

Balloon Rockets

What happens when you blow up a balloon and release it?

How does friction affect how far a balloon rocket will travel?

HYPOTHESIS: Look at the different types of string. Which piece of string do you think will cause less friction and allow the balloon to travel the longest? Why do you think this?

Materials: Different types of string or yarn
Balloons (one size)
Tape
Straws

Procedures:

1. Extend each type of string or yarn, with a straw looped through it, across the room.
2. Secure both ends of the string so the length of it is taught.
3. Choose one person to inflate the balloon so that all balloons are about the same size and contain the same amount of air. Do not tie off the ends.
4. Keeping the open end closed, tape the inflated balloon flat on the straw.
5. Tape the balloon flat on the straw so the open end is facing opposite the direction the balloon will travel.
6. Release the air from the balloon. Watch the balloon travel on the straw.
7. Measure the distance the balloon traveled in centimeters.
8. Repeat the procedures for each type of string.

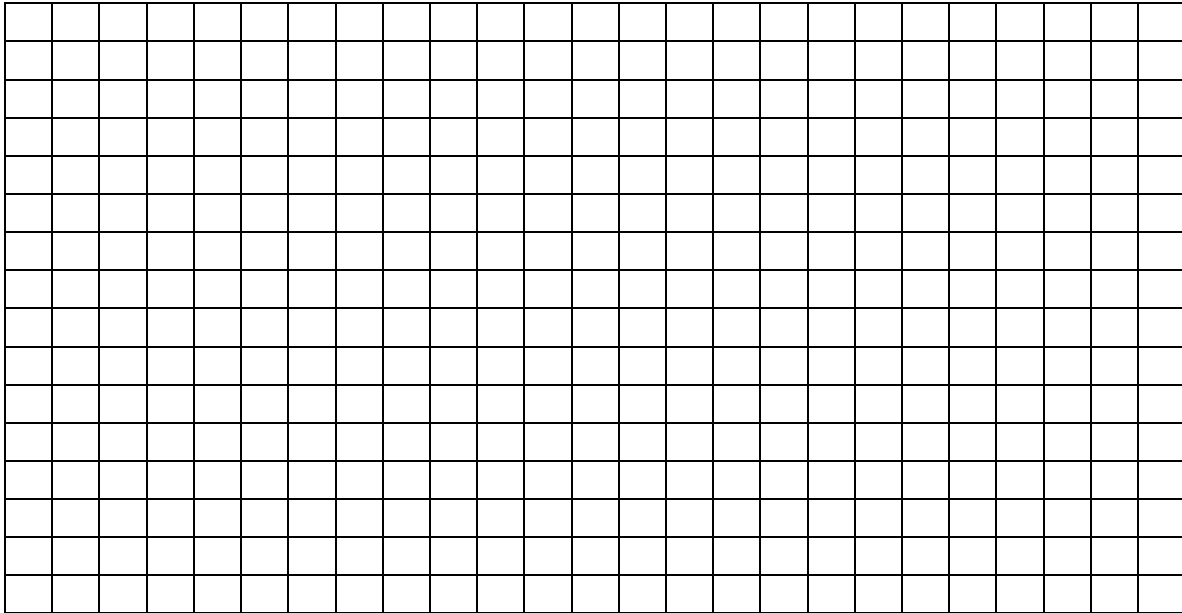
Collect Data:

Distance Balloon Rocket Traveled In Centimeters

	String 1	String 2	String 3
Trial 1			
Trial 2			
Trial 3			

Distance in Centimeters Balloon Rockets Traveled

Centimeters



String 1

String 2

String 3

Conclusions/Analysis:

Which string allowed the balloon to travel the furthest?

Why do you think it traveled the furthest?

Which String allowed the balloon to travel the shortest distance?

Why do you think it traveled the shortest distance?

Was your hypothesis correct? Explain.

Which string created the most friction or resistance to motion?

What is your manipulated variable?

Name at least 3 controlled variables.

What's happening?

Airplanes and rockets are carefully designed to move smoothly through the air.

Balloons, jet airplanes, and rockets all fly according to principles described in one of the most important laws of physics: Newton's third law of motion. This law states that every action has an equal and opposite reaction. In other words, when we push against something, it pushes back on us with an equal amount of force.

Balloons move because of the force of the air inside them. Before a balloon is inflated, it exerts no force. As it's inflated, more and more air molecules are forced into it, increasing the balloon's internal pressure and causing it to expand. As the rubber of the balloon stretches, it applies greater force on the air inside, while that same air pushes back in all directions. When the balloon is released, the air at the opening escapes. At the same time, the air that's farther inside continues to push out of the balloon. This unbalanced push propels the balloon forward.

Unlike airplanes and rockets, balloons aren't shaped well for fast flight. They can't fly straight. The straw that is attached to the balloon directs the jet of air in a consistent direction. The surface of the string rubbing on the straw creates friction. Friction is a force that slows down or stops something from moving. You may notice a bumpy pattern on the bottom of your shoes. The bumpy surface helps you run or walk without sliding around. Rough surfaces create more friction. String with a smoother surface will produce less friction.