

Name _____

Balloon Rockets

Background information: A rocket's movement depends on **Newton's Third Law of Motion – For every action there is an equal and opposite reaction**. When a rocket blows out gas at high speed in one direction (action force), the rocket is pushed in the opposite direction (reaction force). In other words, when there is a force on one thing in one direction, another force is acting on something else in another direction. The gas pushes against the rocket and the rocket pushes back just as hard against the gas.



Problem: To observe Newton's Third Law of Motion

Materials:

Long, thin balloon	5 meters of string	Straw
Tape		

Procedure:

1. Blow up the balloon, but do not tie it. Use the clothespin to clamp it shut.
2. Open the clothespin. What happened? Record your observations.
3. Blow up the balloon and clamp it shut with the clothespin again.
4. Thread the string through the drinking straw. Tape the long side of the balloon along the length of the straw.
5. Have two people hold the ends of the string. Make sure the string is stretched tight.
6. Slide the balloon-straw system down the string until the clamped end reaches the end of the string held by a person.
7. Release the clothespin. Record your observations.
8. Blow up the balloon half-way and repeat steps 5 and 6.

Data:

Observations of completely inflated balloon

Observations of partially inflated balloon

Questions:

1. What is the action force in this investigation?

2. What is the reaction force in this investigation?

3. What is the action force acting on in this investigation?

4. What is the reaction force acting on in this investigation?

5. What happened when the amount of force (amount of air in the balloon) was changed?

6. Explain your answer to number 5 using Newton's 3rd Law.

7. Think about a real rocket launching at NASA. What are the action and reaction forces in the launch? What are the forces acting upon?
