

PEANUTS and SPACE FOUNDATION

The Beagle Has Landed!

OBJECTIVES

Students will:

- ◆ Read *Snoopy, First Beagle on the Moon!* and *Shoot for the Moon, Snoopy!* to give students some background knowledge.
- ◆ Work in teams to design a Doghouse Lunar Lander that will keep Snoopy and Woodstock safe on their journey, "Back to the Moon!"
- ◆ Work in teams to build a Doghouse Lunar Lander that will keep Snoopy and Woodstock safe on their journey, "Back to the Moon!"
- ◆ Test the Doghouse Lunar Landers designed by student teams in order to determine their effectiveness.
- ◆ Redesign the Doghouse Lunar Landers as necessary based on test results.

SUGGESTED GRADE LEVELS

K – 5th

SUBJECT AREAS

Engineering Design, Space Science

TIMELINE

60 minutes

NEXT GENERATION SCIENCE STANDARDS

- ◆ K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- ◆ 3-5-ETS.1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- ◆ 3-5-ETS.1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

21st CENTURY ESSENTIAL SKILLS

Critical Thinking/Problem Solving, Collaboration and Teamwork, Communication, Flexibility, Leadership, Initiative, Social Skills, Constructing Explanations, Obtaining/Evaluating/Communicating Ideas



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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 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 reimaged for this special partnership and for the opportunity to head into outer space.
- ◆ It has been 47 years since our last visit to the Moon, and we're now going back . . . "Back to the Moon, and On To Mars!" Through NASA'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 and *Shoot for the Moon, Snoopy!* pp.1 references Snoopy's return to the Moon.) The Artemis program will focus on:
 1. Demonstrating new technologies, capabilities, and business approaches needed for future exploration, which includes the leap to Mars.
 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.
- ◆ According to NASA, Artemis was the twin sister of Apollo and goddess of the Moon in Greek mythology. Now, she personifies the path to the Moon as the name of NASA's program to return astronauts to the lunar surface by 2024, including the first woman and the next man. When they land, our American astronauts will step foot where no human has ever been before: the Moon's South Pole.

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- ◆ Orion is America's next generation spacecraft that will take astronauts to exciting destinations never explored by humans. It will serve as the exploration vehicle that will carry the crew to distant planetary bodies, provide emergency abort capability, sustain the crew during space travel, and provide safe reentry from deep space. The Orion crew module is capable of transporting four crew members beyond low-Earth orbit, providing a safe habitat from launch through landing and recovery.

VOCABULARY

Gravity, Egress, Engineering Design Process, Impact, Lunar, PPK (Personal Preference Kit)

MATERIALS

- ◆ 1 small dog biscuit , which represents Snoopy - 1 per group
- ◆ 1 small yellow feather, which represents Woodstock - 1 per group
- ◆ Gallon-Sized Bag - 1 per group
- ◆ Tape - 1 roll per group
- ◆ Scissors - several pairs per group
- ◆ 1 Pint Milk Carton (clean and empty) - 1 per group (have your students save these from the cafeteria)
- ◆ Red Paint - 1 container per group
- ◆ Paint Brush - several brushes per group
- ◆ Coffee Filter - 1 per group
- ◆ Index Cards - 2 per group
- ◆ Pipe Cleaners - 2 per group
- ◆ Straws - 2 per group
- ◆ Small, Craft Sticks - 2 per group
- ◆ Rubberbands - 2 per group
- ◆ String - 1 ft per group
- ◆ Ladder

LESSON PROCEDURES

1. Assemble the supplies for each group into a gallon-sized bag prior to the lesson.
 - a. This will be referred to as their PPK, Personal Preference Kit, going forward.
 - b. Please keep in mind that you can adjust the amount and type of supplies you include in their supply kits to fit the needs of your students.



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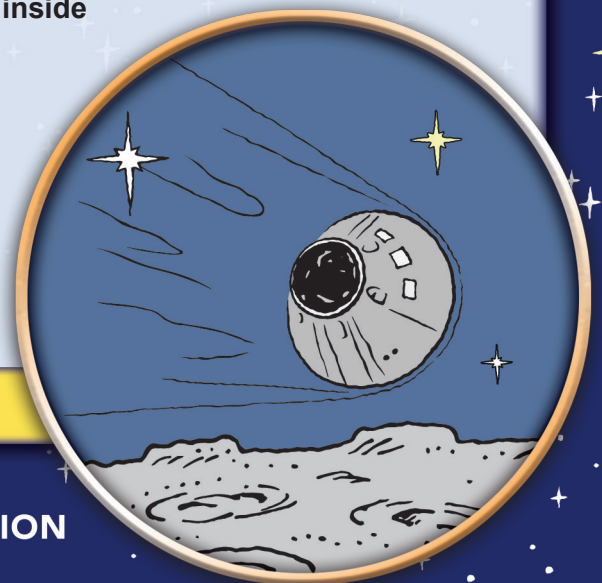
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2. Paint the empty, pint milk cartons red prior to the lesson.
 - a. You can choose to have students paint their own milk cartons, depending on the allowable time, age and ability level of your students.
 - b. If you choose to have students paint their own milk cartons, this should be done the day before in order to allow the paint time to dry.
3. Read Snoopy, *First Beagle on the Moon!* and *Shoot for the Moon, Snoopy!* to the entire class to give students some background knowledge.
4. 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!"
 - a. <https://www.youtube.com/watch?v=dOKKkV-30dE>
5. Show students a picture of the Orion capsule. Explain what Orion is, as well as what it must accomplish in order to deliver astronauts safely to the Moon, and then land safely back on Earth after their mission is complete.
 - a. This NASA webpage provides a look at Orion.
 - b. <https://www.nasa.gov/exploration/systems/orion/about/index.html>
6. Explain the engineering design process to students.
 - a. Ask: Identify the Need & Constraints
 - b. Research the Problem
 - c. Imagine: Develop Possible Solutions
 - d. Plan: Select a Promising Solution
 - e. Create: Build a Prototype
 - f. Test and Evaluate Prototype
 - g. Improve: Redesign as Needed
7. Explain the mission objectives for, "The Beagle has Landed!" (*Snoopy, First Beagle on the Moon!* pp. 1–12 references Snoopy's return to the Moon.)
 - a. Students will work in teams to design a Doghouse Lunar Lander.
 - b. Snoopy, represented by a dog biscuit, and Woodstock, represented by a yellow feather, must remain safely inside their Doghouse Lunar Lander.
 - c. Students cannot strap Snoopy or Woodstock to their Doghouse Lunar Lander using tape, rubber bands, or any other supply.
 - d. Students cannot trap Snoopy or Woodstock inside their Doghouse Lunar Lander; they both must be able to egress safely through an opening in their Doghouse Lunar Lander once they arrive on the Moon.



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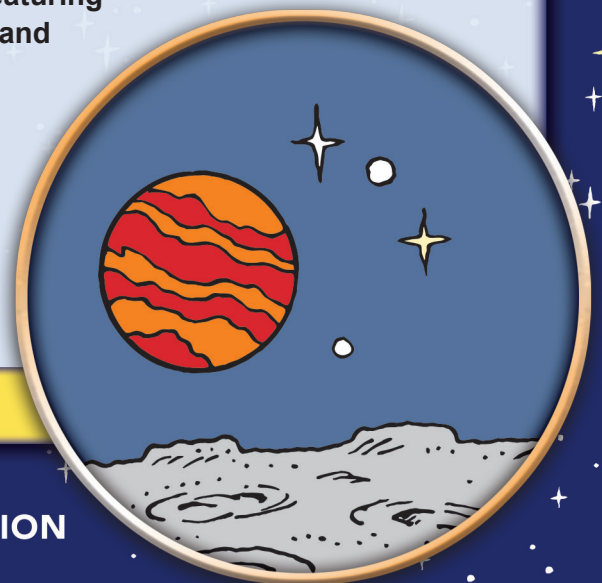
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- e. Show students the available supplies to build their Doghouse Lunar Lander.
 - f. Students will be given their supplies in a PPK, Personal Preference Kit, the contents of which are listed above under materials.
 - g. Students do not have to use ALL of their supplies.
 - h. Students cannot use any additional supplies.
 - i. The team that successfully completes the objectives, using the least NUMBER of supplies from their PPK, will be the winner.
 - j. Check for student understanding prior to moving on to the next step.
8. Separate students into groups of 2 or 3.
 9. Hand out student supplies to each group.
 10. Allow students approximately 30 minutes to build their Doghouse Lunar Lander.
 11. Test the effectiveness of the Doghouse Lunar Lander by dropping it from a ladder onto a target.
 - a. The teacher should drop the landers from similar heights, in order to maintain consistency and student safety.
 12. Provide time for students to redesign their Doghouse Lunar Landers as necessary to improve their designs.
 13. Test the redesigned Doghouse Lunar Landers.
 14. Discuss the design challenge, helping students frame their statements using the following sentence starters:
 - a. 'I noticed . . . '
 - b. 'I wonder . . . '
 - c. 'I observed...'

EXTENSIONS

- ♦ Have students draw a blueprint of their Doghouse Lunar Lander explaining its features, including dimensions and measurements, which will help students review mathematical concepts.
- ♦ Have students create their OWN Peanuts comic strip, featuring the Doghouse Lunar Lander their team designed, built, and tested.
- ♦ Assign each supply a price, and require older students (3rd to 5th) to stick within a budget . . . the amount of which you can set according to the needs of your students.



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RESOURCES

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