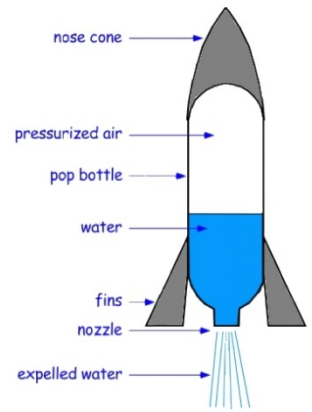


Name: _____

Water Bottle Rocket Lab



Problem:

Create one water bottle rocket that will fly straight and fly the farthest distance.

Background:

Rockets are an excellent way to demonstrate ALL of Newton's 3 Laws of Motion.

1. Newton's 1st Law of Motion: The Law of Inertia- states that an object at rest will stay at rest and an object in motion will stay in motion unless acted upon by an unbalanced force. The rocket is at rest and will remain at rest until _____. The rocket moving at constant velocity will remain moving at constant velocity until _____.

2. Newton's 2nd Law of Motion: $F=ma$ - states to move a mass you need a force. To move a larger mass you need a _____ force. To move a smaller mass you need a _____ force.

3. Newton's 3rd Law of Motion: Action/Reaction- states for every action there is an equal and opposite reaction.

Illustrate and explain how the forces of action and reaction work on a rocket.

4. Potential/Kinetic Energy:

Rockets are a great example of Kinetic and Potential energy. Draw a diagram of a rocket launch and label: Greatest Kinetic, Greatest Potential, Kinetic turning to Potential and Potential turning to kinetic.

Materials:

Soda bottle, tape, paper, ruler, etc.

You will have class time to decorate your rocket. You will want to add a cone and fins to your rocket to make it fly better. You may research rocket designs.

Launch:

Fill your soda bottle approximately 1/3 full of water.

Turn your bottle upside down and attach it to the end of the launcher (some water may spill).

Your teacher will pump air into the rocket and allow you to pull the string when ready.

Conclusion:

Compare your results to other students to answer the following questions.

1. Draw your bottle rocket.
2. How far did your rocket fly?
3. How did your cone and fins compare to other students in size and shape?
4. What fin shape seemed to fly the farthest?
5. Did the amount of fins make a difference in how far the rocket flew?
6. What cone shape seemed to fly the farthest?
7. If you could build another rocket, what would you change?