Unit 2 Origins of Astronomy

Content Area: **Science**
Course(s): **Astronomy 1**
Time Period: **October**
Length: **6 weeks**
Status: **Published**

Transfer Skills

Transfer:

Students will be able to relate the history of and explain the justification for future space exploration and continuing technology development. In addition, they will recognize the role of creativity in constructing scientific questions, methods and explanations.

Enduring Understandings

Identify the celestial sphere

Discuss the contributions and approximate dates of Aristarchus, Eratosthenes, Aristotle, Ptolemy, the methods they used, and approximately when they lived

Identify the contributions of Kepler, Copernicus, Galileo, Newton and about when they lived

State Kepler's laws and their use

Understand the Kelvin Temperature scale

Define angular diameter

Define Ecliptic, Zodiac

Identify and Understand the cause of seasons

Identify and Understand the cause and appearance of eclipses

Identify and Understand the phases of Moon

Essential Questions

What is the geocentric model of the solar system / universe?

Why would people watching the sun, moon and stars believe the geocentric model?

What evidence called the geocentric model into question?

Why do earth's seasons change?

Why do the phases of the moon change?

Do the constellations in the sky change in a predictable pattern?

How do the motions of celestial objects effect what we observe from earth?

What Contributions can be credited to prehistoric and classical

astronomers?

What Contributions can be credited to Renaissance and modern astronomers?

Content

Voc. Terms:

astrology, constellations, geocentric, heliocentric, Coriolis effect, frame of reference, latitude, longitude, meridian, zenith, nadir, ecliptic, horizon, astronomical unit, equinox, solstice, sidereal period,

Skills

Describe how some ancient civilizations Attempted to explain the heavens in terms of Earth-centered models of the universe.

Explain how the observed motions of the planets led to our modearn view of a Sun centered solar system.

Describe the major contributions of Galileo and Kepler to our understanding of the solar system.

State Kepler's laws of planetary motion.

Explain how astronomers have measured The true size of the solar system.

State New ton's laws of motion and universal gravitation and explain how they Account for Kepler's laws.

Explain how the law of gravitation enables us to measure the masses of astronomical Bodies.

Discuss the importance of comparative Planetology to solar system studies.

Describe the overall scale and structure of The solar system.

Summarize the basic differences between The terrestrial and the Jovian planets.

Identify and describe the major Non-planetary components of the solar System.

Describe some of the spacecraft missions that have contributed significantly to our

Knowledge of the solar system.

Resources

Standards

NGSS: Science Performance Expectations(2014)
NGSS: MS Earth & Space Science
MS.Space Systems

Performance Expectations

- MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.
- MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

MS.Earth's Systems
Performance Expectations

- MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

NGSS: Science and Engineering Practices
NGSS: 9-12
Practice 1. Asking questions (for science) and defining problems (for engineering)
Asking questions and defining problems in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations.
Ask questions to determine relationships, including quantitative relationships, between independent and dependent variables.

Practice 2. Developing and using models
Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds.
Evaluate merits and limitations of two different models of the same proposed tool, process, mechanism or system in order to select or revise a model that best fits the evidence or design criteria.

Practice 4. Analyzing and interpreting data
Analyzing data in 9–12 builds on K–8 experiences and progresses to introducing more detailed statistical analysis, the comparison of data sets for consistency, and the use of models to generate and analyze data.
Consider limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.

Practice 6. Constructing explanations (for science) and designing solutions (for engineering)
Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories.
Apply scientific ideas, principles, and/or evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects.

Practice 7. Engaging in argument from evidence
Engaging in argument from evidence in 9–12 builds on K–8 experiences and progresses to using appropriate and sufficient evidence and scientific reasoning to defend and critique claims and explanations about the natural and designed world(s). Arguments may also come from current scientific or historical episodes in science.
Evaluate the claims, evidence, and/or reasoning behind currently accepted explanations or solutions to determine the merits of arguments.

NGSS: Crosscutting Concepts
NGSS: 9-12

Crosscutting Statements

1. Patterns – Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
Patterns of performance of designed systems can be analyzed and interpreted to reengineer and improve the system.

3. Scale, Proportion, and Quantity – In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.
Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale.

NGSS: Disciplinary Core Ideas
NGSS: 9-12
ESS1: Earth's Place in the Universe
ESS1.A: The Universe and Its Stars
The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years. (HS-ESS1-1)

ESS1.B: Earth and theSolar System
Kepler's laws describe common features of the motions of orbiting objects, including their elliptical paths around the sun. Orbits may change due to the gravitational effects from, or collisions with, other objects in the solar system. (HS-ESS1-4)

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-ESS2-1	Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.
SCI.HS-ESS1	Earth's Place in the Universe
SCI.HS-ESS2	Earth's Systems
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.