

# Aerospace

**Objective:** Explore different Aerospace (rocket) activities

**Materials:**

- 4-H Aerospace Project Book
- Rocket Model or Picture of Rocket (for visual)

Candy Rocket:

- Marshmallows (3 per participant)
- Gum Drops (3 per participant)
- Hershey Kisses (1 per participant)
- Toothpicks (11 per participant)

Straw Rocket:

- Straws (large milk straw and smaller drinking straw) (need one of each straw per participant)
- Mailing labels (3 per participant)

Bubble -Powered Rocket:

- Paper to cut to make cone, fins, and to wrap sides.
- Plastic 35-mm film canister (see note below regarding rim)
- Tape
- Scissors
- Effervescing (fizzing) antacid tablet (i.e. Alka-Seltzer)
- Water
- Eye Protection (Safety goggles)

**10 minutes; Parts of a Rocket / Building a Candy Rocket**

Follow directions provided on page 4 of Aerospace Project Book (also listed below) to talk about the parts of a rocket. It would be helpful to find a picture of a rocket or have a rocket on hand to use as a visual while talking about the parts. As each part is discussed, let each student build their own candy rocket using the materials provided.

**Tube:** Using 3 marshmallows, insert two toothpicks between each marshmallow to form a tube shaped structure.

**Fins:** Insert two toothpicks into a gum drop, one straight and one at an angle. Do this with 3 gumdrops and place each around the bottom marshmallow, spacing equally around marshmallow, to form fins.

Cone: Stick a toothpick into a Hershey Kiss chocolate and then insert it into the top marshmallow to serve as the cone.

(Students can eat rocket or take home to show and then eat at home)

### **10 minutes; Making a Straw Rocket**

Follow directions provided on page 6 of the Aerospace Project Book to build a straw rocket. Let students see if they can “shoot off” rocket once they are built.

Steps:

1. Take one label and wrap it around the top end of a large milk straw. Begin wrapping it at an angle to help close off airway to straw. Be sure end is sealed completely to form a nose cone shape.
2. Attach two labels to other end of large straw, leaving about 1/4 inch from bottom. One label should be attached on top and one on bottom. Labels can be pressed together so they become attached to form a fin.
3. Put the drinking straw inside the large milk straw.
4. Aim straight, blow and gently blast-off!

This can be a great activity to divide the class up into groups to allow them to shoot their rockets off to see whose rocket travels the furthest. Winners from each group can then shoot off again against each other.

Review the following information about Isaac Newton (found on page 7 of the Aerospace Project Book):

Isaac Newton Information: Sir Isaac Newton (1642 to 1727), an English scientist, astronomer and mathematician, was the first to discover and describe some of the laws of motion and gravity that today help us understand how things move and how they fly. Newton’s first law of motion says any object that is still will stay still, and any object that is moving will stay moving, unless they are acted on by an unbalanced force. You can see Newton’s first law with your rocket. It will fly nowhere until you blow into it. Your breath creates an “unbalanced force” and away it goes!

### **20 minutes; Build a Bubble Powered Rocket**

Follow the following directions to build rockets using paper, a film canister and fizzing tablets:

1. From film canisters you save or by visiting your local film-processing center, obtain one film canister for each person. Note: Be sure that the film canister has a cap on it that fits **INSIDE** the rim instead of over the outside of the rim.
2. Cut a piece of paper the size of the canister and wrap it around the outside of the canister.
3. Cut paper in a circular shape to form a cone for canister. Make a wedge cut out and join the two sides together to form a cone shape. Tape the paper together to maintain the cone shape and then tape it to the bottom of the canister.

4. Cut 3 triangular shaped fins out and attach to canister.
5. Put on your eye protection.
6. Turn rocket upside down and remove the canister's lid.
7. Fill the canister one-third full of water.
8. Working quickly, drop one-half of an effervescent antacid tablet into the canister.
9. Snap the lid on tight.
10. Stand your rocket on a launch platform, such as a sidewalk or driveway.
11. Stand back and wait. Your rocket will blast off!

Please keep in mind that just like real rockets, the less your rocket weighs and the less air resistance (drag) it has, the higher it will go. When the fizzy tablet is placed in water, many little bubbles of gas escape. The bubbles go up, instead of down, because they weigh less than the water. When the bubbles get to the surface of the water, they break open. All that gas that has escaped from the bubbles pushes on the sides of the canister. As a matter of comparison, when you blow up a balloon, the air makes the balloon stretch bigger and bigger. But the little film canister doesn't stretch and all this gas has to go somewhere! Eventually something has to give and the canister pops its top. Teens will definitely need to assist students in "shooting off rockets." You may consider shooting off rockets 2 or 3 at a time. Safety goggles should be worn for safety.

(Source: NASA Website: <http://spaceplace.nasa.gov/en/kids/rocket.shtml> )

### **30 minutes; Rocket Launch**

Have a responsible adult launch a rocket. Allow students to observe, but not launch due to safety precautions.