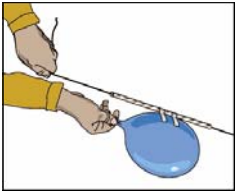


Balloon Rockets: Grade 6

Understanding Structures and Mechanisms - Flight



Introduction: Aerospace engineers are people who design and build vehicles which take astronauts to the moon. Newton's Third Law ("to every action there is an equal and opposite reaction") is an important science principle used in this type of project. With this project, you will become the aerospace engineer, designing and building a balloon rocket which will transport your cargo.



Materials: *Balloon - long, thin type *Clothespin - spring type *Drinking straw *String or fishing line - at least 7.5 meters (20 feet) long *Tape - Scotch or masking *Straws -plastic *Scissors *Scrap paper *Cardboard from empty cereal boxes *Paper cups - small *Marble or bottle cap (for cargo)



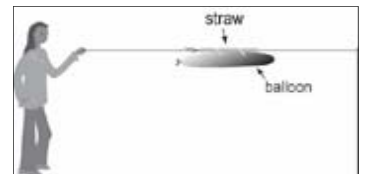
Your mission: Design and build a rocket that will carry its cargo from point A to point B.

Instructions - What to do:

1. An inflated balloon will provide the propulsion for your rocket.
2. Using the materials provided, design a cargo holder which will attach to your rocket. You will need to discover the best way to do this.
3. Your rocket will travel along a piece of fishing line or string, which will be threaded through a straw on your rocket.
4. The ends of the string will need to be taped to two opposite walls about chest high. Make sure the string is taut (tight).
5. You may wish to add fins or other control surfaces to your rocket.

Launching Your Rocket

1. Inflate the balloon, but do not tie it. Instead, use the clothespin to clamp it shut securely.
2. Tape one end of the fishing line to a wall about chest high. Hold the other end in your hand at about the same height.
3. Thread the string through the drinking straw attached to your rocket. Load your cargo into the container
4. Release your clothespin and watch your rocket fly!



What's Happening

When you blow up a balloon, your air is forced into the small space inside the balloon. The air molecules become squished (compressed). The molecules try to escape to a less crowded area. As soon as you let go of the clothespin, the air in the balloon rushes out to the less crowded area on the outside. A rocket's movement depends on Newton's Third Law of Motion. When a rocket blows out gas at high speed in one direction (action), the rocket is pushed in the opposite direction (reaction). The gas pushes against the rocket and the rocket pushes back just as hard against the gas.

A Step Further

Testing is an important part of engineering. Record the distance your rocket travelled, modify your design, and test it again. Did the distance improve? Depending on the time available, retest your balloon rocket several times with changes made prior to each test. Then build a final design for a group competition. Test for the fastest design or for the rocket which can carry the heaviest cargo.