

## Blast Off with Model Rockets

**Grades:** 5-8

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**Goals/Standards:**

- National Science Standard A: Science as Inquiry
- National Science Standard B: Physical Science
- National Science Standard D: Earth and Space Science
- National Science Standard E: Science and Technology
- National Science Standard F: Science in Personal and Social Perspectives
- National Science Standard G: History and Nature of Science
- North Carolina Science Standards Grade 5: Goal 4
- North Carolina Science Standards Grade 6: Goal 1
- North Carolina Science Standards Grade 6: Goal 2
- North Carolina Science Standards Grade 7: Goal 1
- North Carolina Science Standards Grade 7: Goal 2
- North Carolina Science Standards Grade 7: Goal 3
- North Carolina Science Standards Grade 8: Goal 1
- North Carolina Science Standards Grade 8: Goal 2
- North Carolina Science Standards Grade 8: Goal 4

**Objectives:**

The students will create model rockets. Students will understand the relationship that Newton's laws play in launching a rocket. They will also learn about the importance of balance when designing rockets.

**Engagement:**

Have you ever wondered how NASA gets such a large object such as a rocket to blast off into space? How does a rocket move from the planet Earth into the solar system? Is there a protocol design when building a rocket? Is it possible for engineers to create unique structures that will blast off into space?

**Materials:**

- Paper towel tubes
- Toilet paper tubes
- Cardboard
- Construction paper
- Small pieces of straw
- Hot glue sticks
- Glue guns
- "A" powered rocket engines (the lower the power the better)
- Rocket launching system

**Procedure:**

1. The teacher will discuss with the children how a rocket works.
2. Students will take a paper towel tube or a toilet paper tube to use as body for their rocket.
3. Create four rectangular fins from a sheet of cardboard. The fins can be either rectangular or triangular depending on the students.
4. Attach the four fins to the bottom of the paper towel using a hot glue gun. Be careful to evenly space the fins so that the rocket remains balanced. Also, make sure that the fins are not too large for the rocket to fit on the launching system.
5. Attach two small pieces of straw to the rocket. One piece should be near the bottom and another piece should be near the top. Make sure that the two pieces of straw are lined up perfectly with one another. These will be used to attach the rocket to the launching system.
6. Take the corner of a piece of construction paper and roll it so that it takes a cone shape. Glue the cone to the top of the rocket. (As a way of differentiating you may allow students to create parachutes that come out of the rocket. If making parachutes, tape the cone loosely at one point to the top of the rocket instead of gluing.)
7. You have now completed building your rockets. Take the students outside to a large field to launch the rockets. Follow the directions on your rocket launching system. Only a parent or teacher and the students who are launching the rocket should be near the launching system.

**Follow Up Questions:**

1. Share what you did.
  - How did you come up with the design for your rocket?
  - What caused your rocket to launch straight or crooked?
  - What was the most difficult part in building your rocket?
2. Process what is important.
  - Why was it important to make sure that your rocket remained balanced?
  - What factors did you have to take into account for when creating your rocket?
  - What role did Newton's three laws of motion play in getting the rocket to launch?
  - What could you have done differently in order to get your rocket to go higher or straighter?
3. Generalize to your life.
  - How has man used rockets for other purposes than just space travel?
  - What are some similarities between how an automobile and how a space ship move? What are some differences?
  - Do you think it would be possible for man to design an automobile that ran off rocket power? Why or why not?
  - What ways has man benefited from the invention of the rocket?

**Extension Activities:**

1. Rockets powered by either water or vinegar and baking soda
2. Rocket powered cars

**Resources:**

- <http://www.fortunecity.com/marina/caribbean/33/id28.htm> (a website that offers examples of various homemade rockets)
- <http://www.estesrockets.com/> (a website that will lead you to places you can purchase model rockets, engines and launching systems)
- <http://www.howstuffworks.com/rocket.htm> (great website that explains how rocket engines work)
- <http://www.flyrockets.com/index.asp> (a wonderful resource on how rockets work)

**Glossary:**

- gravity
- propulsion
- momentum
- force
- rocket
- NASA

