

Touchdown to the Moon: Apollo Missions

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Grade Level 7
Duration 2 class periods

National Standards

GEOGRAPHY

Element 1: The World In Spatial Terms

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information.

NEXT GENERATION SCIENCE

MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

AZ Standards

ELA

Reading

Key Ideas and Details

7.RI.2: Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.

7RI.3: Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).

Writing

Text Types and purposes

7.W.3: Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

Speaking and Listening Comprehension and Collaboration

7.SL.1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

SCIENCE

Physical Science Standards

7.P2U1.2 Develop and use a model to predict how forces act on objects at a distance.

Arizona Social Science Standards

INQUIRY ELEMENTS

7.SP4.1 Explain the multiple causes and effects of events and developments in the past and present.

7.SP4.2 Evaluate the influence of various causes of events and developments in the past and present.

GEOGRAPHY

7.G1.1 Use and construct maps and other geographic representations to explain the spatial patterns of cultural and environmental characteristics.

TECHNOLOGY

Strand 1: Innovation Concept 1: Knowledge and Ideas

PO 1. Analyze and Creativity and evaluate information to generate new ideas, processes or products.

SIOP Elements		
Preparation Adapting content Linking to background Linking to past learning Strategies used	Scaffolding Modeling Guided practice Independent practice Comprehensible input	Grouping Option Whole class Small groups Partners Independent
Integrating Processes Reading Writing Speaking Listening	Application Hands on Meaningful Linked to objectives Promotes engagement	Assessment Individual Group Written Oral

Arizona English Language Proficiency Standards

Stage IV

Basic

Speaking and Listening

Strand 2: The student will express orally his or her own thinking and ideas.

B-4: participating in social conversations with familiar and unfamiliar people; sharing personal information, experiences, opinions, abilities, and needs, using complete sentences.

Reading

Strand 4: The student will analyze text for expression, enjoyment, and response to other related content areas.

B-4: answering who, what, where, when, why, which and how questions about text.

B-23: locating information in print and electronic reference sources (e.g., encyclopedia, atlas, almanac, dictionary, thesaurus, periodicals, website, and textbooks) periodicals for a specific purpose.

B-28: interpreting information in functional documents (e.g., maps, schedules, letters, graphic organizers) for a specific purpose.

Writing

Standard 1: The student will express his or her thinking and ideas in a variety of writing genres.

B-6: writing a variety of functional text (e.g., *instructions*, *directions*) that addresses the audience, stated purpose and context.

Overview

It has almost been 50 years since we first landed on the moon. Much of what we have learned about the moon is from our first hand experience of walking on the moon. Of course, this exploration of the moon and other space projects all involve teamwork—something every child should learn how to do in order to be successful.

Purpose

In this lesson, students will learn about the Apollo missions and where the space capsules landed on the moon. Students will then work as a team to build and safely land a spacecraft using the engineering

design process. This lesson has adaptations for language learners.

Key Vocabulary

teamwork: the work done by people who work together as a team

lunar: relating to or of the moon.

crater: a large round hole in the ground made by something falling from the sky.

astronaut: a person who travels in space.

mission: a flight by a spacecraft to perform a specific task on the moon

spacecraft: vehicle used to travel in outerspace.

Materials

- Computer with internet access
- Apollo Mission Worksheet (ELL version and English proficient version) and Answer Keys
- Team Building Activity – Challenge
- Engineering Design Process for Challenge
- Vocabulary Cards and Test
- Team Evaluation
- Moon map
https://geoalliance.asu.edu/sites/default/files/LessonFiles/Cullumber/Touchdown/Moon_map.pdf
- Moon Map Answer Key
<https://geoalliance.asu.edu/sites/default/files/LessonFiles/Cullumber/Touchdown/Moon%20Map.jpg>
- Markers or color pencils
- Small paper or plastic cups
- Bag of large and small marshmallows
- Cardboard (about 4"x5")
- Plastic (about 8"x8") (cut up plastic bag works well)
- Craft sticks
- Index cards – 3"x5"
- Rubber bands
- Ruler
- String
- Tape
- Scissors

Objectives

The student will be able to:

1. Describe goals of the Apollo Missions.
2. Determine where they landed on the moon and reasons for these locations.
3. Read and interpret maps and significant features on the maps.
4. Draw and label maps, including symbols and legends.
5. Use the Engineering Design Process to work together as a team to analyze and solve a problem.

Procedures

Prerequisite: Students should have a knowledge of basic map skills, such as locating information and how to use symbols and a legend.

Note: If computers are not available for all students, teachers can go on the [Google.com/moon](https://www.google.com/moon/) site and make a hand-out for each mission. Follow the steps on the Apollo Mission worksheet for students. Once you click on a mission, zoom in and find #1. This is

the landing site for the mission and gives information for the hand-out. You can choose other information from the mission to include with the hand-outs for small group work.

SESSION ONE

Engage:

1. Tell students that in 2019, it will be/was 50 years since a man, an American astronaut, first stepped on the moon. Show the Apollo 11 video clip of the first steps on the moon. **(Integrating Processes: Listening)**
<https://www.youtube.com/watch?v=RMINS7MmT4>
2. Have students then Quick Write in their notebook: What would it be like to travel there as an astronaut? What would it be like to be the first person to step on the moon? **(Preparation: Linking to Background, Integrating processes: Writing).**
3. Discuss as a class their responses and introduce the vocabulary cards. Have students identify which of the vocabulary cards were already mentioned in today's lesson. **(Integrating processes: Listening, Speaking)**

Explore:

1. Divide students in groups of 2-4. Tell each group they will be exploring the Apollo missions to the moon. Go over worksheet. **(Integrating processes: Listening)**
2. For each team, hand out the moon map and Apollo Mission Worksheet. Explain to students that they will be assigned one of the Apollo Missions #11-16. They need to complete their worksheet and locate the landing site on their moon map. Teams will go onto <https://www.google.com/moon/> and find the mission they are assigned. **(Grouping option: small groups)**
3. Teams will follow the directions on the Apollo Mission Worksheet and locate their landing on the moon map. Allow them time to explore the various interactive parts of their mission. **(Integrating processes: Reading, Writing)**
4. After completing the worksheet. Teams will locate their Apollo mission on the classroom map. As a class, have each group share at least one thing they learned about their mission. **(Integrating processes: Speaking, Grouping Option: Whole Class)**

SESSION TWO

Explain:

Touchdown to the Moon: Apollo Missions

1. Explain to class that landing on the moon took lots of team work and cooperation from the astronauts. Review the Apollo missions that the teams located on the moon map. (**Integrating Processes: Listening**)
2. Ask students: Why did the missions pick these landing sites? Have them quick share with a neighbor. (**Grouping option: Partners**).
3. Discuss these reasons as a class and explain the need for astronauts working together to not only to the moon but to also land safely on a flat moon surface. (**Grouping option: Whole Class**)

Elaborate:

1. Explain to class that they will be working in groups of 3-4 to build a shock absorbing system that will safely land a manned spacecraft on a lunar surface. (**Integrating processes: listening**)
2. Assign students their groups. Distribute the Team Building Activity – Challenge and review the instructions with the students. (**Grouping option: Small groups, Integrating processes: listening**)
3. Have students use the Engineering Design Process for Challenge worksheet to design, and build their model spacecraft. (**Grouping option: Small groups, Application: Hands On, Promotes Engagement**)

Evaluate:

1. After completing the construction, each group will test their spacecraft to see if it lands safely with the astronauts (marshmallows) inside. (**Grouping option: Small group, Application: Hands-on**)
2. Teams will evaluate and improve their designs and re-test their crafts. (**Application: Hands-on, Promotes Engagement**)
3. Teams will then complete the questions and the Team Evaluation on themselves and their teammates. (**Assesment: Written, Individual, Group**)
4. Give Vocabulary and Short Answer test (**Assessment: Written**)

Assessment

Reading

Students will accurately complete the Apollo Missions Worksheet. Mastery will be considered 80% or higher on answering the questions correctly. (**Assessment: Group**)

Students will score 80% or higher on Vocabulary and Short Answer test (**Assessment: Written**)

Science

Students will be given points based on evaluation form for Engineering Design process worksheet and teamwork participation on Touchdown activity (**Assessment: Individual, Group**)

Geography

Using the Apollo Missions Worksheet, grade the last two questions. Students should have identified two patterns and plausible reasons for these patterns. Mastery will be considered 75%.

Extensions

Have students read the journal entries on the [google.com/ moon](http://google.com/moon) site and then write a journal entry as if they were one of the astronauts stepping onto the moon.

Host a contest for a successfull launch from the highest point and the astronauts survived.

Sources

Apollo Mission Website:
<https://www.google.com/moon/>

Video:
<https://www.youtube.com/watch?v=RMINS7MmT4>

Touchdown Activity:
<https://www.jpl.nasa.gov/edu/teach/activity/touchdown/>

Moon map
https://geoalliance.asu.edu/sites/default/files/LessonFiles/Cullumber/Touchdown/Moon_map.pdf