# **Balloon Rocket Race**



**Grade:** 5th Grade | **Topic:** Balloon Rocket Race | **Measurement:** US Customary (cups, ounces, inches, etc.)

# Purpose

This experiment shows how air pressure can create movement. You will learn how pushing air out of a balloon can make it travel along a string like a rocket.

# Hypothesis

If I blow up the balloon more, then the balloon rocket will move faster and farther because more air will push it along the string with greater force.

#### Materials

- 1 long piece of string (about 10 feet)
- 1 balloon (standard size, round shaped)
- 1 drinking straw
- 2 chairs or stable objects to tie the string between
- Tape (masking or scotch tape)
- Measuring tape or ruler (at least 10 feet long)
- Stopwatch or clock with a second hand
- Marker (optional for marking start and finish lines)

#### Procedure

- 1. Tie one end of the string to the back of a chair or a stable object.
- 2. Stretch the string tightly across the room and tie the other end to another chair or object at the same height.
- 3. Thread the drinking straw through the string so it can slide freely along the string.
- 4. Blow up the balloon but do NOT tie the end. Pinch the opening to keep the air inside.
- 5. Tape the balloon securely to the straw, making sure the balloon's opening points backward along the string (opposite to the direction you want it to go).
- 6. Hold the balloon's opening closed and place the balloon at the starting end of the string.
- 7. When ready, release the balloon's opening and start the stopwatch at the same time.
- 8. Watch the balloon move along the string until it reaches the other end.
- 9. Measure how far the balloon traveled (should be the full length of the string) and record the time it took.
- 10. Try the experiment again by blowing up the balloon to different sizes and see how it changes the speed.

#### Results

The balloon rocket moved along the string when the air rushed out of the balloon. Larger balloons pushed the rocket faster and farther because more air pushed backward, making the rocket move forward.

#### Conclusion

The experiment shows that air moving out of the balloon creates a force in the opposite direction, which makes the balloon rocket move forward. This is an example of Newton's Third Law of Motion in real life.

# **Learning Objectives**

- Understand how air pressure can create force and motion.
- Explore Newton's Third Law of Motion: For every action, there is an equal and opposite reaction.
- Practice measuring distance and timing speed.
- Enhance problem-solving by adjusting balloon size or angle to change speed.

# **Teacher Notes:**

**Key Concept:** This experiment demonstrates Newton's Third Law of Motion by showing how air pressure escaping from a balloon creates a reaction force that propels the balloon forward. It helps students visualize how forces work in pairs and introduces basic physics concepts through a fun, hands-on activity.

**Answer/Explanation:** When air rushes out of the balloon, it pushes backward on the air, which in turn pushes the balloon forward along the string. The larger the volume of air escaping, the greater the force, so the balloon moves faster and covers more distance. **Teaching Tips:** 

• Make sure the string is pulled tightly and straight for best results. 2. Use different balloon sizes to compare results and discuss how force changes. 3. Remind students to hold the balloon opening closed before release to control the start. 4. Encourage students to measure time and distance carefully for analyzing speed.

**Relevant Standards:** NGSS 3-5-ETS1-2: Generate and compare multiple possible solutions to a problem based on how well they meet the criteria and constraints of the design problem., NGSS 5-PS2-1: Support an argument that the gravitational force exerted by Earth on objects is directed down., NGSS 5-PS2-1: Explain the motion of an object by applying Newton's Third Law.

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Date:	Coperiments
Experiment Title:	
Purpose: (I wonder)	 
Hypothesis: (I think)	
Materials:	
Procedure:	
Results: (What happened?)	
Conclusion: (I learned)	