

## Rocket Car

### Activity Objectives

- To demonstrate Newton's Third Law of Motion, with escaping air as the action force

### Background

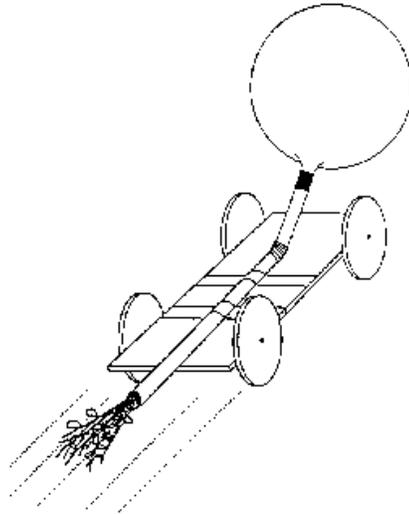
In this activity, students construct a balloon-powered rocket car that rolls across the floor because air is forced to escape through a plastic straw.

### Materials

- ✓ Four pins
- ✓ Styrofoam meat tray
- ✓ Cellophane tape
- ✓ Flexi-straw
- ✓ Scissors
- ✓ Drawing compass
- ✓ Marker pen
- ✓ Small party balloon
- ✓ Ruler

### Instructions

1. Using the ruler, marker, and drawing compass, draw a rectangle about 7.5 cm x 18 cm and four circles 7.5 cm in diameter on the flat surface of the meat tray. Cut out each piece.
2. Inflate the balloon a few times to stretch it. Slip the nozzle over the end of the flexi-straw nearest the bend. Secure the nozzle to the straw with tape and seal it tight so that the balloon can be inflated by blowing through the straw.
3. Tape the straw to the car as shown in the picture.
4. Push one pin into the center of each circle and then into the edge of the rectangle as shown in the picture. The pins become axles for the wheels. Do not push the pins in snugly because the wheels have to rotate freely. It is okay if the wheels wobble.
5. Inflate the balloon and pinch the straw to hold in the air. Set the car on a smooth surface and release the straw.



### **Discussion**

The rocket car is propelled along the floor according to the principle stated in Isaac Newton's Third Law of Motion. The escaping air is the action and the movement of the car in the opposite direction is the reaction. The car's wheels reduce friction and provide some stability to the car's motion. A well-designed and constructed car will travel several meters in a straight line across a smooth floor.

Encourage students to design their own cars. Cars can be made long or short, wide or narrow, or even trapezoidal. Wheels can be large or small. If Styrofoam coffee cups are available, the bottoms can be cut off and used as wheels. Hold car distance trials on the floor. Have students measure and chart the distances that each car travels.

Average multiple runs for individual cars to identify the best cars. What makes one car design perform better than another? Are large wheels better than small wheels?