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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.

✦ Communicate effectively with teammates to accomplish their mission.

✦ Use teamwork to replicate a design.

✦ Utilize time management skills to accomplish their mission.

SUGGESTED GRADE LEVELS

2nd – 5th

SUBJECT AREAS

Science, Engineering, Social Science

TIMELINE

45 – 60 minutes

NEXT GENERATION SCIENCE STANDARDS

✦ 3-5-ETS1-3. 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

Collaboration and Teamwork, Communication, Social Skills

BACKGROUND

✦ 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 of 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, 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.

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✦ Mission Control Center (MCC) is the location that oversees crucial aspects of every U.S. human space flight. According to NASA, "Shuttle MCC workers only spend about 10 percent of their time controlling missions. Seventy-five percent of their time is spent planning and organizing, and 15 percent is devoted to their own training and education. For Space Station missions, the amount of real time spent on missions is considerably larger since the project runs 24 hours a day, seven days a week, 365 days a year."

✦ "Besides managers, Mission Control is divided into flight-control and ground-team workers,' said William Foster, an MCC ground controller. The ground team gathers data from the spacecraft and launch facilities and the flight control team then analyzes that data to make decisions on how best to proceed. 'As a team, we generate procedures, which are rules and conditions for response. We have generic procedures that are in place for every launch and mission-specific procedures that are tailored for a very specific situation. Every flight brings new situations, and sometimes we find we need to modify procedures that are already in place. It's always changing.'"

✦ "In order to be prepared to help astronauts in any situation that could arise, MCC workers go through simulations with the astronauts and the training team. During the simulations, where workers practice responses, an unexpected event might be thrown in to surprise everyone. This anomaly, called a simfault, requires fast thinking and logical responses. "A simfault could be a malfunctioning piece of equipment or it could be a major disaster situation," said Foster. "The way the workers respond shows us how we need to prepare in case the real thing should ever happen."

✦ "If you ever see a scene from the Shuttle Mission Control Center you may notice that each console is identified with an acronym that doesn't make much sense unless you know what it stands for. Each person represented there plays a crucial role in the success of a space mission." Students will be grouped in teams of three to simulate how a NASA team uses communication, attention to detail and teamwork to complete a mission. Each team member will have a specific role during the mission.

✦ Engineer - This person will observe Mission Control's structure, in detail, and then describe that structure to CAPCOM(whispering). The Engineer is the only person that can see Mission Control's structure. Engineer is not allowed to talk to the Astronaut and not allowed outside the Engineer area (light green). Engineer must accurately describe the structure to CAPCOM.

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✦ **CAPCOM** - This person is in direct contact with both the Engineer and the Astronaut. CAPCOM can freely move from the Engineer to the Astronaut and be at the team's station (orange area). CAPCOM is not allowed to touch or manipulate any of the objects at their station. CAPCOM is responsible for relaying accurate information from the Engineer to the Astronaut. (The name CAPCOM originates from the missions where astronauts, where in capsules. It is a shortened version of CAPsule COMmunicator.)

✦ **Astronaut** - This person is the only one that can touch the objects and construct at their station. They are not allowed to leave their team's station and cannot directly communicate with the Engineer. They can only talk to CAPCOM. They must use the information from CAPCOM to recreate the mission control's structure.

VOCABULARY

Mission Control Center, CAPCOM, engineer

MATERIALS

One per team (and a set for you):
✦ Small bowl
✦ Dog bone
✦ Different size balls
✦ "Leash" (string about 12 inches)
✦ Tri-fold Display board

CLASSROOM SETUP

Below is an example of classroom arrangement. Stations will be constructed around the room with Mission Control Center (teacher's station) position at the front of the class. All stations should be hidden from plain view so that it is only visible to one team.

Teacher Station

Marcy Engineers

Peppermint Patty (CAPCOM)

Snoopy Spacecrafts
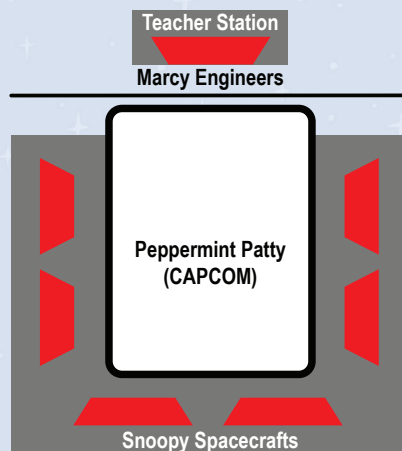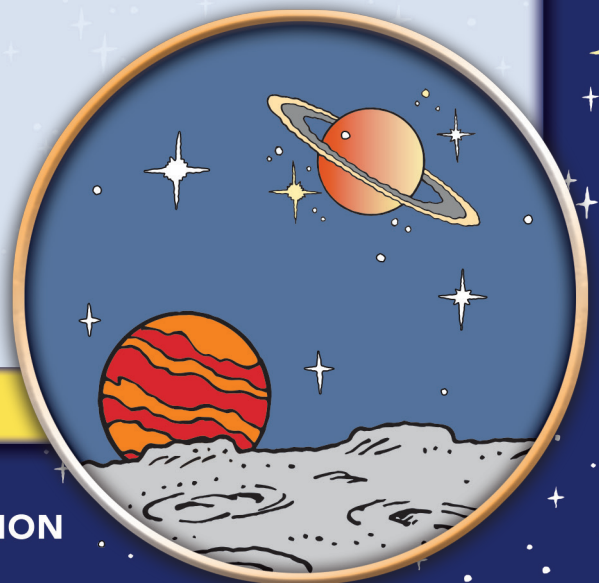
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LESSON PROCEDURES

Teacher's note: Direct references to the book(s) can be found after the procedural step, in parentheses.

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. Ask students, "How does Snoopy receive help from others? In real life, does NASA, engineers and astronauts work together? How?" (*Snoopy First Beagle on the Moon!* pp. 18 - 19, references to Spike helping Snoopy on his mission, *Shoot for the Moon, Snoopy!* Pp. 6 -7, references to Peppermint Patty and Marcy helping Snoopy train to be an astronaut.)

3. Provide students with background information on mission control Center (see background information). Focus discussion on the role of each member and how all three work together. Optional: show students videos of Mission Control, CapCom, or Apollo 11's CapCom chatter when landing on the moon.

4. Explain to students Snoopy's doghouse spaceship has a malfunction! You need to help Snoopy come home safely. Divide class into groups of three. Each person will have a specific role:

   a. Marcy (Engineer): Able to see the new device for Snoopy's spacecraft. Can only stay in the engineering area. They must observe (no touching) and describe in detail HOW to build the new device to Peppermint Patty.

   b. Peppermint Patty (CapCom): Receives the directions from Marcy. CapCom then relays that information to Snoopy (Astronaut) through the board. They must only stay in the CapCom area and cannot see what the astronaut is doing.

   c. Snoopy (Astronaut): On the moon and must rebuild the new device exactly like the model to make it home safely. They must remain seated and behind the display board during the mission.

5. Pass out the parts needed to fix the doghouse spacecraft. Explain how each item may not be used in the design. Snoopy must recreate the device exactly like the original (created by the instructor).

6. Gather all the Marcys (engineers) together up front by MCC (teacher's station), all the Peppermint Pattys (CapCom) in the center and Snoopy sitting behind the display, out of sight from everyone.

7. Construct the new device. The instructor allows only 3 minutes for teams to complete the mission (time can vary depending on age and ability levels). Engineers can have as many looks as needed during those 3 minutes.

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8. Have Snoopy move the display board, so you can inspect their device. A successful mission would be one exactly like the instructor's model. Ask students, "Why did some make it home, while others didn't? What are some examples of good descriptive words that you could use? Why is communication so important, especially in scenarios like this one? What can you do differently to make the next mission more successful?"

9. Rotate roles. Set display boards back up. Design a new device for the teams to replicate. Start timer again and repeat steps 6 - 8. Keep switching jobs so that everyone has a turn. Ideally, students will improve and communicate effectively to reconstruct your device.

10. Collect supplies and come back together as a class. Conclude the lesson by asking students, "What made your team successful? What made this activity difficult to accomplish the mission? Why is it important to be an effective communicator?"

EXTENSIONS

✦ Allow the engineers to only peek at the design 3 times. This will force Marcy to pay very close attention to details.

✦ Have the Marcys (engineers) write the instructions for the Peppermint Pattys (CapCom). Students will now have to follow written instructions instead of verbal directions and hand gestures.

RESOURCES

Dunbar, B. (n.d.). The People Behind the Astronauts. Retrieved from https://www.nasa.gov/audience/foreducators/k-4/features/F_People_Behind_the_Astronauts.html

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

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.

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