

Sky's the Limit

Each and every student builds and launches 2 types of rockets: an engine propelled and a water bottle rocket. Students are highly motivated and have a fun time learning about science. Newton's Laws of Motion are easily demonstrated with each rocket launch. By the end of the unit students can easily verbalize and explain each Law.

Curriculum/State Standard

Oregon State Science Standards, Benchmark 2: describe and compare the motion of objects

Overview

"Sky's the Limit" is a science of rocketry unit focusing on Newton's Laws of Motion in action. Students build and fly a Skill Level 2 ESTES rocket, a water bottle rocket, and various types of simple rockets and paper airplanes.

Objectives

- The student will study the mechanics of flight, the forces that affect the flight of an airplane: thrust, lift, gravity, and drag. They will build many different paper airplanes and study different aircraft mechanisms: the rudder, elevator, flap, and aileron.
- The student will fashion crude rockets from an assortment of materials that include balloons, string, straws, and tape. Force and aerodynamics will be demonstrated and studied. Students will experiment between long, thin balloons and short, fat balloons and the presence and absence of a controlling device or tail on the end. Without this controlling device balloon rockets, as we all know, fly haphazardly.

Continued on the back...

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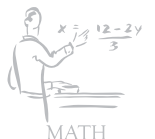
GRADE LEVEL



ARTS



LANGUAGE



MATH

Misc

MISCELLANEOUS



SCIENCE



HISTORY



SOCIAL STUDIES

4

WEEKS

\$337

TOTAL BUDGET



THIS WINNING LESSON PLAN WAS SUBMITTED BY:

Brian Gulka
Yujin Gakuen Japanese Immersion Elementary
250 Silver Lane, Eugene, OR 97448

“Sky’s the Limit” project continued...

- The student will experiment with film canister rockets: mixing the correct amount of vinegar and baking soda in a film canister (Fuji film canisters work best) creates a chemical reaction that blows the canister off the lid (quite forcefully).
- The student will build and fly water bottle rockets. Through discovery and applying basic physics students will find out the best ratio of water and air volume that creates the best (highest/longest) flight.
- The student will conclude the rocketry unit by building and launching Estes model rockets (Alphas). The rocket kits come with exploded views of all the rocket parts and a teacher's guide explaining the function of each part. Students will study forces of thrust, time of thrust, and mass of rockets in calculating total energy used in rocket flight.

Materials

Videos from school district IMC - flight and rocketry

ESTES Alpha Rockets, engines, launcher, launch pad

Pitsco water bottle rockets, launcher, bike pump

Hot glue gun

Science Court CD-ROM, computer

Miscellaneous: paper, baking soda & vinegar and Fuji film canisters (film canister rockets)

Readiness Activity

Students complete a pre-test and then view many types of videos on flight, rocketry, and Newton's Laws of Motion

Strategies/Activities

Students begin the unit studying the forces of flight. They make and fly different paper airplanes. Next, students study Newton's Law of Motion and take part in many different experiments, including baking soda rockets, balloon rockets, and water bottle rockets (made by the teacher). Students build a Pitsco water bottle rocket and an ESTES Alpha rocket

Culminating Activity

The culminating activity takes place over 3 different days. Students launch their water bottle rockets over 2 days. On the final day the entire school comes to watch as the 4th grade students launch their Alpha rockets 3 at a time, including many different rockets that I have made. This activity is so much fun I encourage everyone to do this unit.

Evaluation

Students take a pre- and post-test on rocketry, flight, and Newton's Laws of Motion. I also like to have students write down what they enjoyed the most about the unit and what they think they will remember in 5 years. Also, students are frequently required to verbalize Newton's laws and/or explain them prior to launching their rocket.