



GYSTC Discover Georgia STEM Camp: Day Two

Title: Rosie Revere's Flying Machine

Presenter: Cathy Fontenot



Purpose:	Students will listen to the story Rosie Revere Engineer by Andrea Beaty read by NASA astronauts. Students will then work through the Engineering Design Process to design a flying machine for Rosie Revere. Students will build a simple “flying” machine as they investigate aspects of force and motion.
Standard:	<p>S2P2. Obtain, evaluate, and communicate information to explain the effect of a force (a push or a pull) in the movement of an object (changes in speed and direction).</p> <p>a. Plan and carry out an investigation to demonstrate how pushing and pulling on an object affects the motion of the object.</p> <p>b. Design a device to change the speed or direction of an object.</p> <p>c. Record and analyze data to decide if a design solution works as intended to change the speed or direction of an object with a force (a push or a pull).</p> <p>S4P3. Obtain, evaluate, and communicate information about the relationship between balanced and unbalanced forces.</p> <p>a. Plan and carry out an investigation on the effects of balanced and unbalanced forces on an object and communicate the results.</p> <p>b. Construct an argument to support the claim that gravitational force affects the motion of an object.</p> <p>c. Ask questions to identify and explain the uses of simple machines (lever, pulley, wedge, inclined plane, wheel and axle, and screw) and how forces are changed when simple machines are used to complete tasks. (Clarification statement: The use of mathematical formulas is not expected.)</p> <p>S8P3. Obtain, evaluate, and communicate information about cause and effect relationships between force, mass, and the motion of objects.</p> <p>a. Analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration. (Clarification statement: Students should be able to analyze motion graphs, but students should not be expected to calculate velocity or acceleration.)</p> <p>b. Construct an explanation using Newton's Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object.</p> <p>c. Construct an argument from evidence to support the claim that the amount of force needed to accelerate an object is proportional to its mass (inertia).</p>
Materials:	Tape, Balloons, String, Scissors, Straws

Procedures:	<p>Plan/Create/Test</p> <ol style="list-style-type: none"> 1. Brainstorm ideas regarding how you plan to build your flying machine. 2. Follow your plan and build your flying machine. Put together your zip line also. 3. Once it is created, test your flying machine along the zipline. <p>Improve</p> <ol style="list-style-type: none"> 4. After evaluating your results of your flying machine traveling down the zipline, discuss ways that you could improve your flying machine. Make at least one improvement and re-test to see if it was beneficial.
Science Behind It:	<p>To propel a rocket, some kind of force must be expelled from the rocket in order to push it forward. A force is the amount of push or pull on an object. The mechanical force that pushes a rocket through the air is known as thrust. After you've blown up a balloon, when you let the air out the rocket propels forward.</p>
Questions to Ask:	<ol style="list-style-type: none"> 1. Did your flying machine stay together? 2. Did your flying machine travel all the way down the zip line? 3. What could you do to improve your design?