

# PEANUTS and SPACE FOUNDATION

## The Beagle Has Landed!

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### 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!
- ◆ 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 – 5

### 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.
- ◆ It has been 47 years since NASA's last mission to the Moon—and now we're going "back to the Moon and on to Mars!" NASA's new Artemis lunar exploration program (named for the twin sister of Apollo and the goddess of the Moon in Greek mythology) will use innovative technologies to explore more of the Moon than ever before. Artemis aims to once again send astronauts to the Moon's surface by 2024—this time including the first woman to land on the Moon. These astronauts will set foot where no human has ever been before: the Moon's South Pole.
- ◆ NASA will collaborate with commercial and international partners to establish sustainable Moon missions by the year 2028. The lessons learned on the Moon will help prepare for the next giant leap: sending astronauts to Mars! (*Shoot for the Moon, Snoopy!* pages 1 and 4 reference Snoopy's return to the Moon.) The Artemis program seeks to inspire a new generation of astronauts, scientists, engineers, and space explorers.
- ◆ 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), Thrusters



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 **SPACE FOUNDATION**

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### MATERIALS

- ◆ 1 small dog biscuit, representing Snoopy – 1 per group
- ◆ 1 small yellow feather, representing Woodstock – 1 per group
- ◆ Tape - 1 roll per group
- ◆ Safety scissors – several pairs per group
- ◆ 1-pint milk carton (clean, empty, painted red) – 1 per group (Have students save these from the cafeteria and paint them red ahead of time; allow 1 day for cartons to dry.)
- ◆ 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
- ◆ Rubber bands – 2 per group
- ◆ String – 1 ft per group
- ◆ Gallon-size resealable bag – 1 per group
- ◆ Ladder or stepstool

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### LESSON PROCEDURES

1. Assemble the supplies for each group into the gallon-size 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.
2. 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


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- 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.
    - e. Show students the available supplies to build their Doghouse Lunar Lander.
    - f. Hand out PPKs (coffee filters may be used as a parachute, even though the lack of atmosphere on the Moon would require thrusters to slow down the capsule).
    - 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 or stepstool 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...’



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### 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.

### RESOURCES

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