

02 The Daytime and Nighttime Sky

Content Area: **Science**
Course(s): **CP Astronomy**
Time Period: **Marking Period 1**
Length: **3-4 weeks**
Status: **Published**

Course Pacing Guide

Since the dawn of man, humans have been on a quest to understand who we are. At its most basic level, this quest is inextricably linked to a desire to discover how the universe is put together, how it works, and what our place is in it. In this course, we will explore the science that guides the phenomena we observe in the natural world as we stand on our Planet Earth and gaze into the furthest expanses of the universe. As we journey through the cosmos, we will also explore the social, historical, and philosophical impacts of scientific exploration.

Unit	MP/Trimester	Weeks
A Cosmic Perspective	1	4
The Daytime and Nighttime Sky	1	4
The Space Program	1-2	2
The Solar System	2	3
The Stars	2	3
The Universe	2	2

Unit Overview

In this unit, we explore naked-eye astronomy. We examine what the sky looks like from Earth and how that varies by time of year, time of day, and latitude. We study the positions and observed phenomena of the Sun, Moon, and stars.

Enduring Understandings

- The changing motion of the Sun throughout the year is a consequence of Earth's axial tilt.

- The phases of the Moon are caused by the relative positions of the Earth, Moon, and Sun.
- The sky appears to change throughout the year and at different latitudes.
- On human time scales, the stars are relatively constant.

Students will know:

- The celestial sphere is a projection of Earth's coordinates onto the sky. Its apparent motion is due to the Earth's rotation.
- The Earth and Moon exert tidal forces on each other.

Students will be able to:

- Investigate the cause and nature of the lunar phases using Styrofoam balls and flashlights.
- Predict the times at which various phases of the Moon will be visible.
- Evaluate illustrations of the Moon in children's books.
- Predict what the sky would look like for observers at different latitudes throughout the year.
- Demonstrate the cause of the seasons by using models and analyzing data.

Essential Questions

- Why do objects appear to move in the sky?
- How do observations of the sky vary by latitude?
- What does the Earth experience seasons?
- How do the relative positions of the Earth, Moon, and Sun cause various phenomena?

New Jersey Student Learning Standards (No CCS)

9-12.HS-ESS1-1.3.1	students understand the significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. They recognize patterns observable at one scale may not be observable or exist at other scales, and some systems can only be studied indirectly as they are too small, too large, too fast, or too slow to observe directly. Students use orders of magnitude to understand how a model at one scale relates to a model at another scale. They use algebraic thinking to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth).
9-12.HS-ESS1-4.5.1	Use mathematical or computational representations of phenomena to describe explanations.
9-12.HS-ESS1-2.6.1	Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.
9-12.HS-ESS2-4.ESS1.B.1	Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These

phenomena cause a cycle of ice ages and other gradual climate changes.

Amistad Integration

Holocaust/Genocide Education

Interdisciplinary Connections

MA.N-Q.A	Reason quantitatively and use units to solve problems.
LA.RST.11-12.2	Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.
LA.SL.9-10.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

Technology Standards

List specific standards that are relevant
No general statements

TECH.8.1.12.A.CS1	Understand and use technology systems.
TECH.8.1.12.A.CS2	Select and use applications effectively and productively.
TECH.8.1.12.E.CS2	Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
TECH.8.1.12.E.CS3	Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.

21st Century Themes/Careers

CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP11	Use technology to enhance productivity.

Financial Literacy Integration

Instructional Strategies & Learning Activities

1. Sunrise, Sunset: Simulation and Questions
2. The Motion of the Sun: Simulation and Questions
3. Special Dates and Latitudes: Guided Notes
4. The Reason for the Seasons (Part 1): Graphing and Questions
5. The Reason for the Seasons (Part 2): Simulation and Questions
6. Why We Have Seasons: Kinesthetic Activity
7. The Rotating Sky: Simulation and Questions
8. Making and Using a Star Wheel: Activity and Assessment
9. Phases of the Moon: Kinesthetic Activity and Questions
10. Evaluating Illustrations in Children's Books: Activity and Questions
11. On The Night You Were Born: Sky Chart Activity and Questions
12. Study Guide
13. Jeopardy Review
14. Unit Test

Differentiated Instruction

Examples may include:

- Inquiry/Problem-Based Learning
- Variety of learning preferences (visual, auditory, kinesthetic)
- Meaningful Student Voice & Choice
- Self-Directed Learning
- Debate
- LMS use
- The Hot Seat/Role-Play
- Mastery Learning (feedback toward goal)
- Simulation-Based Learning
- Grouping
- Socratic Seminar
- Rubrics
- Concept Attainment
- Assessment Design & Backwards Planning

Formative Assessments

- Various Do-Now Activities
- Observation
- Question and answer
- Informal check-ins

Summative Assessment

Unit test

Benchmark Assessments

Alternate Assessments

Resources & Technology

- Astronomy Picture of the Day
- Heavens-Above Interactive Sky Chart
- University of Nebraska Lincoln Astronomy Simulations
- Star Wheel Activity materials

BOE Approved Texts

none

Closure

Such as:

- Gallery Walk - On chart paper, small groups of students write and draw what they learned. After the completed works are attached to the classroom walls, others students affix post-its to the posters to extend on the ideas, add questions.
- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Question Stems - Have students write questions about the lesson on cards, using [question stems framed around Bloom's Taxonomy](#). Have students exchange cards and answer the question they have acquired.
- Kids answer the following prompts: "What takeaways from the lesson will be important to know three years from now? Why?"
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to

answer. Repeat.

- Have kids orally describe a concept, procedure, or skill in terms so simple that a younger student would understand it.
- Kids write notes to peers describing what they learned from them during class discussions.

ELL

Such as:

- Alternate Responses
- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- E-Dictionaries
- Google Translate

Special Education

List is not inclusive but may include examples such as:

- Shorten assignments to focus on mastery of key concepts.
- Specify and list exactly what the student will need to learn to pass.
- Evaluate the classroom structure against the student's needs (flexible structure, firm limits, etc.).
- Keep the classroom quiet during intense learning times.
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Provide an unobstructed view of the chalkboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Provide a vocabulary list with definitions.
- Permit extra time as indicated in IEP.
- Allow tests to be taken in a room with few distractions (e.g., the library).
- Have test materials read to the student, and allow oral responses.
- Divide tests into small sections of similar questions or problems.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).
- Stand near the student when giving directions or presenting a lesson.

504

Examples of accommodations in 504 plans include but are not limited to:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

At Risk

Examples may include:

- Use of mnemonics
- Have student restate information
- Concrete examples
- Weekly home-school communication tools (notebook, daily log, phone calls or email messages)
- No penalty for spelling errors or sloppy handwriting
- Teach time management skills
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Immediate feedback
- Work-in-progress check
- Pace long-term projects
- Preview test procedures
- Cue/model expected behavior

Gifted and Talented

Focus on effort and practice

Offer the Most Difficult First

Offer choice

Speak to Student Interests

Allow G/T students to work together

Encourage risk taking