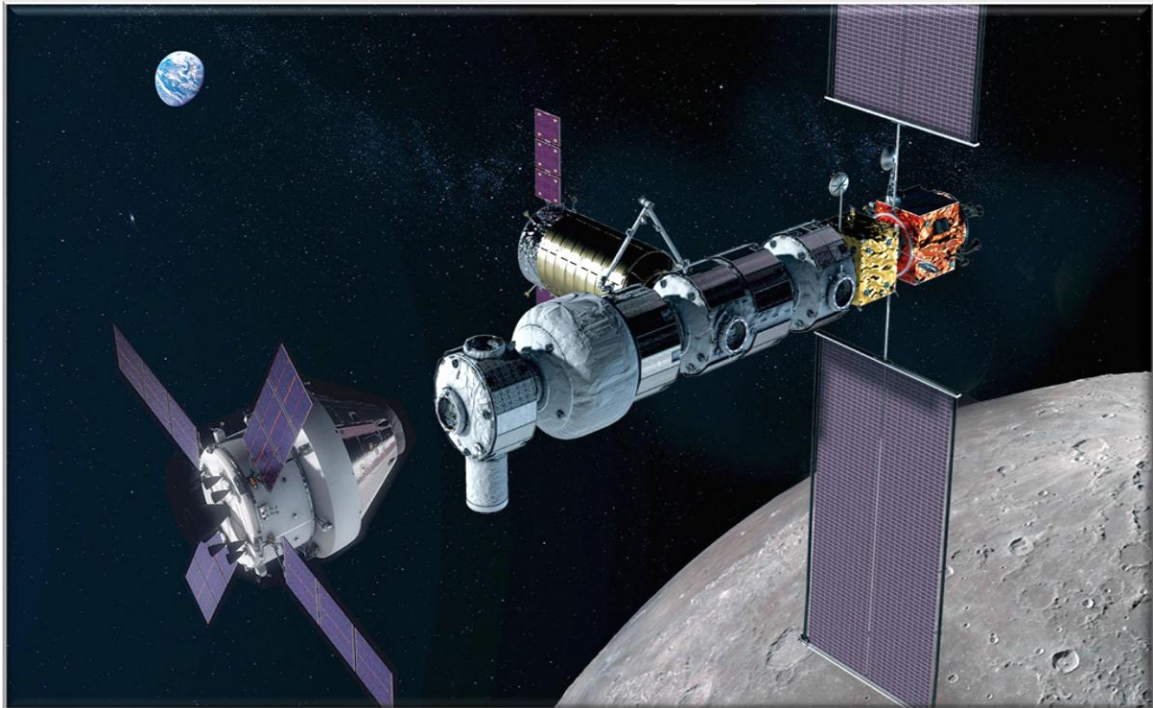


Spacegate Station Season 5

Episode 26



Energy Systems & Solar Power

Resource Content

- Guided Notes
- Higher Order Discussion Sheet
- Guided Notes Answer Key
- Curriculum Alignment Page

Season 5 Episode 26

Hurricanes Guided Notes

WORD BANK

bonds	kinetic	power
change	mass	silicon
cool	molecules	solar cells
conductor	move	tension
direct current	orientation	vibration
electrons	photons	wattage
gimbals	position	work
hot	potential	

SECTION 1 — What Is Energy?

1. Energy is “the ability to do _____.”
2. Energy is how things _____ and _____.
3. The episode describes several forms of energy, including chemical, electrical, heat, sound, light, _____, and _____ energy.

SECTION 2 — Chemical, Electrical, Heat, Sound, and Light Energy

4. Chemical energy is stored in the _____ between atoms and molecules.
5. Electrical energy is produced by the movement of negatively charged particles called _____.
6. When electrons flow through a _____, they create an electric current.
7. Heat energy comes from the movement of _____ in a substance.
8. Heat flows from _____ objects to _____ objects.
9. Sound energy is caused by the _____ of air particles or molecules.
10. Light energy is made of electromagnetic radiation containing tiny packets of energy called _____.

SECTION 3 — Kinetic and Potential Energy

11. _____ energy is the energy an object has because it is moving.
12. The more _____ an object has, the more kinetic energy it has.
13. _____ energy is stored energy that is waiting to be used.
14. One way to store potential energy is by an object’s _____ above the ground.
15. Another way to store potential energy is through _____ or compression, such as in springs or rubber bands.
16. A roller coaster at the top of a hill has high _____ energy and low _____ energy.

SECTION 4 — Solar Energy and the Spacegate Solar Array Wings

17. The Spacegate Station uses solar array wings made of thousands of _____.
 18. Each solar cell contains layers of _____ that release electrons when struck by sunlight.
 19. When sunlight hits the top layer, electrons are knocked loose and create _____ (DC).
 20. The station's power problem was caused by incorrect panel _____ toward the Sun.
 21. Adjusting the alpha and beta _____ helped restore proper power output.
-

SECTION 5 — Problem Solving on Spacegate Station

22. The scientists discovered that the solar panels were not receiving enough _____ from the Sun.
23. Changing the station's orbit affected the panels' _____ to the light source.
24. When the panels were realigned, the station's _____ output increased.

Higher-Order Discussion Questions

1. Systems Thinking — Energy Interactions

Which form of energy described in the episode is most important for operating a space station, and why?

2. Engineering — Solar Power Efficiency

Why is the angle of solar panels so important for generating electricity?

3. Cause and Effect — Energy Transfer

How does sunlight cause electrons in a solar cell to move?

4. Human–Technology Interaction

Why is it important for Aurora (the AI) to understand changes in station operations?

5. Real-World Application

Where do you see examples of kinetic and potential energy in everyday life?

6. Problem Solving

Why is it important for scientists to consider multiple possible causes when diagnosing a technical issue?

7. Communication in STEM

Why must scientists clearly explain energy concepts when working as a team?

Guided Notes Answer Key

SECTION 1

1. work
2. change, move
3. kinetic, potential

SECTION 2

4. bonds
5. electrons
6. conductor
7. molecules
8. hot, cool
9. vibration
10. photons

SECTION 3

11. Kinetic
12. mass
13. Potential
14. position
15. tension
16. potential, kinetic

SECTION 4

17. solar cells
18. silicon
19. direct current
20. orientation
21. gimbals

SECTION 5

22. wattage
23. orientation
24. power

CURRICULUM ALIGNMENT PAGE

Grade Band: Middle School (6–8)

Focus Areas: Forms of Energy, Energy Transfer, Solar Power, Engineering Design, Problem Solving

Episode Length: 15 minutes

Instructional Purpose: Core instruction, enrichment, and remediation

Learning Objectives

- After viewing this episode, students will be able to:
- Identify and describe common forms of energy (chemical, electrical, heat, sound, light, kinetic, potential).
- Explain how solar cells convert sunlight into electrical energy.
- Describe how energy transfer occurs in solar panels and mechanical systems.
- Distinguish between kinetic and potential energy using real-world examples.
- Analyze how orientation affects solar panel efficiency.
- Apply engineering thinking to diagnose and solve energy-related problems.

NGSS Alignment

MS-PS3-1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

Episode Connection: Roller coaster example; mass and speed affecting kinetic energy.

MS-PS3-2 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored.

Episode Connection: Potential energy in height, springs, and tension.

MS-PS3-3 Apply scientific principles to design, construct, and test a device that converts one form of energy into another.

Episode Connection: Solar cells converting light energy into electrical energy.

MS-PS3-4 Plan an investigation to determine the relationships among transferred energy, type of matter, mass, and temperature change.

Episode Connection: Heat transfer, temperature differences, and energy flow.

MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.

Episode Connection: Solar orientation, orbital changes affecting energy collection.

Science & Engineering Practices (SEPs)

- Developing and Using Models
- Constructing Explanations
- Analyzing and Interpreting Data
- Planning and Carrying Out Investigations
- Engaging in Argument from Evidence
- Using Mathematics and Computational Thinking
- Asking Questions and Defining Problems
- Obtaining, Evaluating, and Communicating Information

Florida B.E.S.T. Science Standards Alignment

SC.6.P.11.1- Explore the forms of energy and ways energy is transformed.

Episode Connection: Chemical, electrical, heat, sound, light, kinetic, potential.

SC.6.P.11.2 - Investigate and describe the transformation of energy from one form to another.

Episode Connection: Solar energy → electrical energy; potential → kinetic.

SC.7.P.11.3 - Cite evidence to explain that energy cannot be created or destroyed, only changed.

Episode Connection: Energy transfer in solar cells and mechanical systems.

SC.7.E.6.6 - Identify how energy from the Sun influences Earth systems.

Episode Connection: Solar radiation powering the station.

SC.6.E.7.5 - Explain how energy from the Sun drives processes on Earth.

Episode Connection: Solar energy as a power source.