



Balloon Rocket Activity

OVERVIEW

In this activity, students will make a balloon 'rocket' to demonstrate that in order to make an object move one way, a force must work in the opposite direction. In this case, it is the air being released from the balloon that propels the balloon across the yarn.

TOPIC AREA(S)

Physics

GRADE LEVEL

Grade 3/4

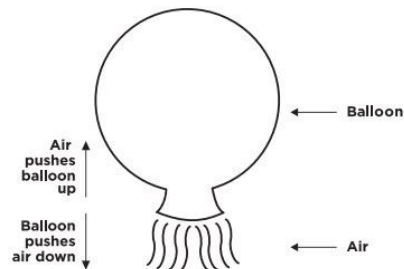
QUESTIONS PRIOR TO THE LESSON/GETTING EXCITED

- Have you ever seen a rocket? (consider showing a video of a space takeoff)
- How does a rocket take off?
- What happens when you blow up a balloon then let it go without tying it up? Does it fall to the ground? Does it 'fly' around?
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BACKGROUND INFORMATION FOR INSTRUCTORS (INCLUDE QUESTIONS W/ ANSWERS)

A force is the amount of push or pull on an object. The force that pushes a rocket or plane through the air is a forward motion called **thrust**. This is a pushing force. In this experiment, the energy to produce the thrust comes from the balloon forcing the air out of the opening - this is pressure. Pressure is the amount of force exerted on an area.

Blowing up a balloon fills it with gas particles - they move freely within the balloon. As more air is added to the balloon, the pressure inside increases. When the balloon is released, air escapes from the opening so that the pressure outside the balloon (all around us) is the same as the pressure inside the balloon. The escaping air thrusts the balloon rocket forward!



Different sizes of balloons will create more or less thrust. Looking at a professional space rocket, thrust is created by the force of burning rocket fuel as it blasts from the rocket's engine... the engine blasts down and the rocket goes up!

Perform experiment, then initiate a second discussion including some of the following:

Going further:

- Predict what would happen if the balloon was inflated **halfway** instead of fully inflated... would the balloon go as far? Test your prediction.
- How would the type of string used affect the speed of the balloon?



- What if one side of the string was placed at a greater height than the other? Would this affect the speed at which the rocket travels?
- Attach some paper clips or other objects to the balloon to make it heavier, how will this affect the speed?

RELEVANCE TO THE CURRICULUM

Grade 1 and 2	Grade 3 and 4	Grade 5 and 6	Grade 7 and 8
<ul style="list-style-type: none"> € Needs & Characteristics of Living Things € Growth and Changes in Animals € Materials, Objects and Everyday Structures € Movement € Energy in Our Lives € Properties of Liquids and Solids € Daily and Seasonal Changes € Air and Water in the Environment 	<ul style="list-style-type: none"> € Growth and Changes in Plants € Habitats and Communities € Strong and Stable Structures € Pulleys and Gears € Forces Causing Movement € Light and Sound € Soils in the Environment € Rocks and Minerals 	<ul style="list-style-type: none"> € Human Organ Systems € Biodiversity € Forces Acting on Structures and Mechanisms € Flight € Properties of and Changes in Matter € Electricity and Electrical Devices € Conservation of Energy and Resources € Space 	<ul style="list-style-type: none"> € Interactions in the Environment € Cells € Form and Function € Systems in Action € Pure Substances and Mixtures € Fluids € Heat in the Environment € Water Systems

MATERIALS (SPECIFY WHETHER PER CAMPER, GROUP OR CLASS)

Per camper:

- 1 latex balloon
- yarn/string of some sort
- Plastic straw
- Tape
- Scissors
- 2 chairs

SAFETY CONSIDERATIONS

- Blowing up a balloon can be tiring, pay attention to lightheadedness or dizziness, take breaths while blowing up balloon
- Latex balloons can pose a choking risk
- **As always, ask an adult for help if needed**

PROCEDURE

1. Cut a piece of yarn approximately 6 feet long



2. Tie one end of the yarn to the back of a chair
3. Thread the plastic straw onto the other end of the yarn, then tie this end to another chair. Place chairs far enough apart from one another that the yarn is stretched out.
4. Prepare 2 long strips of tape and place them over the straw for attaching the balloon (later).
5. Blow up a balloon but **leave the end untied**, then attach the balloon to the straw using the prepared tape
6. Move the balloon to one side of the yarn (close to a chair) and let it go! If working properly, the balloon should shoot across the string to the other side!
7. This activity can be repeated by reinflating the balloon, or using a new balloon
 - a. Modifications: Instead of two chairs, one could use a box and table or any other two surfaces at even heights.

REFERENCES

<https://happybrownhouse.com/balloon-rocket-stem-activity/>

<https://sciencebob.com/make-a-balloon-rocket/>

<https://www.sciencefriday.com/educational-resources/balloon-rockets/>