

3,2,1 Blast Off: Forces and Motion (3rd-5th grades) Post-Visit Activities

We hope that you enjoyed your visit to the Children's Science Explorium!

To help reinforce the concepts covered during today's field trip, we have prepared the following wrap-up activities for you to incorporate into the classroom.

Vocabulary List and Student Definitions (elementary level):

- **Force:** a push or a pull
- **Motion:** the act of moving; movement
- **Gravity:** the force between two objects that attract one another (Earth's gravitational pull is much stronger than any other within its atmosphere).
- **Inertia:** A object will stay at rest or continue in motion until acted upon by a force
- **Action:** the act of doing something; something that somebody or something does
- **Reaction:** response to an action
- **Drag:** resistance against an acting force

Rocket Results

1. During the program, *3, 2, 1 Blast Off: Forces and Motion*, your students explored different forces that act on a rocket during a launch. The following activities will allow students to gain a better understanding of the application of these forces.
 - a. Generate a class chart to compare rocket results (see template on the following pages).
 - i. Display for a class discussion.
 1. Which rocket had the longest time? Shortest?
 2. Which rocket weighed the most? Least?
 3. How might the construction of the rockets have affected its launch?
 4. What might you change in your rocket design if you were to repeat this experiment?
 - b. Generate the results into a line or bar graph (4th and 5th grade)
 - i. Mass vs. Time
 1. Create a line or bar graph to show the relationship between the mass of the rocket and the time spent in the air.
 2. Students can interpret the results and generate ideas about how the mass, amount of water, and number of fins affected the overall result of the rocket launch.
 - c. Have students write an essay describing the design changes they would make if they were going to do this experiment again.
 - i. What changes, if any, would be made? Why?
 - ii. What worked well in the first design? What did not?
 - iii. How will these changes improve the overall design and function of the rocket?

Acting Forces

1. Review the forces that acted on each rocket during the launch:
 - a. Gravity
 - i. The rocket needs energy (fuel) to overcome the force of gravity as it moves away from Earth.
 - b. Mass (weight)
 - i. The heavier the rocket is, the more energy needed to lift and propel.
 - ii. Heavier rockets may not have gone as high as others.
 - c. Lift
 - i. Energy is needed to raise the rocket from the launch pad.
 - d. Thrust
 - i. Enough energy is also needed to move the rocket forward and along its path once it raises off the launch pad.
 - e. Drag
 - i. As the rockets move along their path, air is pushing against the rocket, causing friction and slowing it down.
 - ii. The shape of the rocket and all of its parts helps to reduce drag.
2. Read: Isaac Newton and the Laws of Motion by Andrea Gianopoulos

Rocket Class Results:

Rocket Name	Number of Fins	Amount of water	Mass (weight) in grams	Time in seconds	Amount of Air (lbs/in ²)
					60
					60
					60
					60
					60
					60
					60
					60
					60
					60
					60
					60
					60
					60
					60

