Do It Yourself: Bottle Rocket

How do Bottle Rockets Work?

The famous physicist Isaac Newton changed how people thought about the world. In the mid 1600s, he presented Newton's Three Laws of Motion to describe how things move through the universe. Newton's 3rd Law of Motion states, "for every action, there is an equal and opposite reaction."

To understand what this means, think of a bird. As it flaps its wings, the bird is pushing the air down. The air is pushing up on the bird with the same amount of force, allowing it to fly through the air.

This is also how bottle rockets take off. As you pump air into the rocket, the pressure inside the bottle builds up until it's great enough to force the cork out of the bottom. As the water rushes down and out of the bottle (the **action**), your rocket is launched into the air (the **reaction**).

Make Your Own Bottle Rocket

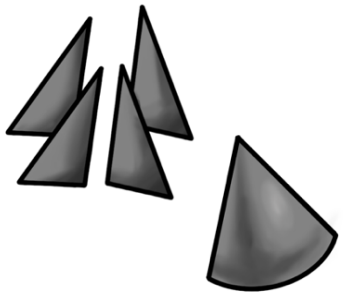
Follow the directions on the rest of the page to create a bottle rocket and test Newton's 3rd Law of motion yourself!

Materials

- An empty plastic 2-liter bottle
- A cork
- An air pump with a needle adaptor
- Cardboard, construction paper, or foam core
- Markers, paint, stickers
- Duct tape
- Water

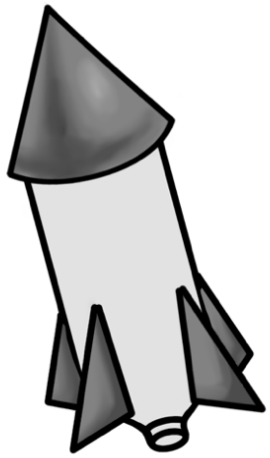
Step 1:

Cut out 4 triangles and a cone from construction paper, cardboard, or foam core.



Step 2:

Use duct tape to attach the 4 triangles near the opening of the bottle and the cone on the bottom of the bottle. Have fun decorating your rocket with markers, paint, or stickers!



Step 3:

Push the needle adaptor of your air pump all of the way through the cork. If your cork is too long, cut it a little shorter.

Step 4:

Remove the cap to your bottle. Fill your rocket ¼ of the way with water, then plug the hole with your cork. Take the rocket outside and connect the needle adaptor to your air pump.

If your fins are strong, they might be enough to hold your rocket upright. If they're not, use a box to prop your rocket upright.

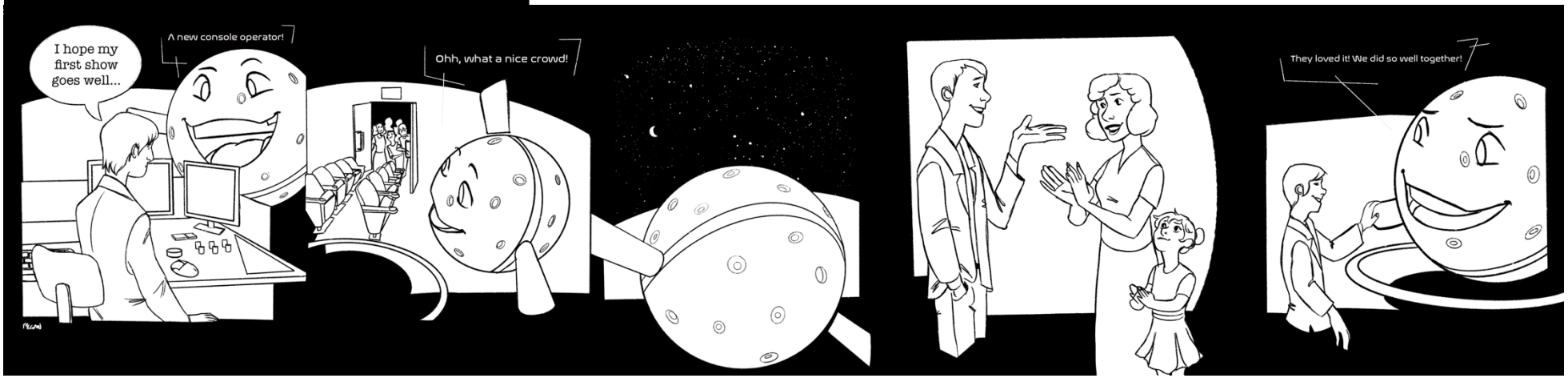
Step 5:

Have spectators stand back several feet while an adult pumps air into the bottle rocket. After a few seconds of pumping, watch your rocket take off!

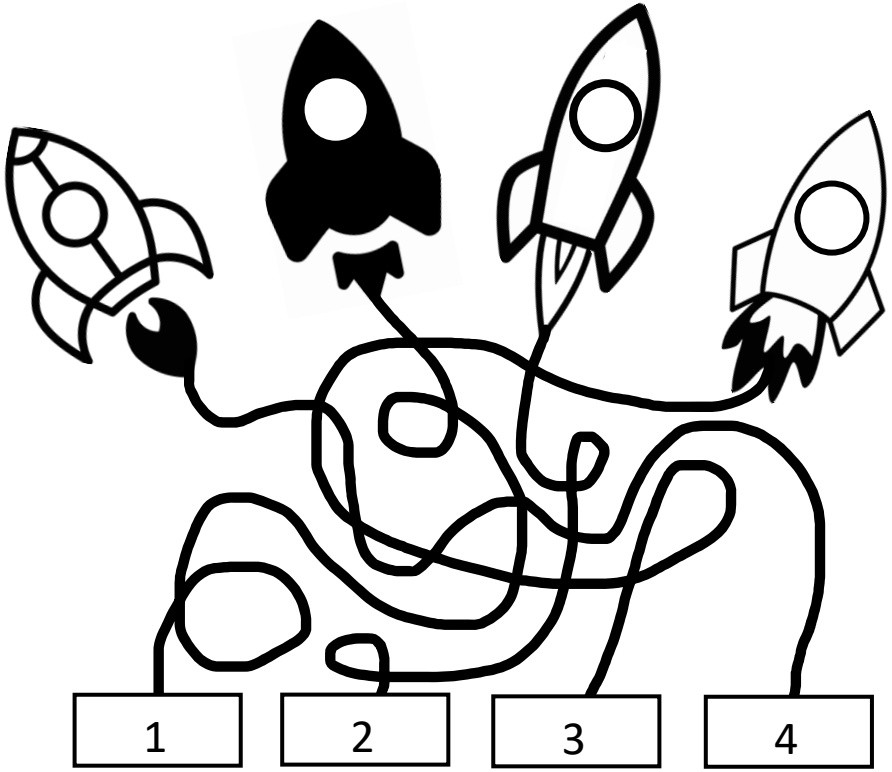
IMPORTANT: Make sure an adult is present for the launch. Do not disturb the rocket after you have started pumping air, even if it looks like nothing is happening. It could take off at any moment!

Konnie THE STAR PROJECTOR — FIRST FLIGHT

Konnie is the star projector in our planetarium.
Color in her first planetarium show with a new astronomer!



Uh oh! Mission control lost track of where each rocket launched. Follow the lines to match each rocket with the launch pad where it took off. Then, label each rocket with the same number as the launch pad it took off from.



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