

# Future Engineers: Tools for Success

*Providing the students with their own toolbox and tools at the conclusion of the project will enable them to take ownership in both their work and their equipment. Having their own tools will encourage their creativity and enthusiasm for future design and development projects, whether in school or at home.*

## Curriculum/State Standard

New York State Standard 5 - Technology  
5.1 Engineering Design;  
5.2 Tools, Resources, Technological Processes;  
5.7 Management of Technology

## Overview

Students create and engineer various projects. I chose transportation vehicles, such as mousetrap cars, balsa airplanes, paddle boats, etc. They utilize technical drawing to develop their ideas, choosing the appropriate tools and processes during the manufacturing of their designs. The students create prototypes of the projects, changing or improving their designs during the testing stages.

## Objectives

- The student will demonstrate the proper use of drafting and wood working tools.
- The student will design, develop, and construct technology projects.
- The student will analyze their projects to determine how to make them more effective and efficient and problem solve to maximize the energy source.

## Materials

Wood - pine and balsa, dowel rods, small wood or plastic wheels, mouse traps, recyclable materials, CD's, rubber bands, propellers, drawing paper, fasteners (nails, screws, tape, glue), etc.; items for the tool box: plastic tool box (16" size is good), hammer, screwdrivers, coping saw, files, safety glasses, square, retractable ruler, mechanical pencil, drafting eraser, 30 and 45 degree angle templates, etc.

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# 6-8

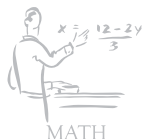
GRADE LEVEL



ARTS



LANGUAGE



MATH

# Misc

MISCELLANEOUS



SCIENCE



HISTORY



SOCIAL STUDIES

# 40-50

HOURS

# \$1000

TOTAL BUDGET

# *“Future Engineers: Tools for Success” project continued...*

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## **Readiness Activity**

Research various types of energy sources on the Internet. Investigate Web sites that show examples of mousetrap cars and how they are powered. Have a model of the project for students to examine and test to develop their own designs. A written pretest on the recognition and proper use of tools was given.

## **Strategies/Activities**

Technical drawing - Develop an idea from rough sketches or from a model. Create a technical blueprint, complete with dimensions.

Choose appropriate tools and processes - Develop a manufacturing plan (sequence of steps), utilizing tools and resources properly and effectively. Discuss the need for safety when working with tools and machines.

Manufacture - Create a prototype of project. Provide inspection points and testing during various stages of development.

The students will keep the toolbox and tools at the conclusion of the program. Providing the students their own set of tools will create a lifelong learning enthusiasm for future design and development projects.

## **Culminating Activity**

Contests were held after completion of each of the projects. Winners were based on various aspects - design, creativity, speed, distance traveled, etc.

A “tool box party” was held to officially congratulate the students and to give the students their tool-boxes with tools and their certificate of achievement. Parents and school administrators were invited to share the students' accomplishments and enthusiasm.

## **Evaluation**

A pretest and posttest were given on the recognition and proper use of tools to compare the progress of the students. An essay was composed by each student, entitled “Having My Own Tools Encourages Me To...”

After each of the contests, the teacher facilitated a discussion with the students to summarize the results of the races. We analyzed the effectiveness of the various designs of the project and reviewed the scientific principles that we had discussed during the design and production of the projects.