

Effervescent Rockets

A Lesson Illustrating Newton's Third Law of Motion

For every action there is an equal and opposite reaction

Science Concepts

In this model rocket, water reacts with the effervescent tablet causing it to fizz as it produces carbon dioxide gas. When the lid is placed on the film canister the gas becomes trapped and puts pressure on the lid of the canister. As the pressure builds, the canister (rocket) separates from the lid and shoots into the air. This is similar to the way that a rocket is launched—only NASA uses fuel instead of effervescent tablets and water.

A rocket's action is to push down on the ground with the force of its engines and the reaction is that the ground pushes the rocket upwards with an equal force.

Procedures

- Gather the following supplemental materials:
 - Plastic 35mm film canisters—these must have internal sealing lids. They are usually translucent and can be obtained from film processing centers.
 - Cellophane tape
 - Effervescent tablets (e.g., Alka-Seltzer®)
 - Water
 - Eye Protection
- Using the AccuCut® MARK IV® machine and the Rocket Ship die, cut the pieces for the rocket tube, nose cone and fins using construction paper. Later conduct tests with different types and weights of paper.
- Wrap and tape the tube of paper around a film canister. Use the long side of the rectangle to produce a tall rocket. The lid end of the film canister goes down and should be free to be opened and closed. Tape the entire edges of the tube to form a cylinder (Figure 1 & 2).
- Fold the four fins along the perforations and tape on to the lower sides of the rocket tube (Figure 3).
- Roll the semicircle paper into a cone shape and tape onto the other end of the paper tube. This forms the nose cone of the rocket (Figure 4).

Launch Instructions

- Take the rocket, water, effervescent tablets, and eye protection outside to the launch site.
- Put on your eye protection.
- Turn the rocket upside down, remove the lid from the canister, fill one fourth full of water.
- Drop in one half of an effervescent tablet and quickly replace the lid. Set on the launch site.
- BACK UP! Observe the rocket launch.

Questions to further test and discuss

- How does the amount of the tablet used affect how high the rocket will fly?
- How does the amount of water placed in the canister affect how high the rocket will fly?
- How does the empty weight of the rocket affect how high the rocket will fly?
- How does this simulated rocket flight demonstrate Newton's Laws of Motion?

Extension

Design experiments using these rockets. Take measurements and record your data.

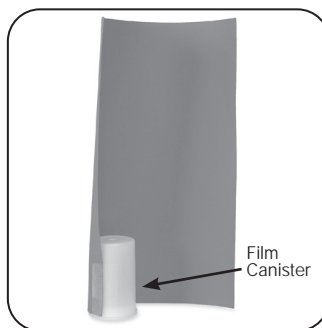
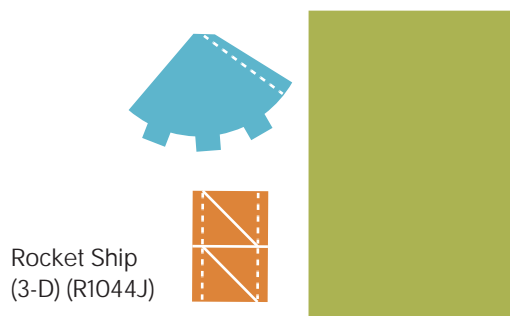


Figure 1



Figure 2

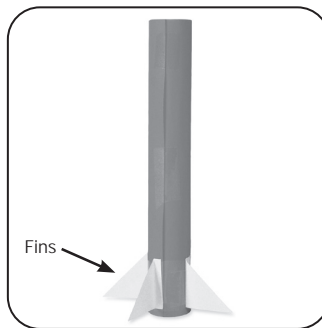


Figure 3

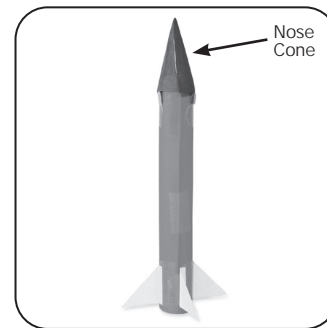


Figure 4