Orange Public Schools

Office of Curriculum & Instruction

2019-2020 Science Curriculum Guide

Grade 5

Module 1: Earth and Sun

September 9, 2019 – December 20, 2019

Board Approved: 1.14.2020

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GRADE 5 Yearlong Scope and Sequence by Instructional Weeks

Week 1 9/9	Week 2 9/16	Week 3 9/23	Week 4 9/30	Week 5 10/7	Week 6 10/14	Week 7 10/21	Week 8 10/28	Week 9 11/4*	Week 10 11/11	Week 11 11/18	Week 12 11/25*

UNIT 1 – Earth Science: Earth and Sun (Sept 9th – Dec 20th)

Investigation 1: The Sun (2 Weeks)
Students observe the phenomenon of outdoor shadows.

Investigation 2: Planetary Systems (4 Weeks)
Students investigate the phenomena of objects giving off light and others reflecting light in the sky

Investigation 3: Earth's Atmosphere (2 Weeks)
Students investigate the phenomenon that air surrounds us- Earth's atmosphere.

Investigation 4: Heating Earth (4 Weeks)
Students investigate the phenomenon of energy transfer on Earth.

Week 13 12/2	Week 14 12/9	Week 15 12/16	Week 16 12/23*	Week 17 12/30*	Week 18 1/6	Week 19 1/13	Week 20 1/20	Week 21 1/27	Week 22 2/3	Week 23 2/10	Week 24 2/17*

UNIT 1 – Earth Science (Sept 9th – Dec 20th)

Investigation 5: Water Planet (3 Weeks)
Students turn to the phenomenon of water on Earth. They consider why Earth is called the water planet.

December Break

UNIT 2 – Physical Science: Mixtures and Solutions (Jan 6th – Mar 27th)

Investigation 1: Separating Mixtures (2 Weeks)
Students engage with three distinct phenomena: simple mixtures, suspensions, and solutions.

Investigation 2: Developing Models (2 Weeks)
Students experience a variety of ways to represent models that have

Investigation 3: Concentration (2 Weeks)
Students investigate the ratio of solute to solvent (concentration) in solutions.

Februar y Break

Week 25 2/24	Week 26 3/2	Week 27 3/9	Week 28 3/16	Week 29 3/23	Week 30 3/30	Week 31 4/6	Week 32 4/13*	Week 33 4/20	Week 34 4/27	Week 35 5/4	Week 36 5/11

UNIT 2 – Physical Science: Mixtures and Solutions (Jan 6th – Mar 27th)

Investigation 4: Reaching Saturation (3 Weeks)
Students investigate the solubility of solutes in water to discover that there is a different maximum amount of every solute that will dissolve in a measure of water—the phenomenon of saturation.

Investigation 5: Fizz Quiz (2 Weeks)
Students make more complex mixtures of water with multiple solutes and explore the phenomenon of chemical reactions.

Unit 3 – Life Science: Living Systems (Mar 30th – Jun 19th)

Investigation 1: Systems (3 Weeks)
Students are introduced to a system as a collection of interacting parts that work together to make a whole or produce an action. They explore Earth as a system, focusing on the biosphere and describing ecosystems by looking at the phenomena of feeding relationships and energy transfers, described as food webs.

Investigation 2: Nutrient Systems (3 Weeks)
Students investigate the phenomena of nutrient systems of yeast, plants, and animals.

Week 37 5/18	Week 38 5/25	Week 38 6/1	Week 40 6/8	Week 41 6/15	Week 42 6/22

Unit 3 – Life Science: Living Systems (Mar 30th – Jun 19th)

Investigation 3: Transport Systems (3 Weeks)
Students learn that all cells have basic needs: water, food, gas exchange, and waste disposal.

Investigation 4: Sensory Systems (2 Weeks)
Students explore ways that animals communicate through sound, visual displays, and smell.

*** All days off are taken into planning**

Grade 5 Earth Science Course Overview:

In this unit of study, students explore the effects of gravity and determine the effect that relative distance has on the apparent brightness of stars. They also collect and analyze data in order to describe patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

To begin the progression of learning in this unit, students explore the effects of gravity by holding up and releasing a variety of objects from a variety of heights and locations. Students should record and use their observations to describe the interaction that occurs between each object and the Earth. In addition, students should use their observations as evidence to support an argument that the gravitational force exerted by the Earth on objects is directed "down" (towards the center of the Earth), no matter the height or location from which an object is released.

Next, students investigate the effect of distance on the apparent brightness of stars. Using information from a variety of print or digital sources, students learn that natural objects vary in size, from very small to immensely large. Stars, which vary in size, also range greatly in their distance from the Earth. The sun, which is also a star, is much, much closer to the Earth than any other star in the universe. Once students understand these concepts, they should explore the effect of distance on the apparent brightness of the sun in relation to other stars. This can be accomplished by modeling the effect using a light source, such as a bright flashlight. As students vary the distance of the light from their eyes, they should notice that the farther away the light is, the less bright it appears. Observations should again be recorded and used as evidence to support the argument that the differences in the apparent brightness of the sun compared to that of other stars is due to their relative distances from the Earth.

To continue the progression of learning, students investigate the following observable patterns of change that occur due to the position and motion of the Earth, sun, moon, and stars.

Day and night: This pattern of change is a daily, cyclical pattern that occurs due to the rotation of the Earth every 24 hours. Students can observe model simulations using online or digital resources, or they can create models in class of the day/night pattern caused by the daily rotation of the Earth.

The length and direction of shadows: These two interrelated patterns of change are daily, cyclical patterns that can be observed and described through direct observation. Students need the opportunity to observe a stationary object at chosen intervals throughout the day and across a few days. They should measure and record the length of the shadow and record the direction of the shadow (using drawings and cardinal directions), then use the data to describe the patterns observed.

The position of the sun in the daytime sky: This daily, cyclical pattern of change can also be directly observed. Students will need the opportunity to make and record observations of the position of the sun in the sky at chosen intervals throughout the day and across a few days. Data should then be analyzed in order to describe the pattern observed.

The appearance of the moon in the night sky: This cyclical pattern of change repeats approximately every 28 days. Students can use media and online resources to find data that can be displayed graphically (pictures in a calendar, for example), which will allow them to describe the pattern of change that occurs in the appearance of the moon every four weeks.

The position of the moon in the night sky: This daily, cyclical pattern of change can be directly observed, but students would have to make observations of the position of the moon in the sky at chosen intervals throughout the night, which is not recommended. Instead, students can use media and online resources to learn that the moon, like the sun, appears to rise in the eastern sky and set in the western sky every night.

The position of the stars in the night sky: Because the position of the stars changes across the seasons, students will need to use media and online resources to learn about this pattern of change.

Whether students gather information and data from direct observations or from media and online sources, they should organize all data in graphical displays so that the data can be used to describe the patterns of change.

Interactions between the Earth and Sun

Unit Summary:

What patterns do we notice when observing the sky? In this unit of study, students develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. The crosscutting concepts of patterns, cause and effect, and scale, proportion, and quantity are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in analyzing and interpreting data and engaging in argument from evidence. Students are also expected to use these practices to demonstrate an understanding of the core ideas.

This unit is based on 5-PS1-1, 5-PS2-1, 5-ESS1-1, 5-ESS1-2, 5-ESS2-1, 5-ESS2-2, 5-ESS3-1, 3–5-ETS1-2, 3–5-ETS1-3

Conceptual Flow and Related Phenomena

Investigation 1 - Outdoor Shadows (5-ESS1-2.)

Students observe the phenomenon of outdoor shadows. They trace their shadows in the morning and afternoon. They use this information to monitor the position of the Sun as it moves across the sky. After using a compass to orient a Sun tracker, students make hourly records of the position of the shadow cast by a golf tee. Back in the classroom, students use flashlights to reproduce the shadow movements to model how the Sun's position in the sky changes during the day. Students imagine an observer on Earth (their head) and position themselves around a lamp to observe day and night. They discover that rotation of Earth produces day and night. Students put the observed daily movement of the Sun phenomenon together with the phenomenon of day and night and use another model to resolve explanations for both phenomena.

Investigation 2- Objects in the sky giving off or reflecting light (5-ESS1-1.)

Students investigate the phenomena of objects giving off light and others reflecting light in the sky. They take a field trip to the schoolyard to look for the Moon. The class starts a Moon calendar, on which they record the Moon's appearance every day for a month and analyze their observations to discover the sequence of changes. Students grapple with the size and distance relationships among the Moon, Earth, and the Sun, and build a model of the Earth/Moon/Sun system.

Based on previous knowledge, information on solar system cards, and information provided by the teacher, students organize a model of the solar system. Gravity is introduced as the force that pulls on planets, changing their direction of travel to produce circular orbits. Students are introduced to constellations as patterns of stars. They simulate Earth's rotation to observe the appearance of stars rising in the east and setting in the west. Students observe a demonstration of why different stars are visible in different seasons.

Investigation 3- The air surrounding us (5-ESS2-1.)

Students investigate the phenomenon that air surrounds us—Earth's atmosphere. They explore air by working with syringes and tubes to discover that air takes up space and is compressible. They are introduced to the atmosphere as a mixture of gases with properties that change with altitude above Earth's surface. They review local weather reports and determine the variables that combine to produce the weather. They use a weather station to monitor the weather and look for patterns.

Investigation 4- Energy Transfer on Earth (5-ESS3-1.)

Students investigate the phenomenon of energy transfer on Earth. They investigate uneven heating by recording and graphing temperature changes when two earth materials absorb solar energy. They observe examples of energy transfer by radiation and conduction and discuss mechanisms of energy transfer to and from the air. Students observe convection currents in water as a model of what happens in air. They test different designs for solar water heaters. Students consider how the atmosphere, hydrosphere, and geosphere interact.

Investigation 5 - Water on Earth (5-ESS2-2. , 5-ESS2-1.)

Students turn to the phenomenon of water on Earth. They consider why Earth is called the water planet. They investigate systems to observe condensation on cold surfaces and determine the components of the water cycle. Students explore the conditions that promote evaporation. They simulate the travels of a drop of water through the water cycle to explore the complexities of the process. Students are introduced to world climate regions and global climate change. This brings students back to the driving question for the module—how do Earth's hydrosphere, geosphere, atmosphere, and biosphere interact to create a sustainable environment for all life?

Additional Phenomena Worth Exploring

Fire Rainbows (Investigation 2, 3, 4, 5)

Bioluminescence (Investigation 4)

Lenticular Clouds (Investigation 3 & 5)

Aurora Borealis (Investigation 3 & 4)

Sun Dogs (Investigation 2)

Sky Punches (Investigation 3 & 5)

Morning Glory Clouds (Investigation 3 & 5)

Water Spouts (Investigation 5)

Mammatus CLouds (Investigation 3 & 5)

Hessdalen Light (Investigation 2, 3, 4)

Supercells (Investigation 3 & 5)

Essential Questions:

Investigation 1: How and why does your shadow change during the day? What is the relationship between the position of the Sun and the length and direction of shadows? What causes day and night?

Investigation 2: How can you explain why we see some natural objects only in the night sky, some only in the day sky, and some at both times? How would you describe the size of and distance between Earth, the Moon, and the Sun? How does the shape of the Moon change over 4 weeks? How do the parts of the solar system interact? Why do stars appear to move across the night sky?

Investigation 3: What is Earth's atmosphere and what does it have to do with weather? What is air? What is Earth's atmosphere? How do meteorologists measure and record weather variables?

Investigation 4: How does Earth's atmosphere heat up? What is the effect of sunlight on earth materials? How does energy transfer to the air? What happens when a volume of fluid is warmed at the bottom? What is the best design for a solar water heater?

Investigation 5: How is water distributed over Earth's surface and atmosphere, how does it move, and what is the effect on Earth? What causes condensation to form? How does water vapor get into

Enduring Understandings:

The ideas "the sun is a star" and "the earth orbits the sun" appear counter-intuitive to elementary-school students. The ideas "the sun is a star" and "the earth orbits the sun" is challenging for students. Explanations of the day-night cycle and the seasons are very challenging for students. To understand these phenomena, students should first master the idea of a spherical earth, itself a challenging task. Similarly, students must understand the concept of "light reflection" and how the moon gets its light from the sun before they can understand the phases of the moon. Finally, students may not be able to understand explanations of any of these phenomena before they reasonably understand the relative size, motion, and distance of the sun, moon, and the earth

the air? What is the water cycle? What is the difference between weather and climate?	

Possible Student Misconceptions:

- The sun passes directly overhead at noon
- The shape of the Earth's revolution around the sun, including its effect on the Earth's seasons.
- The Water Cycle: Water only evaporates from the ocean, water goes into the clouds (remind students it enters the air as GAS)
- Misuse the vocabulary, revolution and rotation
- The moon stays the same distance from us, the moon/sun "rise and set", the moon is only visible at night
- The stars/ the Sun do not move

NGSS Performance Expectations: ***Students who demonstrate understanding can…***

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

5-ESS2-2. Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

5-ESS1-1. Support an argument that the apparent brightness of the sun and stars is due to their relative distances from the Earth.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. The performance expectation above was developed using the following;

To find the observable features students should be able to perform by the end of the grade, view the evidence statements for each standard here: https://drive.google.com/file/d/1I-z-qLnEAc2QOlicJjl-apgSqTvrZ7vB/view?usp=sharing

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. **Using Mathematics and Computational Thinking** Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions. • Describe and graph quantities such as area and volume to address scientific questions. **Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. **Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions	**ESS3.C: Human Impacts on Earth Systems** • Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. **ESS2.A: Earth Materials and Systems** • Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. **ESS1.B: Earth and the Solar System** • The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. **ESS1.A: The Universe and its Stars**	**Systems and System Models** • A system can be described in terms of its components and their interactions. **Scale, Proportion, and Quantity** • Natural objects exist from the very small to the immensely large. **Patterns** • Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. ***Connections to Nature of Science*** **Science Addresses Questions About the Natural and Material World.** • **Science findings are limited to questions that can be answered with empirical evidence.**

proposed by peers by citing relevant evidence about the natural and designed world(s). • Support an argument with evidence, data, or a model. **Asking Questions and Defining Problems** Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.	• The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. •	

Primary CCSS ELA/Literacy Connections:	**Primary CCSS Mathematics Connections:**
English Language Arts Students should use information from print and digital sources to build their understanding of: • *The Earth's gravitational force on objects.* • *The differences in the apparent brightness of the sun compared to that of other stars due to their relative distances from Earth.* • *Patterns of change that occur due to the position and motion of the Earth, sun, moon, and stars. As students read and gather information from multiple sources, they should integrate and use the information to answer questions and support their thinking during discussions and in their writing.* Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS3-1)	*Mathematics Students reason abstractly and quantitatively when analyzing and using data as evidence to describe phenomena, including:* • *The Earth's gravitational force pulls objects "down" (toward the center of the Earth).* • *The differences in the apparent brightness of the stars are due to their relative distances from Earth.* • *Patterns of change, such as the day/night cycle, the change in length and direction of shadows during the day, the apparent motion of the sun across the daytime sky and the moon across the nighttime sky, the changes in the appearance of the moon over a period of four weeks, and the seasonal changes in the position of the stars in the night sky. Students will model with mathematics as they graphically represent*

RI.5.1 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS2-1),(5-ESS3-1) **RI.5.7** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-ESS3-1) **W.5.8** Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS3-1) **RI.5.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-ESS3-1) **W.5.9** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS2-2),(5-ESS2-1)	*data collected from direct observations and from multiple resources throughout the unit, and as they describe relative distances of the sun and other stars from the Earth. Students might also express relative distances between the Earth and stars using numbers that can be expressed using powers of 10.* **SL.5.5** Reason abstractly and quantitatively. (5-ESS2-1),(5-ESS3-1) **MP.2** Model with mathematics. (5-ESS2-1),(5-ESS3-1) **MP.4** Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS2-1) (5.G.A.2)

Unit Performance Task:

One summative assessment you can use is a RAFT assignment. It allows you to differentiate to meet the needs of all learners in the classroom and give them the best opportunity to show what they know. Students choose a Format that is designed to highlight their strengths. Once they have a format, they will take on the Role of that character to create a presentation geared towards the specific Audience about the assigned Topic.

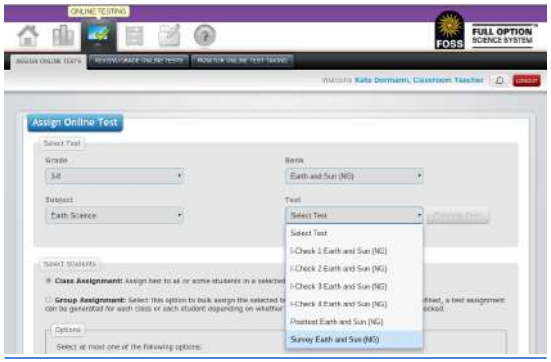
See an example below.

This assignment can be assigned to be completed at home. Students should be given adequate time to get materials and complete the task.

RAFT Assignment
Unit/Theme: Astronomy

Role	Audience	Format	Topic
Astronomy Teacher	College Class	3-D Model (To Scale)	What are the parts of our solar system and how do they interact? (Sun, Planets, stars, etc)
Alien Explorer	Alien Science Convention	Scientific Poster with pictures and field notes	What I learned while travelling through the Milky Way galaxy. (Include pictures from your journey and captions of facts for each of the pictures. You should have pictures of the different parts of the galaxy - stars, planets, moons, etc)
Planet Earth	The Sun	Monologue, Poem, or Song	What is it like to be able to move around me? What are revolutions like? What are rotations like? How do you change while you move? How long do the different movements take? How do you change while you move? How do our movements affect other components in the galaxy? How do our movements differ?
The Sun	Engineers	Engineering Design Process - with Prototype	How to make the best solar oven?
NASA Astronaut	Kindergarten class	Puppet show	All about the Moon, Sun, Planets, and Stars. (Include a puppet for each, a backdrop, and a puppet script of what they are going to say. The puppets should tell facts about themselves.)
Movie Producer	Families around the world	iMovie Adobe Spark Movie	Constellations – folk tales behind them, what they look like, fun facts. (Make an iMovie with pictures of the constellations, folklore, and facts to go with each. Must include at least 5 constellations.)
Alex Tribek	CBS Viewers	Jeopardy Board	Hydrology, The Water Cycle and how it works

Lesson Scope and Sequence

Unit Pacing and Duration 1 Session = 45 Minutes **Readings should be completed at home to maximize class time*	**Focus Standards with CCSS Connections**	**Main Activities to be undertaken and Primary Materials/Resources to be used during lesson**	**Assessment**
<u># of Session: 3</u> **Assessment**: 1 Session **Investigation:** 2 Session **Reading(s)*:** n/a	<u>NGSS:</u> 5-ESS1-2 <u>CCSS for ELA:</u> <u>CCSS for Math:</u>	<u>Primary Resources:</u> Letter to Family PreAssessment / Survey **<u>I</u>nvestigation 1 Part 1: Shadow Shifting** (TE Page 104-115) Students compare data regarding the movement of shadows to determine the sun's position over the course of a day. FQ: How and why does your shadow change during the day? <u>Supplements</u>	Benchmark Assessment Survey (in FOSS Map) (FOSS Web Assessment Masters, Pg 1-8)  Students trace their shadows in the morning and afternoon, and compare the tracings. They use this information to determine the position of the Sun as it appears to move throughout the day. Shadow Challenges requires a sunny day (outdoor activity) Embedded Assessment (Reference TE pg 434): Science notebook entry
<u># of Session: 3-4</u> **Assessment**: - **Investigation:** 2-3 Sessions **Reading(s)*:** 1 Session	<u>NGSS:</u> 5-ESS1-2 <u>CCSS for ELA:</u> <u>CCSS for Math:</u>	<u>Primary Resources:</u> **Investigation 1 Part 2: Sun Tracking** (TE pg 116-128)**)** Students collect data regarding the position of the tip of the shadow cast by a golf tree using sun trackers. FQ: What can be learned by studying the length and direction of shadows? Science Resources Book: "Changing Shadows" (The readings should be completed at home to ensure class time is being used efficiently) Online Activities: "Tutorial: Sun Tracking" "Shadow Tracker"	Embedded Assessment (Reference TE pg 434) Response sheet **SEE Assessment Questions 14-20** (FOSS Web Assessment Masters, Pg 9-14)

		Supplements:	
# of Session: 4 **Assessment**: - **Investigation:** 2 Sessions **Reading(s)*:** 2 Sessions	NGSS: 5- ESS1-1, 5- ESS1-2 CCSS for ELA: CCSS for Math:	Primary Resources: **Investigation 2 Part 1: Night-Sky Observations** (TE pg 129-150) Investigate and record data on the Moon's appearance for a month FQ: What natural objects can you see in the night sky? Science Resources Book: "The Night Sky", "Looking Through Telescopes"	Embedded Assessment (Reference TE pg 434) Science notebook entry
# of Session: 3 **Assessment**: - **Investigation:** 1 Session **Reading(s)*:** 2 Sessions	NGSS: 5-ESS1-2 CCSS for ELA: CCSS for Math: Scale and Proportion	Primary Resources: **Investigation 2 Part 2: How Big and How Far?** (TE pg 172-185) Students build a model of the Earth/Moon/Sun system to better understand the size and distance relationships among Earth, the Moon, and the Sun. FQ: How would you describe the size of and distance between Earth, the Moon, and the Sun? Supplements: https://www.skypeascientist.com/ Science Resources Book: "Comparing the Size of Earth and the Moon" "Apollo 11 Space Mission" "How Did Earth's Moon Form?" Online Activity: "Lunar Calendar"	Embedded Assessment (Reference TE pg 434) Performance assessment
# of Session: 4 **Assessment**: - **Investigation:** 2 Sessions **Reading(s)*:** 2 Sessions	NGSS: 5-ESS1-2 CCSS for ELA: CCSS for Math:	Primary Resources: **Investigation 2 Part 3: Phases of the Moon** (TE pg 195-205) Students examine the sequence of changes in their Moon observations in order to identify the pattern of the four phases of the moon. FQ: How does the shape of the Moon change over 4 weeks?	Embedded Assessment (Reference TE pg 434): Performance assessment **Investigation 2 I-Check** (FOSS Web Assessment Masters, Pg 15-20)

		Science Resources Book: "Changing Moon" (optional) "Lunar Cycle" (optional) "Eclipses" (optional) Video: All about the Moon Online Activity: "Lunar Calendar" Supplements: Instead of tracking the moon for a month, students can be assigned a date and use this website to create a class calendar https://www.moonpage.com/ Thess websites already has a monthly calendar of the phases of the moon https://stardate.org/nightsky/moon https://www.almanac.com/astronomy/moon/calendar Sunrise, Sunset, Moon Rise, Moon Set, Eclipses, Weather, "The Sky Tonight", Meteor Showers https://www.timeanddate.com/astronomy/ Google Sky Map Supplements:	
# of Session: 2 **Assessment**: - **Investigation:** 1 Session **Reading(s)*:** 1 Session	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resources: **Investigation 3 Part 1: Air Around Us (TE pg 254-264)** Students take a close look at the air surrounding us. They explore the properties of air by working with syringes and tubes to discover that air takes up space and is compressible. Students discuss evidence that air is matter and has mass. FQ: What is air? Ball on a Scale Fizz Keeper Experiment Soda Can Experiment Supplements:	Embedded Assessment (Reference TE pg 434):

# of Session: 2 **Assessment**: - **Investigation:** 1 Session **Reading(s)*:** 1 Session	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resource **Investion 3 Part 2: The Atmosphere (TE pg 265-273)** Students study Earth's atmosphere, using diagrams, photos from space, and a reading. They are introduced to the atmosphere as a mixture of gases with properties that change with distance above Earth's surface. FQ: What is Earth's Atmosphere? Earth's Atmosphere video Supplement	Embedded Assessment (Reference TE pg 434):
# of Session: 4 **Assessment**: 2 Sessions **Investigation:** 1 Session **Reading(s)*:** 1 Session	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resource **Investigation 3 Part 3: Local Weather (TE pg 274-292)** Students review local weather reports and determine the variables that combine to produce the weather. They are introduced to weather instruments—a thermometer, barometer, hygrometer, compass, and wind vane. They use a digital weather station with a receiver outdoors to gather weather data, and develop a plan for acquiring daily data and sharing them with the class. Fq: How do meteorologists measure and record weather variables? All about Meteorology (optional), Chapters 2-4, 6-9, 14 National Weather Service: Lightning Safety The Weather Channel Weather Grapher The Weather Underground Supplement	Embedded Assessment (Reference TE pg 434): **Embedded Assessment Notes** **Assessment Record -- Investigation 3 I-Check** (FOSS Web Assessment Masters, Pg 21-24
# of Session: 4 **Assessment**: - **Investigation:** 3 Sessions **Reading(s)*:** 1 Session	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resource **Investigation 4 Part 1: Heating Earth Materials** "Students set up an investigation to monitor temperature changes when solar energy is transferred to two earth materials: water and dry soil. Students record the temperature of the two materials in sunshine and in shade. They graph the data to discover that the temperature of the dry soil goes higher than water and cools to a lower temperature than that of water. The concept of uneven heating is introduced. Supplement	Embedded Assessment (Reference TE pg 434):

		Video: "Star Stuff: The Story of Carl Sagan" (video) https://vimeo.com/136262971	
# of Session: 3 **Assessment**: - **Investigation:** 2 Sessions **Reading(s)*:** 1 Session	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resource **Investigation 4 Part 2: Conduction** Students observe two examples of heat transfer by conduction: from hot water to a container of cold water, and from one end of a metal strip to the other. Students discuss the mechanisms by which energy transfers to and from the air: radiation and reradiation from Earth's surface, and conduction between Earth's surface and air particles. Supplement	Embedded Assessment (Reference TE pg 434)
# of Session: 2 **Assessment**: - **Investigation:** 1 Session **Reading(s)*:** 1 Session	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resource **Investigation 4 Part 3: Convection** Students use a fluid, water, at different temperatures to discover the relationship between temperature and density. They put a layer of cold blue water on the bottom of a vial of room-temperature water. They put a bag of hot water against the vial and watch the blue water rise as it warms, cools, and descends, creating a convection current. Students discuss how the same process results in wind on Earth. Supplement	Embedded Assessment (Reference TE pg 434):
# of Session: 5-6 **Assessment**:	NGSS: 5-ESS1-1	Primary Resource Investigation 4 Part 4: Color and Energy Transfer	Embedded Assessment (Reference TE pg 434):

2 Sessions **Investigation:** 2-3 Sessions **Reading(s)*:** 1 Session	CCSS for ELA: CCSS for Math:	"Students set up solar water heaters using black and white collectors to see if color affects temperature change in water. They also set up open and covered solar water heaters to find out if exposure to air affects temperature change in water. FQ: What is the best design for a solar water heater? Lab Notebook Sheet 25-30	**Investigation 4 I-Check** (FOSS Web Assessment Masters, Pg 25-30)
# of Session: 3 **Assessment**: - **Investigation:** 2 Sessions **Reading(s)*:** 1 Session	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resource **Investigation 5 Part 1** Students set up cups of ice water and roomtemperature water and observe condensation on the ice-water cup. They investigate other systems to observe condensation on cold surfaces. They learn that water vapor in the air condenses into liquid dew (or frost) on cold surfaces. FQ: What causes condensation to form Science Resources Book "Condensation"	Performance assessment
# of Session: 2 **Assessment**: - **Investigation:** 2 Sessions **Reading(s)*:** -	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resource **Investigation 5 Part 2 : Evaporation** Students observe a demonstration in which two cups with equal amounts of water are placed on a balance. Both cups are open to the air, but one cup is under a lamp. Water temperatures are monitored over time. One day later, students find that more water evaporated from the cup that was heated by the lamp. GQ: How does water vapor get into the air?	Response Sheet
# of Session: 4	NGSS: 5-ESS1-1	Primary Resource	Science Notebook Entry

Assessment: - **Investigation:** 2 Sessions **Reading(s)*:** 2 Sessions	CCSS for ELA: CCSS for Math:	**Investigation 5 Part 3: Water Cycle** Students consider why Earth is called the water planet. They toss an inflatable globe, keeping track of how often their fingers end up on water. They take part in a demonstration that shows the relative amounts of fresh water and salt water, and their distribution on Earth. They simulate the travels of a water drop through the water cycle. **FQ: What is the water cycle?** **Science Resources Book** "Where Is Earth's Water?" "The Water Cycle" "Severe Weather" **Videos** *Water Cycle* **Online Activities** "Water-Cycle Game"	
# of Session: 5-6 **Assessment**: 2 Sessions **Investigation:** 2-3 Sessions **Reading(s)*:** 1 Session	NGSS: 5-ESS1-1 CCSS for ELA: CCSS for Math:	Primary Resource **Investigation 5 Part 4 : Climate** Students are introduced to climate and suggest schemes for describing world climate regions, based on their understanding of weather variables. They view a video to gather information on climate and compare their climate-region scheme to those of climatologists. Students develop an awareness about global climate change. FQ: What is the difference between weather and climate **Climate and Seasons, Chapters 1-3; 6; 4, 7-8** **Climate Regions Map** **Science Resources Book** Weather" "Earth's Climates" "Global Climate Change"	Science Notebook Entry Post Test (FOSS Web Assessment Masters, Pg 1-8, REPEAT*)

		Videos *Climate and Seasons* **Online Activities** "Climate Regions Map"	

Modifications	
Special Education/ 504:	**English Language Learners:**
• Adhere to all modifications and health concerns stated in each IEP. • Give students a MENU of options, allowing them to choose assignments from different levels based on difficulty. • Accommodate Instructional Strategies: use of post-its, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time • Allow extra time to complete assignments or tests • Allow students to demonstrate understanding of a problem by drawing a functional model of the answer and then explaining the reasoning orally and/or writing. • Provide breaks between tasks, use positive reinforcement, use proximity • Work in a small group • Use large print books, Braille, or digital texts Strategies for students with 504 plans	• Simplify written and verbal instructions • Use manipulatives to promote conceptual understanding and enhance vocabulary usage • Allow for alternate forms of responses- drawing or speaking instead of writing to demonstrate knowledge when you are not specifically assessing writing • Allow the use of an online dictionary to look up the definition and hear the pronunciation of unknown words • Provide graphic representations, gestures, drawings, equations, and pictures during all segments of instruction • Utilize program translations tools such as Snap and Read (if available) • Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information • Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve real life problems. • Reword questions in simpler language • Provide class notes ahead of time to allow students to preview material and increase comprehension • Provide extended time

Gifted and Talented:	Students at Risk for Failure:

• Organize and offer flexible small group learning opportunities / activities.
• Utilize elevated contextual complexity
• Inquiry based or open ended assignments, performance tasks and projects
• Allow more time to study concepts with greater depth
• Provide options, alternatives and choices to differentiate and broaden the curriculum.
• Promote the synthesis of concepts and making real world connections
• Provide students with enrichment practice that are imbedded in the curriculum
  ○ allowing students to design problems to be addressed by the class
  ○ allowing students to modify the lesson by introducing a related phenomena
  ○ allow for interest-based extension activities
• Utilize an enhanced set of introductory activities (e.g. phenomena, organizers, concept maps etc)
• Provide whole group enrichment explorations.
• Teach cognitive and methodological skills
• Allow for the use of stations
• Organize integrated problem-solving simulations.
	• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum
	• Modify Instructional Strategies; extended time, reading aloud text, graphic organizers, flexible grouping, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Utilize Scaffolded Questioning, Field Trips, Google Expeditions, Peer Support, Modified Assignments, Chunking of Information, Peer Buddies
	• Assure constant parental/ guardian contact throughout the year with successes/ challenges
	• Provide academic contracts to students and guardians
	• Create an interactive notebook with samples, key vocabulary words, student goals/ objectives.
	• Always plan to address students at risk in the designing of learning tasks, instructions, and directions.
	• Try to anticipate where the needs will be and then address them prior to lessons.
	• Teacher should allow for preferential seating
	• Include Visual Cues/Modeling
	• Allow for technology Integration, especially Assistive Technology

21st Century Life and Career Skills:

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. These skills enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century workplace. As such, they should be taught and reinforced in all career exploration and preparation programs, with increasingly higher levels of complexity and expectation as a student advances through a program of study.

https://www.state.nj.us/education/cccs/2014/career/9.pdf

- **CRP1**. Act as a responsible and contributing citizen and employee.
- **CRP2**. Apply appropriate academic and technical skills.
- **CRP3**. Attend to personal health and financial well-being.
- **CRP4**. Communicate clearly and effectively and with reason.
- **CRP5**. Consider the environmental, social and economic impacts of decisions.
- **CRP6**. Demonstrate creativity and innovation.
- **CRP7**. Employ valid and reliable research strategies.
- **CRP8**. Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9**. Model integrity, ethical leadership and effective management.
- **CRP10**. Plan education and career paths aligned to personal goals.
- **CRP11**. Use technology to enhance productivity.
- **CRP12**. Work productively in teams while using cultural global competence.

Students are provided with an equitable opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are also encouraged to reason through experiences and exposure to phenomena that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, and educational websites.

Technology Standards:

All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.
https://www.state.nj.us/education/cccs/2014/tech/

8.1 Educational Technology:

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

A. **Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.
B. **Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
C. **Communication and Collaboration:** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
D. **Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
E. **Research and Information Fluency:** Students apply digital tools to gather, evaluate, and use of information.
F. **Critical thinking, problem solving, and decision making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

A. **The Nature of Technology: Creativity and Innovation-** Technology systems impact every aspect of the world in which we live.
B. **Technology and Society:** Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society.
C. **Design:** The design process is a systematic approach to solving problems.
D. **Abilities in a Technological World:** The designed world in a product of a design process that provides the means to convert resources into products and systems.
E. **Computational Thinking: Programming-** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.