small group activities.
3. After learning the basic functions of the digital camera, each group of students will go on a geometrical “scavenger hunt” throughout the school, taking pictures of listed vocabulary words.
4. Students will print pictures of their vocabulary “finds” and they will outline individual examples of geometrical shapes within their pictures, listing the specific words below the pictures.

5. The above three steps will be repeated as necessary throughout the geometry section.
6. A scrapbook of each groups’ pictures will be kept for review and evaluation.
7. Students will be post-tested over geometric terms.

Culminating Activity
The culminating activities included the production of the geometric scrapbook and the posttest, including an essay portion.

Evaluation
1. Pretest evaluating vocabulary and geometrical shape attributes.
2. Evaluation of scrapbook completion and accuracy.
3. Posttest evaluating vocabulary and geometrical shape attributes.
4. Short answer essay questions applying geometrical concepts to solve problems.
Geometric String Design

The students enjoyed the opportunity to explore geometry in a creative venue. The designs turned out so nice that many students gave their creations as gifts for Mother’s Day.

Curriculum/State Standard
Use of transformations to demonstrate geometric properties.

Overview
It’s a pleasure to see students blending their creative art skills with standards-based math curricula. Students began by developing a line design using \( x \) and \( y \) coordinates, transformation, and geometry. They transferred their design onto mat board and sewed the lines with colorful embroidery floss.

Objectives
- The students will transform their line design into a colorful, creative geometric string art.
- The students will use their knowledge of symmetry, perpendicular, and reflection in their design.
- The students will practice their graphing skills by drawing on an \( x \) and \( y \) coordinate plane and formula the equations for their lines.

Materials
- 10"x10" mat board for each student
- 2 skeins of embroidery floss for each student
- 2 sewing needles with large enough eyes for 3 threads for each student
- Masking tape, pin cushion (recycled styroform works great)
- Scissors, colored pencils, copies of the line design sheets

Readiness Activity
- Linear and parabolic graphing
- Geometric transformation, symmetry, reflection, rotation

Strategies/Activities
Day 1: Introduction to Line Design handout.
Day 2: Students choose their 10"x10" design, must be completed before putting on the mat board.
Day 3: Students center their line design on their mat board using geometric constructions. Perpendicular to base, symmetry of color and design are all part of the final grading.
Day 4: Students punch sewing holes into their mat board.
Day 5-7: Students sew their designs.

Continued on the back . . .
“Geometric String Design” project continued . . .

Culminating Activity
The final product is impressive, creative, colorful, and rewarding. Students often comment, “This was easier than I thought” or “Cool looking.”

Evaluation
Attached to the back of the string design is the rubric where students have the opportunity to evaluate their final project along with me.
Under Construction

This project allows students to work with a mentor from an architectural firm and learn about cutting-edge technology as it relates to the field of architecture and design.

**Curriculum/State Standard**
Missouri Show Me Standard MA2: Students will acquire a solid foundation that includes knowledge of geometric and spatial sense involving measurement (including length, area, and volume).

**Overview**
After students learn about the mechanics of drawing, they will design pieces of outdoor furniture that can be constructed from 2 x 4’s. Students will learn how to read and write assembly instructions, how to measure properly, and how to use power tools necessary for construction.

**Objectives**
- The student will learn the fundamental principles of architectural design and the skills necessary to create conceptual drawings.
- The student will apply mathematical concepts and operations in the design and construction of outdoor furniture.

**Materials**
2 x 4 boards, circular saw, electric drill, screws, hand tools (measure tapes, hammers, etc.)
Helpful: CAD (Computer-Aided-Drawing) Software

**Readiness Activity**
Students learn about the principles of architectural design through computer software drawings and hand-drawn grid drawings. Students use design books to give them ideas as they work to create original pieces of outdoor furniture using 2 x 4’s.

**Strategies/Activities**
1. Students are “mentored” by architects from a local architectural firm (or a parent at your school could provide the same service).
2. Students learn basic principles of architectural design and what elements need to be incorporated into a finished piece.
3. Students create an original design for an outdoor piece of furniture.
4. Students learn how to use the appropriate power/hand tools during construction. Safety procedures are emphasized.
5. Students apply math concepts as they measure twice and cut once!

**CONTINUED ON THE BACK . . .**
“Under Construction” project continued . . .

Culminating Activity
The culminating activity is the actual creation of an outdoor piece of furniture. Students created a garden trellis, garden work stands, outdoor benches and chairs, and outdoor planters. These finished products were placed in the environmental courtyard at our school.

Evaluation
Students were evaluated on a unit scoring guide that marked the academic progress of each student in relation to the objectives of the unit. Student learning was measured on a continuum, allowing students to progress at their own rate. Students also completed self-reflection evaluations on how they felt about their own learning and personal progress through this project.
Sewing Success

This project is a very rich experience for students and provides them with a glimpse into how their world functions economically.

Curriculum/State Standard
Math: Measurement to 1/8 inch, inches, feet. Measurement in centimeters - Ability to measure using U.S. Customary and Metric systems; Gathering Data, graphing data, analyzing data, extrapolation of data; Analyzing and using charts; Fractions - inches, yards; Money-calculation and estimation
Social Studies: Identifying countries, continents; Using maps, globes; Understanding manufacturing processes, past and present; Understanding global communities
Language Arts: Reading directions; Steps in a process (oral and written), sequencing; Following multi-step directions (oral and written); Vocabulary and terminology; Writing “how-to” piece, Narrative piece; Recording data

Objectives
• The student will collect data on five pieces of their clothing and identify country and continent where their clothing was manufactured.
• The student will, with the class, plot data, and discuss.
• The student will measure him/herself (in U.S. Customary and Metric) and determine his/her size from a chart included on the pattern.
• The student will layout and cut fabric for a pair of shorts.
• The student will learn the vocabulary associated with sewing and be able to follow a simple pattern.
• The student will learn to use a sewing machine and sew a pair of shorts following pattern directions.
• The student will analyze production costs in the U.S. and in foreign countries and understand why much of our production takes place in other countries.

Materials
measuring tapes, simple shorts patterns, 1½ yards of fabric per child, thread, cord, pinking shears, waxed colored tracing paper, sewing machine, map, push pins

Overview
Students identified the origin of five pieces of their clothing. We graphed and discussed this information. Students measured themselves and determined shorts size from a chart. Students cut out and sewed a pair of shorts following pattern directions. Students analyzed why many jobs are going overseas.

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“Sewing Success” project continued . . .

**Readiness Activity**
For our readiness activity, we analyzed where the children’s clothing came from. On a world map (using push pins), each child identified the country and continent where each piece of their clothing was manufactured. This information was then graphed and analyzed. We got into a lengthy discussion about why most of their clothing was manufactured in other countries. We decided to analyze cost of production of a pair of shorts (at minimum wage U.S., using students’ labor) vs. $1.00 per hour overseas.

**Strategies/Activities**
1. As homework, each child determined where their clothing was manufactured. Each child then individually charted their clothing’s origin on a map. We then had discussion described in readiness activity.
2. Using parent volunteers, each child measured chest, waist, hip, and inseam in U.S. customary and metric. They recorded measurements in their journals, determined their shorts size from the pattern chart, and wrote a description of activity.
3. Using parent volunteers/teacher/practicum student, each child laid out, pinned and cut their shorts and marked them for sewing. Students wrote about this activity and kept a time log in their journals.
4. Small group discussion on sewing machine operation and safety, threading the machine, and terminology. We also discussed stitch lengths, locking seams, and seam width. During this time, we also read through pattern instructions and sewed a pair of shorts so each step could be demonstrated.
5. Using parent volunteers/teacher, each child individually sewed a pair of shorts according to pattern instructions. This part of the project obviously was the most time consuming and took a considerable amount of volunteer time. Each child wrote a description of what they did and time log.
6. In small groups, we finished up seams (hemming) and inserted drawstrings. Each child wrote a description of the activity and kept a time log.

**Culminating Activity**
Each child wrote a step-by-step procedure on how to sew a pair of shorts. They calculated the amount of time spent and the cost of labor for their pair of shorts using the minimum wage. They contrasted that to how much it would cost to produce the same pair of shorts overseas at $1.00 per hour. We then combined all our data so that we could analyze 25 pairs of shorts produced in the U.S. versus 25 pairs overseas. We then extrapolated it to 100, 1000, and 100,000 pairs to give the students an idea about mass production. We then discussed the downside of manufacturing items overseas (or in different countries) -loss of jobs and unemployment.

**Evaluation**
- Student journals were evaluated for clarity of directions/observations using teacher-designed rubrics.
- Students were evaluated on their ability to follow a pattern accurately in 3 step increments.
- Students were evaluated on ability to identify fractions to 1/8, specifically 5/8 inch seams.
- Students were evaluated on following oral instructions throughout the project.
- Students completed their project.
- I chose not to do a lot of formal evaluation on this project, largely because of the age of my students and wanting it to be a fun project that had real world application.
Eatable Math Week

Bilingual and English students cooperated to present their final products for this project, which reinforces math concepts in a productive way, motivating students to learn and apply knowledge.

Curriculum/State Standard
Place value, geometry, graphing, multiplication, division, addition, subtraction, and money problem solving, were some of the concepts students reviewed with cooperative groups and individually. All of these concepts are tested at the district level as well as the Texas State Test (TAKS - Texas Assessment of Knowledge and Skills).

Overview
Students participated in daily activities for a week as a whole grade level in the cafeteria. Students from bilingual, English, and special education classrooms participated with eatable manipulatives. The activities were hands-on, student-centered, and required the students to work together while reinforcing the math concepts being taught in their classrooms.

Objectives
- The students will gain knowledge and work toward the mastery of several math concepts.
- The students in cooperative teams will use food manipulatives to experience place value, addition, subtraction, multiplication, division, graphing, geometry, and problem solving.

Materials
- toothpicks, small marshmallows, large marshmallows, straws, crackers (diamond = Triscuit; rectangle = club; square = saltines; octagon = party mix; hexagon = party mix; oval = Town House; circle = Ritz) Goldfish Crackers, large pizzas, fruit punch, fruit salad (apples, pears, strawberries, watermelon, grapes, Cool Whip), trail mix (peanuts, raisins, Cheerios, popcorn, M&Ms), “Big Macs” (peanut butter, Ritz crackers), napkins, large plates, small plates, plastic cups, plastic knives

Strategies/Activities
Monday: Students will construct three dimensional shapes with the use of toothpicks and marshmallows. Discovery of weight, mass, and stability will naturally occur. Students will have the opportunity to discuss least and most effective methods of building the geometry figures during the activity.

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„Eatable Math Week” project continued . . .

Tuesday: Students will draw and describe a variety of shaped crackers based on appearance and physical properties. Students will get to sample each type of cracker and vote for the cracker with the best taste. Results will be counted for each classroom and tally mark charts will be visible to all students in that class. Participants will then create a picture graph to share the results of the voting.

Wednesday: Students will calculate the total number of students in each class and devise a plan about how to divide pizzas into fractions that provide slices for all students to taste one piece. Students will also have to calculate how many pizzas to order and what the cost will be. They will make comparisons between the distances of the three closest pizza restaurants to solve which is closest in location to the school. They will end the activity by eating pizza.

Thursday: Going Fishing! Learners will receive a bag of Goldfish Crackers and must predict how many are in each bag, how many are in their small group, how many are in the whole class, and how many are in all 3rd grade classes. Students will then count crackers, subtract the difference of the actual amount from their prediction, and record results. Instructors will assign grouping of crackers to show multiplication arrays. For example, three rows with six in each row to represent 3 x 6. This will be done with several different array patterns.

Friday: Students will vote as a class on which recipe they would like to prepare for another one of the 3rd grade classes. The choices will be fruit salad, trail mix, or peanut butter “Big Macs.” The cooking activities will be simple but will require direction following and measurement. Students will prepare and present another class with what they have made, as well as a sample for themselves. Students will give another student the recipe and step-by-step directions to make their foods.

Evaluation
Observation of student learning was the most frequently used method of evaluation. Conversations with the students while they participated in group activities served as a measuring tool for the program director. Students were required to record findings and write comments about the activities in which they had participated. Evaluation of these comments and observations confirmed the effectiveness of “Eatable Math Week.”