Unit 6: Beyond Earth

Content Area: **Template**
Course(s):
Time Period:
Length:
Status: **Published**

State Mandated Topics Addressed in this Unit

This unit aligns with the following NJ Student Learning Standards for Science (NJSLS-S) and supports understanding of space science, celestial phenomena, and the Earth-Moon-Sun system:

NJSLS-S Performance Expectations:

- **HS-ESS1-1**: Develop a model based on evidence to illustrate the life span of the Sun and the role of nuclear fusion in the Sun's core to release energy that eventually reaches Earth.
- **HS-ESS1-2**: Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.
- **HS-ESS1-3**: Communicate scientific ideas about the way stars, over their life cycle, produce elements.
- **HS-ESS1-4**: Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

Integrated Mathematics Standards (NJSLS-M):

- **F-IF.B.4**: For a function that models a relationship between two quantities, interpret key features of graphs and tables.
- **A-SSE.A.1**: Interpret expressions that represent a quantity in terms of its context.

Science & Engineering Practices (SEPs):

- SEP 2: Developing and Using Models
- SEP 4: Analyzing and Interpreting Data
- SEP 5: Using Mathematics and Computational Thinking
- SEP 6: Constructing Explanations and Designing Solutions
- SEP 7: Engaging in Argument from Evidence

Crosscutting Concepts:

- Patterns
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter

These standards support instructional objectives including:

- Understanding the Earth-Moon-Sun system, eclipses, tides, and seasons
- Modeling the motion and interaction of celestial bodies
- Analyzing star formation, nuclear fusion, and stellar life cycles
- Interpreting spectral data and astronomical observations
- Exploring galaxy formation and the expansion of the universe
- Evaluating how space phenomena impact Earth's systems and technological applications

Unit Summary

This unit introduces students to the structure and behavior of celestial bodies beyond Earth and how these dynamic systems influence our planet. Students will investigate the interactions between the Earth, Moon, and Sun, including eclipses, tides, and seasons. They will explore the organization and motion of the solar system, the characteristics and life cycles of stars, and the formation of galaxies. The unit also addresses modern tools and methods scientists use to study space, such as telescopes, satellites, and spectral analysis. Through evidence-based models and simulations, students will gain a clearer understanding of Earth's place in the universe and how cosmic phenomena affect conditions on Earth.

Standards

SCI.HS-ESS1-1	Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.
SCI.HS-ESS1-2	Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.
SCI.HS-ESS1-3	Communicate scientific ideas about the way stars, over their life cycle, produce elements.
SCI.HS-ESS1-4	Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

Instructional Tasks/Activities

- Big Bang and Beginning of the Universe
- Build Your Own Universe Lab
- Common assessment chapter test

- Common assessment quiz
- Constructed response
- Do now’s and/or exit slips
- Exit Cards (answer to daily objective questions)
- Graphic organizers or models
- Guided practice
- Homework
- Homework
- Individual, small, and large group work
- Intro to Space Science
- Laboratory investigations within small groups
- Moon Formation Theories and Lesson
- Moon Phases and Tides
- Orbits and Kepler Intro
- Orbits Virtual Lab
- Orbits/Kepler Lab
- Planet formation and our solar system
- Review Activity
- Section Review Questions
- Solar System and Planets Project
- Space Science Research Project
- Star formation lesson
- Star formation project
- Stars and star formation lesson
- Study Guide Packets
- Vocabulary flash cards or map (word, picture, sentence, example)

Assessment Procedure

- Flashcards and/or drill and practice
- Inquiry based activities with reflective discussion
- Laboratory groups
- Lecture with note taking or guided notes
- Online models and simulators
- Power point presentations
- Whole and small group discussions

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Quiziz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials

- eliminate answers
- extended time
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Honors Modifications

Resources

- Resource 1
- Resource 2
- Resource 3
- Resource 4

- Resource 5