



Balloon Rocket

Students will learn about force and the ability to put an object in motion by testing and observing self-made balloon rockets.

LESSON PLAN

Learning Objectives:

The students will:

- Construct a balloon rocket
- Observe force and motion in nature
- Measure the duration of the flight
- Measure the distance of the flight
- Collect, organize and present data

Purpose:

Students will understand that forces affect the motion of an object and that certain scientific rules accompany it. Students will learn how to craft balloon rockets that represent the effects of a force pushing an object. They will understand the changes in motion that occur and that any object can be moved if enough force is exerted. Students will work together to take measurements, make graphs and develop statistical analyses on their findings.

Introduction:

Forces within the world affect all objects in their natural domain. Gravitational, applied, frictional, and other types of forces are always being exerted on objects. With regards to the balloon rocket, forces are constantly acting upon the balloon and its ability to move in forward. It requires a certain amount of force to push the balloon forward on the string.

With every object within the world, it takes a certain amount of force to make an object go into motion. Each object varies depending on its mass, weight, size, and other interactions with natural forces. In that regard, the balloon rocket is only a few ounces so it does not take large amounts of force to keep the object in motion. Additionally, with every force acting upon an object, there is an equal and opposite force that opposes it. With the balloon rocket, the gas/air particles play a major role in how far and fast the balloon rocket slides on the fishing line. These forces can be applied to any object and varies depending on certain environments. Students will learn from this experiment that the forces exerted to move the balloon rocket can be applied to any object and that these natural forces will always be present within our world.

Grade Level: 2 - 4

[Ohio Learning Standards/Science \(2018\)](#)

Expectation of Learning

[Nature of Science](#)

Physical Science

[2.PS.1](#): Forces change motion of an object

[Ohio Learning Standards/Mathematics \(2017\)](#)

Numbers & Operations

[2.NBT.7](#): Add & subtract within 1,000

[3.NBT.1](#): Add & subtract using strategies

[4.NBT.4](#): Fluently add & subtract

Measurement & Data

[2.MD.10](#): Organize, represent & interpret data

[3.MD.3](#): Created scaled picture graphs

[4.MD.4](#): Display & interpret data in graphs

Materials Required:

- Balloons in various sizes
- Balloon pumps
- Clothespins - pinch-type
- Straw
- Fishing line or heavy thread
- Duct tape
- Marker
- Stop watch
- Ruler

Procedure:

A. Warm-up

1. Review information on forces and motion. "For every force, there is an equal and opposite force."
2. Blow up a balloon and release it. What happened? How can the balloon be directed in a straight line?
3. Demonstrate attaching the balloon to its fishing line track and releasing it.
4. Determine location and set-up of the balloon tracks.

B. Activity

1. Give materials to each team and allow each student to blow up a balloon. Students should write their names on the balloons with a marker. Gently release the air from the balloon.
2. For each balloon track, take a straw and thread one end of the fishing line or string through the straw.
3. Stretch the fishing line or string across the room horizontally (about waist high) and secure it tightly. Very important - the line must be as tight as possible for the balloon to fly properly.
4. Inflate balloons one at a time. Twist the neck and use a pinch clothespin to secure the end.
5. Use two pieces of tape to secure the balloon to the straw on the fishing line. See the diagram on page four.
6. First hold the balloon on the center of the track and ask the students which way it will fly. Then ask them which end of the track should be the starting point given the direction of the opening of the balloon. They will most certainly know the correct answers. Explain to them that they are already aware of the equal and opposite law!
7. Allow the students to fly their own rocket balloons, releasing the clothespin and observing the results.
8. Students may time the duration of the flight and/or measure the distance.

C. Wrap-up

1. Repeat the activity using different size balloons. Record observations and compare results.
2. If the students recorded time and distance, create a graph or determine the averages for the team or class.

Resources:

Forces & Motion:

http://phet.colorado.edu/sims/html/forces-and-motion-basics/latest/forces-and-motion-basics_en.html

<https://www.khanacademy.org/science/physics/forces-newtons-laws>

Different types of Force:

<https://www.physicsclassroom.com/class/newtlaws/Lesson-2/Types-of-Forces>

Balloon Rockets:

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

<https://www.kaplenco.com/ii/balloon-rockets>



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