



How To Launch A Rocket

Grade Range: Elementary School

Lesson Time: 40 minutes

Key Terms

Crawler
Launch
Rocket
Rocket engine
Thrust

Materials and Resources

Balloon
How to Launch a Rocket Flowchart
Rocket Venn Diagram

Activity Overview

Can you imagine what it would be like if, instead of planning a trip to the beach, you were planning a trip to the moon? How would you get there? Well, right now the only option is a rocket. In this activity students will learn about how rockets work, how they are transported to the launchpad, and how they are sent into space.

Essential Questions

1. Why are rockets important for space exploration?
2. What is the significance of space exploration?

Objectives

- Compare rockets
- Describe the steps involved in launching a rocket

Introduction

Prior to this activity students should have completed the StudioA3 activities on the solar system and/or be familiar with the solar system. Blow up a balloon in front of the class. Release the balloon. Repeat this process once. Discuss with the class how the balloon moves when released and how this compares with a rocket traveling through space.

zSpace Activity

Activity Questions Provided in StudioA3

Answers may vary. Sample answers are provided below.

1. What is a rocket? Well, a rocket can be defined in a few different ways. One definition of *rocket* is a cylindrical vessel or vehicle that takes objects and people into space. Here are two rockets. Examine both of the rockets. How are they similar?

Both of these rockets are similar in shape and component parts.

2. Another definition of *rocket* is a type of engine: a rocket engine. The product formed from the combustion of liquid or solid fuel and chemicals in the combustion chamber of the rocket engine causes the rocket to move. The combustion of rocket fuel produces a hot gas that is pushed out, moving or thrusting the rocket forward. Rocket engines do not require any air. Why is that important while the rocket is in space?
This is important because there is no air in space.
3. Examine and dissect the rocket. What are the main parts of this rocket? What are its dimensions? Hint: Turn on the labels and use the Ruler.
The parts are the thrusters, first stage, second stage, third stage, and Apollo spacecraft. The dimensions are 110.48 m by 17.14 m.
4. Rockets are built out of aluminum and titanium. These metals are both very lightweight. Why do you think rockets are built out of lightweight materials?
I think they are built out of lightweight materials so they are easier to launch.
5. The parts of a rocket are not always built at the same location. When all of the parts are built, the rocket is put together in the assembly building at NASA. Once built, the rocket is then moved to the launchpad, which is 5 miles away. This is no easy task! Why wouldn't it be an easy task?
It would not be an easy task because the rocket is so large.
6. This is a crawler. The crawler has the important task of transporting the rocket to the launchpad. You will notice that its tracks are the size of large buses. What other observations can you make about the crawler?
It looks like there are stairs and a big flat deck where the rocket sits.
7. It takes 11 people working together to move the 6 million-pound crawler, which has a flat deck as big as a baseball diamond. It travels 1 mile per hour when transporting the rocket. So how many hours does it take to transport the rocket? Hint: Remember that the launchpad is 5 miles away.
It would take about 5 hours.
8. After the slow-moving trek on the crawler, the rocket arrives at the launchpad. Place the rocket on the launchpad. Take a photo.
Photo.
9. When the rocket is ready for takeoff, how does the rocket engine thrust it into the sky?
The fuels and chemicals mix together, producing a hot gas that thrusts the rocket into the sky.
10. What do you think space rockets take into space?
Space rockets take not only people but also supplies to the International Space Station.

Closing

Rocket to the Moon

Instruct students to choose one of the following scenarios and write a persuasive essay.

- You are entering a contest to win a vacation to the moon on the newest rocket. The winners will be the first people to ride on the rocket to the moon. To win you must write a persuasive essay convincing the judges why you should be selected to win this vacation and ride on the newest rocket. You will share your essay with the class.
- 10 people in the United States were randomly selected to test out the newest rocket to the moon and you were one of the 10. You do not want to go! Write a persuasive essay stating the reasons why you do not want to test out the newest rocket. You will share your essay with the class.

Build and Launch a Rocket Flowchart

Have students work with a partner to create a flowchart outlining how to build and launch a space rocket step by step, using the knowledge they gained from this activity, additional research, and the How to Launch a Rocket Flowchart. Explain to students that the flowchart must be detailed so that someone else would be able to follow the steps. Then have students exchange flowcharts with another student pair. Instruct each pair to evaluate the other's flowchart, making sure no steps were left out and making notes if they have any questions or if something was unclear. When students finish their evaluations, have them return the flowcharts, share their evaluations, and ask questions if needed. Finally, allow the students a chance to edit and make updates to their flowcharts if needed.

Build and Launch a Rocket

Have students build and launch a rocket, following step-by-step directions.

Rocket Venn Diagram

Have students work with a partner to research 2 different rockets and complete the Rocket Venn Diagram using what they have learned. As a class, compare and discuss information from their Venn diagrams.

Extension Activity: Invite a leader in the field of aeronautical science to speak to the class

Follow-up Activity: *What Is a Satellite?* - StudioA3

Follow-up Activity: *Types of Artificial Satellites* - StudioA3

Follow-up Activity: *Space Living and Research* - StudioA3

Teacher Note: In the "Resources" section you will find websites that provide a list of materials and directions for building different types of rockets.

Differentiation

- Group students heterogeneously to allow students with a strong command of the English language to assist in reading or interpreting questions
- Provide paper copies of diagrams for students to use as a reference
- Provide a handout with a list of vocabulary terms and definitions that will appear in the activity
- Allow students to provide answers that are handwritten, typed, or verbal
- Give students a variety of presentation styles to choose from (using charts/graphs, PowerPoint, making 3D presentations, creating videos/movies, making posters)
- Have students work as partners or in small groups (younger children could partner with older buddies)
- Enrichment: Students could change an additional variable in the activity and look for patterns
- Enrichment: Students could find real-world problems involving the concept and design solutions to those problems
- Enrichment: Students could research similar topics and create presentations
- Enrichment: Students could build a model of a key concept

Resources

<http://www.nasa.gov/externalflash/RocketScience101/RocketScience101.html>

<http://www.livescience.com/33410-how-to-launch-rocket-space.html>

<http://spaceplace.nasa.gov/pop-rocket/en/>

<http://www.telegraph.co.uk/sponsored/why-not/11621623/build-a-rocket-at-home.html>