

CRM 4 Sun, Earth and Moon System

Pacing

- 25 days
- Nov. 13-Dec. 20
- Weeks 12-17

DESIRED RESULTS

Making Meaning

Concepts in the study of the Sun, Earth, and Moon System help explain many patterns of change we observe in the world around us. Students examine changes in the sky and build an understanding of the Earth and our place in the solar system. These concepts in this unit build a foundation for the study of Astronomy, Climate Change, and Environmental Sciences. The following make meaning valuable for learners and are investigated in this unit:

- The Sun, Earth, and Moon interact in a system and are intricately interconnected. The motion of the Sun, Earth, and moon and tilt of the Earth cause observable patterns: the apparent movement of the Sun in the sky, day/night, daily and seasonal changes in the length of shadows, seasons, phases of the moon, and the movement of stars in the night sky.
- Earth is part of a broader system: the solar system, which is a small part of the Milky Way Galaxy which is one of many galaxies in the universe.
- Gravity holds the planets in orbit around the Sun, and the gravity of various planets holds their moons in orbit around them.
- The Sun is the major source of energy for Earth, and fuels the water cycle and weather.

Transfer: Students will observe, graph, and analyze patterns of change in both weather and objects in the sky to build an understanding of interactions among the Sun, Earth, and Moon. Students will analyze the position of the planets to understand as the Earth and other planets formed, the heavier elements fell to their centers. On planets close to the Sun, the lighter elements were mostly blown or boiled away by radiation from the newly formed the Sun. On the outer planets, the lighter elements still surround them as a thick layer of gas or frozen solid layers. So, how the planets are positioned in the solar system gives you an idea of how they were formed and their composition.

Enduring Understandings:

- Earth’s Sun drives many of our cycles on Earth.
- We can observe, describe and record objects and patterns in our sky and on Earth.
- Eight planets of very different size, composition, and surface features orbit the Sun.

Essential Questions:

- How do the patterns and cycles of the Earth, Moon, and Sun system affect us?
- How are the planets positioned in our solar system?

Essential Vocabulary

- air mass / masa de aire
- air pressure/presión atmosférica
- anemometer / anemómetro
- atmosphere / atmósfera
- axis/eje
- barometer/barómetro
- condensation /condensación
- evaporation/evaporación
- forecast / pronóstico
- front / frente metereológico
- ground water/agua subterránea
- high tide/marea alta
- high-pressure area / área de alta presión
- humidity / humedad
- hydrometer / hidrómetro
- low tide/marea baja

- low-pressure area / área de baja presión
- meteorologist / meteorólogo
- percolation/percolación
- phase/fase
- position/posición
- precipitation/ precipitación
- rain gauge/pluviómetro
- revolution/vuelta
- rotation/rotación
- solar system/sistema solar
- tide/ marea
- transpiration/ transpiración
- weather map/ Mapa del tiempo
- weather symbols/ símbolos de tiempo
- wind vane / manga de viento

Supporting Vocabulary Link

- [Elementary School Supporting Vocabulary](#)

Student Prerequisite Knowledge

Students should know:

- weather is always changing and occurs locally over a short time.
- thermometers measure temperature (heat energy).
- the Sun is a medium sized star that provides heat and light energy for the water cycle.
- the water cycle consists of the movement of water above and on the surface of the Earth, causing patterns and cycles in Earth’s weather.
- water evaporates from the Earth’s surface, rises and cools, condenses into precipitation, and falls again to the surface.
- water that falls to the ground collects in streams, rivers, and lakes, and eventually flows back into the oceans.
- models help us understand the relationships, positions and orbits of the Sun, Moon, and Earth system.
- the Sun is the center of our Solar System and its gravity keeps all the planets and other objects in orbit around it.
- the moon orbits the Earth in a 28 day cycle which causes different parts of the moon to be illuminated and seen from the Earth. (moon phases)
- the Earth orbits the Sun in a 365 day cycle. (one year)
- the Sun, moon, and Earth all rotate. The Earth’s rotation causes day and night cycles on Earth.
- the Earth tilts on its axis at a 23.5 degree angle. This tilt coupled with the revolution gives us the seasons.
- the Earth is one of 8 planets that revolve around the Sun in nearly circular orbits.
- Each planet has unique characteristics and a unique position in the solar system.

Resources: AISD Module Kit, Model Lesson Portfolio, [STEMscopes](#), eBooks: Envisions Science Levelled Readers, Scott Foresman Text, [Science Notebook Resources](#), [Weather Whiz Kids](#) , [Tree House Weather Kids - University of Illinois Extension](#)

ELPS: Mandated by Texas Administrative Code (19 TAC §74.4), click on the link for [English Language Proficiency Standards \(ELPS\)](#) to support English Language Learners.

TEKS Knowledge & Skills	Acquisition	
STAAR: RC = Reporting Category; DC = Dual Coded Skills; Readiness Standard ; Supporting Standard Concepts are addressed in another unit.	Students Will Know	Students Will Be Able To
4.8: Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to		
4.8A: measure and record changes in weather and make predictions using weather maps, weather symbols, and a map key.	<ul style="list-style-type: none"> • Weather is always changing and occurs locally over a short time. • Thermometers measure temperature (heat energy). • Rain gauges measure precipitation levels. • Wind vanes measure wind direction. • Many weather changes are caused by changes in air pressure systems. 	<ul style="list-style-type: none"> • Observe, measure and record daily changes in weather over time (temperature, precipitation, wind direction and wind conditions). • Graph and compare recorded weather data in different locations. • Use weather maps, symbols, and map keys to predict.

<p>4.8B: describe and illustrate the continuous movement of water above and on the surface of Earth through the water cycle and explain the role of the Sun as a major source of energy in this process.</p>	<ul style="list-style-type: none"> • The Sun, the major source of energy for Earth, is a medium sized star that provides heat and light energy for the water cycle. • The water cycle consists of the movement of water above and on the surface of the Earth, causing patterns and cycles in Earth’s weather. • Water evaporates from the Earth’s surface, rises and cools, condenses into precipitation, and falls again to the surface. Water that falls to the ground collects in streams, rivers, and lakes, and eventually flows back into the oceans. 	<ul style="list-style-type: none"> • Create a diagram of the Sun and its effect on Earth. • Describe and illustrate the continuous movement of water above and on the surface of Earth. • Investigate the water cycle processes through hands-on explorations.
<p>4.8C: collect and analyze data to identify sequences and predict patterns of change in shadows, tides, seasons, and the observable appearance of the Moon over time.</p>	<ul style="list-style-type: none"> • Models help us understand the relationships of the Sun, Moon, and Earth system. • Earth rotates on its axis, causing the Sun to appear to move across the sky and creating changes in shadows throughout the day. • Tides are the alternating rise and fall in sea level with respect to the land, produced by the gravitational attraction of the moon. • Tides occur twice a day or about every 12 hours. • The Earth orbits the Sun in a 365 day cycle (one year). • The Earth tilts on its axis at a 23.5 degree angle. This tilt coupled with the revolution causes direct and indirect lighting in the hemispheres giving Earth different seasons. • The moon orbits the Earth in a 28 day cycle which causes different parts of the moon to be illuminated and seen from the Earth (moon phases). 	<ul style="list-style-type: none"> • Collect and analyze data collected from observations and research, then predict the movement of the Sun in the sky and shadow formation. • Collect, analyze and predict tidal occurrence using data from tidal activity. • Collect, analyze and predict patterns of change as the Earth goes through the cycle of seasons. • Collect, analyze and predict the observable appearance of the moon using models, data, and observations.

3.8: Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:		
3.8D: identify the planets in Earth's solar system and their position in relation to the Sun.	<ul style="list-style-type: none"> • People cannot determine how the Solar System is put together just by observing the night sky. • The Earth is one of 8 planets that revolve around the Sun in nearly circular orbits. • Each planet has unique characteristics and a unique position in the Solar System. 	<ul style="list-style-type: none"> • Illustrate and describe the position of each of the 8 planets in our solar system. • Describe the unique characteristics of each of the planets.
<p>The study of science is taught through the lens of Scientific Processes (TEKS 4.1-4.4); therefore, these TEKS should be taught in conjunction with content throughout the year. Suggestions for TEKS to embed in each unit are provided in the Yearly Itinerary; however, the TEKS that can be addressed within a unit depends greatly on the learning activities in which students are engaged. Therefore, teachers must be deliberate in their choice of learning activities to ensure that all Scientific Processes TEKS are appropriately embedded within the course. In 4th grade, districts are encouraged to facilitate laboratory and field investigations for at least 60% of instructional time.</p>		

ASSESSMENT EVIDENCE	
Student Work Products/Assessment Evidence	
Performance Tasks	Other Evidence (i.e. unit tests, open ended exams, quiz, essay, student work samples, observations, etc.)
<ul style="list-style-type: none"> • Students record daily weather for several weeks in their science notebook to build concept and language attainment. • Identify weather patterns including the water cycle process from diagrams and lists using the sentence stem today's weather is ___ the temperature ___ . • Measure weather patterns including temperature, rainfall, wind speed, cloud formations, make a graph, and draw conclusions about patterns from the data. • Read, analyze, and then create a weather map. • Use of a weather map and data to make an oral weather report to predict the weather for the next few days. • Water Cycle Labs • Draw and label the water cycle showing how water travels through the cycle. • Collect and analyze researched data to draw conclusions about the patterns and occurrence of shadows, tides, seasons, and moon phases. • Illustrate and describe Earth's solar system. 	<p>Short Cycle Assessment</p> <ul style="list-style-type: none"> • <i>SCA Testing Window: December 4-12, 2012</i> Tested TEKS: 4.8A, 4.8B • <i>SCA Testing Window: December 13-20, 2012</i> Tested TEKS: 4.8C, 3.8D <p>Additional Suggestions for Assessment</p> <ul style="list-style-type: none"> • Student Interactive Notebook • Student discussions • Weather Calendars and Data collection • Graphs and comparisons of weather from different places • Weather Map use and predictions using the data on the maps • descriptions of the water cycle and identification of real world applications of the water cycle • analyze pictorial representations and data to predict and recognize patterns of change in shadows, tides, seasons, and moon phases. • solar system diagrams • Teacher observations: Use of safety rules and equipment • Teacher observations: management and use of tools • Tools foldable/web in Interactive Notebook • Students' use of evidence to support explanations and claims.

LESSON PLANNING TOOLS

In the course of lesson planning, it is the expectation that teachers will include whole child considerations when planning such as differentiation, special education, English language learning, dual language, gifted and talented, social emotional learning, physical activity, and wellness.

Model Lesson- [Water Cycle](#)

- Water Cycle
- Suggested Pacing: (4 days)
TEKS: 4.8B, 4.8A

Model Lesson- [Observing, Measuring, and Recording Weather](#)

- Measuring Weather with Tools
 - Weather Symbols and Maps
- Suggested Pacing: (7 days)
TEKS: 4.8A

Model Lesson- [Patterns of Change](#)

- Sun's Angle & Temperature
 - Sun Shadow Tracers
 - Reason for the Seasons
 - Moon Phases
 - Tides
- Suggested Pacing: (10 days)
TEKS: 4.8C

Model Lesson- [Our Solar System](#)

- Review Lessons (Optional)
- Our Solar System
- Suggested Pacing: (4 days)
TEKS: 3.8D