Lesson Activities

Lesson 1 Getting to Know the Space Station

Length:1-2 hours

Essential Questions:

What is the Space Station? What does it do?

What is a reduced gravity environment?

Why study plant growth for space travel?

What are some challenges growing plants in space?

Objectives:

Students will be able to observe a reduced gravity environment on the Space Station.

Students will be able to discuss their observations and questions with 90% participation.

Students will investigate how plants grow both in space and on earth with 85% accuracy.

Materials: Chromebooks, 4 large pieces of paper, markers/pens, science journals (composition notebook), Post-it Notes

Engage:

To create interest, students will begin the lesson with a fictional scenario.

The year is late July, 2024. After travelling for 3 days, the astronauts arrived safely on the moon. NASA's Artemis mission to the moon is a success! (https://www.nasa.gov/specials/artemis/) The astronauts unloaded their payload and explored the South Pole of the lunar surface for frozen water ice. After several hours of exploring, astronauts returned to base only to notice a sealed package of tomato seeds laying on the lunar surface! The astronaut's surmise the seeds fell out of the storage unit during unloading. The sealed package of tomato seeds was exposed to freezing temperatures and solar radiation for hours! However, the astronauts still believe it is possible to grow the plants. Your task is to help them answer: "How will exposure to space affect the tomato seeds that will be used to grow food on the moon?"

Exploration:

In order to understand a reduced gravity environment and Space Station research, teachers and students begin their inquiry by getting to know the Space Station.

Students will watch two Space Station video's:

https://www.youtube.com/watch?v=oLrOnEmy_GA

https://www.youtube.com/watch?time_continue=93&v=1FxYleYSWHM&feature=emb_logo

Students will record their observations about the Space Station in their science journals. After watching the video, the class will share their understandings of a reduced gravity environment and how the Space Station is a working laboratory above Earth. Teachers can use the *Participation Rubric* to guide class discussions.

Explain:

After discussing what students learned about the Space Station and how it is a working laboratory for scientists all over the world, students begin learning about plant growth on the Space Station.

Students will watch "Space Station LIVE: Everything's Coming up Veggie" Prior to watching the video, the teacher will ask students: Why is it important to study plant growth for space travel?

https://www.youtube.com/watch?v=FjqdEVfYQAo

Students will record their answers in their science journal. They will also include any questions.

After the video, the teacher will write "Why is it important to study plant growth for space travel?" on one side of the board. Next, the teacher will write "Questions about Topic Being Discussed" on the other side of the board. The teacher will pass out two post-it-notes for each student. Students will write down why they think it's important to study plant growth for space travel on one Post-it Note. On the other post-it note, students will write down questions. Finally, students will place their Post-it-Notes in the designated areas on the board to create a class explanation. Students do not need to write their names on the post-it-notes.

Elaborate:

https://www.youtube.com/watch?v=SgpU08WJm0c

1) What are some challenges to growing plants in space? 2) How can astronauts grow food in space 3) What will help the food grow best on the Space Station 4) How do plants grow in reduced gravity?

Extend:

Next, students will investigate plant growth on the Space Station by watching NASA's video "Plants in Space." Students will compare plant growth on the ground with plant growth in Space.

https://www.youtube.com/watch?v=LyMZiht8EI4

Evaluation:

In order to evaluate student learning, the teacher can create an exit ticket that includes the essential questions. Students will answer each question before leaving class.

Another option includes revisiting the essential questions and objectives as a class or in pairs.

Sample Exit Ticket

Name_____

Before leaving class, choose 2 Essential Questions to answer. Circle the two questions you will answer. Must be 3-5 sentences each.

Essential Questions:

What is the Space Station? What does it do?
What is a reduced gravity environment?
Why study plant growth for space travel?
What are some challenges growing plants in space?

1. _____
_____
_____
_____
_____
2. _____
_____
_____
_____

Optional Rubric for Group Work Teacher's Note: Teachers may choose to use this rubric as a way to assess students with or without making it a basis for student grades.

Category	Below Target	At Target	Above Target
Participation	Seldom participated. Did very little work.	Cooperative. Did his/ her part of the work. Often offered useful ideas.	Was always willing to do more. Routinely offered useful ideas.
Reliability	Did not have work done on time. Did not show up when the group met.	Group members could count on him/her.	Went beyond what was expected of him/her.
Attitude	Did not support group members. Did not share information. Had little interest in success of the group.	Supported efforts of others. Served to facilitate rather than disrupt the group work.	Listened to and shared ideas with others. Was very self directed.

https://er.jsc.nasa.gov/seh/main_EDC_Lunar_Plant_Growth_Chamber.pdf