



Stomp Rockets

3, 2, 1, Liftoff! Engineer a rocket prototype that can overcome Earth's gravity and launch into the sky.

TEKS:

SCI 3.7.A: The student is expected to demonstrate and describe forces acting on an object in contact or at a distance, including magnetism, gravity, and pushes and pulls.

SCI 4.7: Force, motion, and energy. The student knows the nature of forces and the patterns of their interactions. The student is expected to plan and conduct descriptive investigations to explore the patterns of forces such as gravity, friction, or magnetism in contact or at a distance on an object.

SCI 5.7.A: The student is expected to investigate and explain how equal and unequal forces acting on an object cause patterns of motion and transfer of energy.

SCI 5.7.B: The student is expected to design a simple experimental investigation that tests the effect of force on an object in a system such as a car on a ramp or a balloon rocket on a string.

Materials:

Part 1:

- Duct tape
- Empty 2-liter bottle or boat buoy
- 1-foot piece of PVC pipe
- 2-3-foot piece of flexible plastic tubing
- Sharp scissors or utility knife

Part 2:

- Markers
- Notecard
- Paper
- PVC Pipe
- Scissors
- Tape

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How To:

Part 1: Create the rocket launcher.

1. Use scissors or a utility knife to cut a one-inch slit into the 2-liter bottle or boat buoy.
Safety: An adult should assist when using the scissors or utility knife.
2. Insert one end of the plastic tubing into the bottle or buoy and secure it with duct tape.
3. Place the PVC pipe on the other end of the plastic tubing and secure it with duct tape.
4. This is the rocket launcher!



Part 2: Create a stomp rocket.

You are an Aerospace Engineer on NASA's Artemis Mission to explore the Moon. They need your help creating a rocket that can overcome Earth's gravity and launch into space! Follow the instructions below to design, build, and test your stomp rocket.

1. Roll the piece of paper around a PVC pipe to make a tube. The tube should be just wide enough so it can slide off the pipe. Secure the paper with tape and remove from the PVC pipe. This is the fuselage of your rocket!



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2. Press one end of the tube together. Fold down the two corners to make the rocket's nose, and secure it with tape. This is the nose cone of your rocket.



3. Use a notecard, scissors, and tape to add fins to your rocket, and use markers to decorate it.



4. Place the rocket onto the end of the PVC pipe of the rocket launcher. Stomp on the bottle or boat buoy and watch your rocket fly into the air!

STEM Explanation:

Rockets launch satellites, spacecrafts, and even people into space! Every rocket is unique, but they all have three main parts: the fuselage, the nose cone, and the fins. The fuselage is the body and structure of the rocket, the nose cone is shaped so that the rocket glides smoothly through the air, and the fins help stabilize the rocket as it flies. Rockets have super powerful engines that burn fuel, or propellants, such as liquid hydrogen.

NASA's Artemis mission will use innovative technologies to establish a long-term presence on the Moon and send the first astronauts to Mars! The mission will land the first woman and first person of color on the Moon. Why the name *Artemis*? Artemis is the twin sister of Apollo and the goddess of the Moon in Greek mythology.

Artemis astronauts will travel aboard the Orion spacecraft, launched by a powerful new rocket... NASA's Space Launch System (SLS). The most powerful rockets in the world, including the SLS, are called super heavy-lift rockets.

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Earth has gravity, but space doesn't! **Escape velocity** is the speed at which an object must travel to break free of a planet or Moon's gravitational force. The SLS will travel at a top speed of over 6 miles *per second* to escape Earth's gravity... that's over 20,000 miles per hour! This is so fast that SLS could go from New York City to San Francisco in eight minutes, or circle the world in only 66 minutes!

Career:

Aerospace engineers design rockets, planes, missiles, rovers, and more. They help create, test, and modify all types of flying machines, ensuring these vehicles are safe and effective.

Resources:

<https://www.jpl.nasa.gov/edu/teach/activity/stomp-rockets/>

<https://www.nasa.gov/what-is-artemis>

<https://www.nasa.gov/feature/meet-nasa-s-new-artemis-landing-recovery-lead-lili-villarreal>

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