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Are We There Yet, Snoopy? (Mapping the Moon)

OBJECTIVES

Students will:

- Read *Snoopy, First Beagle on the Moon!* and *Shoot for the Moon, Snoopy!* to give students some background knowledge.
- Map the six Apollo landing sites on the Moon using latitude and longitude coordinates.
- Determine potential landing sites for the upcoming Artemis missions.

SUGGESTED GRADE LEVELS

2nd – 5th

SUBJECT AREAS

Earth & Space Science, Mathematics, English Language Arts

TIMELINE

60 minutes

NEXT GENERATION SCIENCE STANDARDS

- 4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features.

COMMON CORE STANDARDS FOR MATHEMATICS

- CCSS.MATH.CONTENT.5.G.A.1. Graph points on the coordinate plane to solve real-world and mathematical problems.
- CCSS.ELA-LITERACY.RI.4.3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

21st CENTURY ESSENTIAL SKILLS

Critical Thinking/Problem Solving, Collaboration and Teamwork, Communication, Information Literacy, Flexibility, Leadership, Initiative, Social Skills, Organizing Concepts, Predicting Patterns, Constructing Explanations, Obtaining/Evaluating/Communicating Ideas

BACKGROUND

- According to NASA.gov, NASA has proudly shared an association with Charles M. Schulz and his American icon Snoopy since Apollo missions began in the 1960s. Schulz created comic strips depicting Snoopy on the Moon, capturing public excitement about America's achievements in space. In May 1969, Apollo 10 astronauts traveled to the Moon for a final trial run before the lunar landings took place on later missions. Because that mission required the lunar module to

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skim within 50,000 feet of the Moon's surface and "snoop around" to determine the landing site for Apollo 11, the crew named the lunar module Snoopy. The command module was named Charlie Brown after Snoopy's loyal owner.

- These books are a united effort between Peanuts Worldwide, NASA and Simon & Schuster to generate interest in space among today's younger children. The character of Snoopy has been allowed to be reimagined for this special partnership and for the opportunity to head into outer space.
- Latitude and Longitude lines are important imaginary lines used to identify specific locations on Earth and the other planets and moons. Latitude lines run horizontal, where north is above the Equator (0°) and south is below the Equator (0°). Longitude lines run vertical, where west is left of Prime Meridian (0°), and east is right of the Prime Meridian (0)°. The intersection between the two lines creates a coordinate. When plotting coordinates, latitude is listed first and longitude is listed second.
- A topography map is also useful for researching landing sites and identifying terrain of a region. The different colors signify the varying elevations in hat area. It is also helpful when comparing the topography of land features, like craters and land formations.
- Landing on the moon was a huge feat for mankind. The Apollo missions demonstrated the human drive for exploration. According to Nasa, Project Apollo's goals went beyond landing Americans on the moon and returning them safely to Earth. They included establishing the technology to meet other national interests in space, achieving prominence in space for the United States, carrying out a program of scientific exploration of the Moon, and developing human capability to work in the lunar environment. (Snoopy First Beagle on the Moon! pp. 32 - 38).
- It has been 47 years since our last visit to the Moon, we're now going back . . . "Back to the Moon, and On To Mars!" According to NASA, they are committed to landing American astronauts, including the first woman on the Moon, by the year 2024. Through the agency's Artemis Lunar exploration program, NASA will use innovative new technologies and systems to explore more of the Moon than ever before. NASA will collaborate with commercial and international partners to establish sustainable missions by the year 2028. Finally, we will use those lessons learned not only on the Moon, but as we take the NEXT giant leap – sending astronauts to Mars! (Shoot for the Moon, Snoopy!, pp. 1 and 4). The Artemis program will focus on:
  1. Demonstrating new technologies, capabilities, and business approaches needed for future exploration, which includes the leap to Mars.

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2. Establishing American leadership, as well as a strategic presence, on the Moon . . . while expanding our U.S. global economic impact.
3. Broadening our commercial and international partnerships.
4. Inspiring a NEW generation of astronauts, scientists, engineers, and space explorers, which includes encouraging careers in STEM.

VOCABULARY

Coordinates, Crater, Equator, Latitude and Longitude Lines, Prime Meridian, Topography

MATERIALS

- Pencils - one per student
- Coordinates for the Apollo landing sites - one set per group
- Enlarged map of the Moon with latitude and longitude lines - one per group
- Enlarged map of the Moon with colorized topography AND latitude and longitude lines - one per group

LESSON PROCEDURES

1. *Read Snoopy, First Beagle on the Moon!* and *Shoot for the Moon, Snoopy!* to the entire class, to give students some background knowledge.
2. Show students, "We Go as The Artemis Generation." This will provide students with the background knowledge to understand the mission directives from NASA as we prepare to go, "Back to the Moon and on to Mars!" https://www.youtube.com/watch?v=dOKKkV-30dE
3. Introduce mapping coordinates.
   a. Explain longitude and latitude.
   b. Show students where latitude and longitude lines are located on a map.
   c. Inform students that we use these latitude and longitude lines to identify places on a map.
   d. Explain that a coordinate is the location on a map where latitude and longitude lines intersect.
   e. When finding a specific location on a map, latitude is first and longitude is second.
   f. Explain that north latitude lines are above the Equator (0°); and that south latitude lines are below the Equator (0°).
   g. Explain that west longitude lines are left of the Prime Meridian (0°); and that east longitude lines are right of the Prime Meridian (0°).

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4. Explain to students that we use latitude and longitude here on Earth, but on other planets and moons.
5. Show students a topographical map of the Moon with latitude and longitude lines and colorized topography.
6. Using the map key as a guide, discuss what the different colors represent.
7. Discuss what land features Snoopy might have discovered on the Moon, and how those land features are similar to land features found here on Earth.
8. Split students into groups of two.
9. Hand each group of students a set of coordinates for the six Apollo landing sites.
10. Hand each group of students an enlarged map of the Moon with longitude and latitude lines.
11. Hand each group of students an enlarged map of the Moon with colorized topography and latitude and longitude lines.
12. Have each group of students plot the six Apollo landing sites on both the enlarged map of the Moon and the enlarged map of the Moon with colorized topography.
13. Have each group of students label the landing sites with the name of the mission that landed there. (For example, 1° North and 23° East would be plotted on both maps, as well as labeled with Apollo 11.)
14. Have students determine the landing site for the next mission to the Moon, using the map key on the colorized terrain and the information gained from plotting the six Apollo landing sites, as a guide.
15. Have students write a summative paragraph describing the criteria used to determine the landing site they chose.
16. Compare and contrast as a class, the Apollo Moon landing sites with the landing sites each group chose for the Artemis mission using a Venn Diagram. (Snoopy First Beagle on the Moon! pp. 32–33 references to the Apollo landing sites.)

EXTENSIONS

- Have students research the historical significance of the "Space Race," the lead-up to the landing of the first mission on the Moon, as well as the people behind the scenes that made the Apollo missions such a success. (Snoopy First Beagle on the Moon! pp. 33, & 36 - 37, gives a bit of historical information on Apollo mission 10 and Apollo mission 11.)
- Have students research the meaning behind the names of each Apollo landing site. Who picked the name? Which astronauts landed there? Why did NASA select that particular landing site?

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- Have students create a public service announcement (PSA) describing WHY their landing site should be chosen for the next landing site on the Moon, as part of NASA's Artemis mission.

RESOURCES

Apollo Landing Sites – Moon: NASA Science. Retrieved from https://moon.nasa.gov/resources/52/apollo-landing-sites/

Apollo Landing Sites. Retrieved from https://airandspace.si.edu/multimedia-gallery/5480640jpg?id=5480

Dunbar, B. (2019, July 23). What is Artemis? Retrieved from https://www.nasa.gov/what-is-artemis

Garcia, M. (2018, July 9). NASA and Peanuts Celebrate Apollo 10's 50th Anniversary. Retrieved from https://www.nasa.gov/feature/nasa-and-peanuts-celebrate-apollo-10-s-50th-anniversary

Loff, S. (2019, June 4). Artemis Program. Retrieved from https://www.nasa.gov/artemis

Loff, S. (2015, March 16). The Apollo Missions. Retrieved from https://www.nasa.gov/mission_pages/apollo/missions/index.html

Schultz, Charles M. (2019). Snoopy, First Beagle on the Moon! New York, NY: Simon & Schuster.

Schultz, Charles M. (2019). Shoot for the Moon, Snoopy! New York, NY: Simon & Schuster.

Apollo Landing Coordinates

Directions: Plot the six Apollo landing sites using the latitude and longitude coordinates below. Remember: latitude lines are horizontal, and longitude lines are vertical. North is above the Moon's equator, and South is below the Moon's equator. East is on the right of the Prime Meridian, and West is on the left of the Prime Meridian. Label each Apollo mission as you plot each coordinate.

Apollo 11: Mare Tranquillitatis - 1° North, 23° East

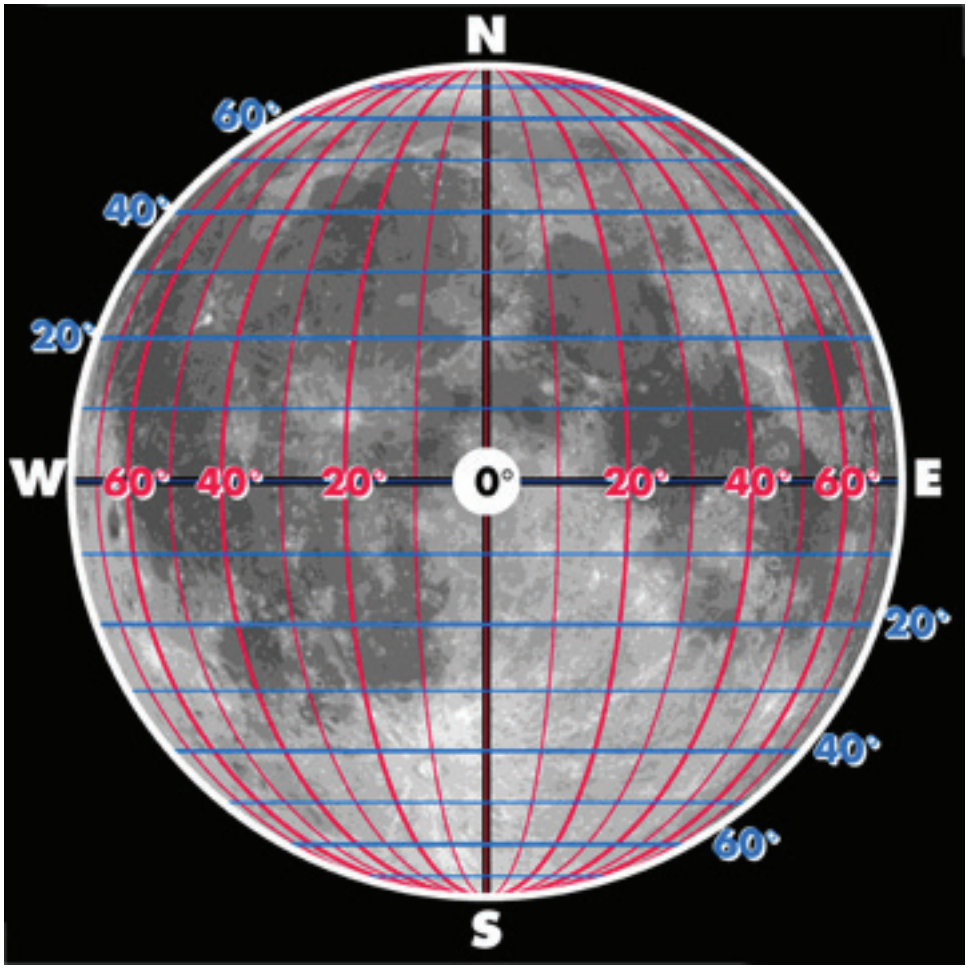
Apollo 12: Oceanus Procellarum - 3° South, 23° West

Apollo 14: Fra Mauro - 4° South, 17° West

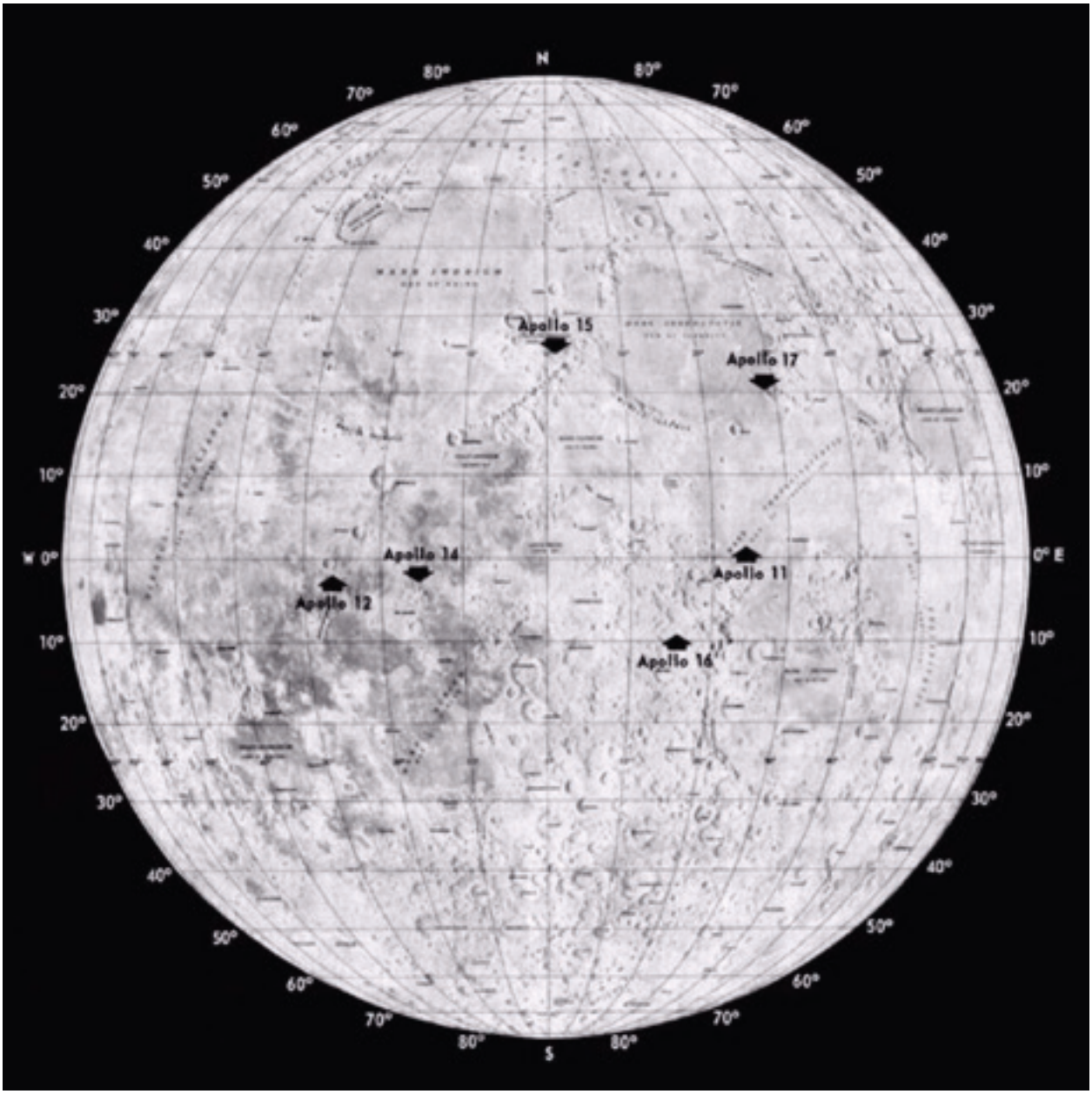
Apollo 15: Hadley/Apennines - 26° North, 4° East

Apollo 16: Descartes - 9° South, 15° East

Apollo 17: Taurus-Littrow - 20° North, 31° East



Answer Key


N
S
W 0°
0° E
80°
70°
60°
50°
40°
30°
20°
10°
Apollo 15
Apollo 17
Apollo 14
Apollo 12
Apollo 11
Apollo 16