Washington Township School District

The mission of the Washington Township Public Schools *is to provide a safe educational environment for all students to attain the skills and knowledge specified in the New Jersey Student Learning Standards at all grade levels so as to ensure their full participation in our global society as responsible, self-directed, and civic-minded citizens.*

Course Title:	**Science**
Grade Level(s):	**1st**

Duration:	*Full Year:*	**X**	*Semester:*		*Marking Period:*	
Course Description:	The Washington Township School District first grade curriculum uses an integrated approach to general science that focuses on units in physical, life, and earth science. By using this approach, teachers are able to meet the needs of all students while aligning with the New Jersey Model Curriculum, the Next Generation Science Standards, and the New Jersey Student Learning Standards. Hands-on activities are stressed and include student discovery experiments, problem solving, model building, cooperative learning, technology integration, classroom discussion, teacher demonstrations, and writing opportunities for research and self-expression. Interdisciplinary subject areas are incorporated whenever possible. Students are introduced to the use of scientific tools and methods used for investigations. The course is designed to be implemented using the 5E Model of Instruction: Engage, Explore, Explain, Extend/Elaborate, and Evaluate. The major topics of study for first grade are taken specifically from the Next Generation Science Standards: ● Waves: Light and Sound ● Structure, Function, and Information Processes ● Space Systems: Patterns and Cycles					
Grading Procedures:	Unit tests will be administered at the end of each marking period. Refer to individual unit tests for percentages that equate for Secure, Developing and Beginning grades. Benchmarks will be administered twice a school year and equate to a grade of Secure, Developing or Beginning Skills.					
Primary Resources:	National Geographic Learning: Exploring Science First Grade Program					

Washington Township Principles for Effective Teaching and Learning

- Implementing a standards-based curriculum
- Facilitating a learner-centered environment
- Using academic target language and providing comprehensible instruction
- Adapting and using age-appropriate authentic materials
- Providing performance-based assessment experiences
- Infusing 21st century skills for College and Career Readiness in a global society

Designed by:	Jeanne York
Under the Direction of:	Linda Thomas, Elementary Supervisor and Gretchen Gerber, Director

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Revised: _____

BOE Approval: _____

Unit Title: **Waves: Light and Sound (Physical Science)**

Unit Description: Students will investigate light and sound. First students will explore the relationship between vibrations and sound. Then light will be defined as the source of making objects visible (example: the sun). Different materials will be identified by the degree to which they allow light to pass. The concept of a shadow and reflective light will be studied. Next, light and sound will be explored as a means to help people communicate. The unit will culminate first with students designing a communication device using light or sound. Then students will makes connections to the real world through the career of a science photographer.

Unit Duration: Marking Period 1

Desired Results

Standard(s):

1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]

1-PS4-2. Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

1-PS4-3. Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [**Assessment Boundary: Assessment does not include technological details for how communication devices work.]**

Indicators:

PS4.A: Wave Properties

- Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

PS4.B: Electrocmagnetic Radiation

- Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)
- Some materials allow light to pass through them, others only allow some light through and others block light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3)

PS4.C: Information Technologies and Instrumentation

- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

Understandings: *Students will understand that…* • vibrating matter can make sound. • sound can make matter vibrate. • light makes it possible to see objects. • the sun is an object that gives off its own light. • objects that give off light can be used to help us see. • objects can be seen only where there is light. • clear is defined as the ability of a material to allow light to pass through it. Some materials can be classified as clear. • some materials allow only some light to pass through them. Some materials block all light. • a shadow is a dark shape made when something blocks the light. • some materials redirect a beam of light. (reflect) • people communicate in many ways. • certain devices enable people to communicate over long distances.	**Essential Questions:** • How is vibrating related to sound? • What makes it possible to see? • What are the different degrees to which light can pass through materials? • What devices can help people communicate over long distances? • What does a science photographer do?

Assessment Evidence

Performance Tasks:

Investigate Lessons – Students will practice performance tasks in cooperative groups engaging in scientific steps of an investigation.

- Lesson 2((TG pages 6-7) Investigate Sound – Demonstrate that vibrating matter can make sound.
- Lesson 5 (TG pages 12-13) Investigate Vibration – Demonstrate that sound can make matter vibrate.
- Lesson 9 (TG pages 20-21b) Investigate Light and Dark – Observe evidence that objects can be seen only where there is light.
- Lesson 16 (TG pages 34-35) Investigate Communicating with Sound – Observe and record evidence that information can be communicated using devices.

Think Like A Scientist: Plan and Investigate Lessons – Students will engage in performance tasks in cooperative groups to plan and conduct an investigation, provide evidence and use that evidence to explain results. This task will be recorded in their science notebook and evaluated by a Teacher Rubric and Student Rubric.

- Lesson 3 (TG pages 8-9b) – Show how vibrating materials make sound.
- Lesson 6 (TG pages 14-15b) – Show how sound makes materials vibrate.
- Lesson 14 (TG pages 30-31b)– Show what happens to light when it shines on different objects.

Think Like An Engineer Lesson: - Students will engage in performance tasks in cooperative groups to design, build and test a prototype device and analyze and improve results. This task will be recorded in their science notebook and evaluated by a Teacher Rubric and Student Rubric.

- Lesson 17 (TG pages 36-37b)– Design and build a device to communicate through sound or light.

Other Evidence:

Students will demonstrate their understandings through:

- Science Notebook Entries
- Science in a Snap (Additional Investigations) in Lessons 1, 12, 13, 15)
- Goals and Scales Analysis
- Unit Test

Benchmarks:

Benchmarks will be administered twice during the school year (at the end of Marking Period 2 and 4). The benchmark at the end of Marking Period 2 will include concepts from Physical and Earth Science. The benchmark at the end of Marking Period 4 will include concepts from Life Science. Results will be graded on the scale of Secure, Developing and Beginning Skills.

Physical Science Unit Test Percentages (Based on 20 questions):

Secure = 80% - 100%

Developing = 60% - 79%

Beginning = Below 60%

Learning Plan

Resources: National Geographic Learning: Exploring Science Teacher's Guide, Student Book, Interactive eBook and Website, Student Science Notebook. Schoolwide Mentor Text The Listening Walk can be used to start the unit before sound lessons and Light is All Around Us can be used to start the unit before light lessons.

Learning Activities:

Lesson and Duration	Activties	Supplemental Materials
Lesson 1 (TG pages 4-5) Vibrate and Make Sound NGSS PS4.A Sound can make matter vibrate and vibrating matter can make sound. (1-PS4-1) Objective: Explain that vibrating matter can make sound. 1 Day	**Engage:** Students share knowledge about sound. **Explore:** Preview then read pages 4-5. **Explain:** Vibration – What happens when something vibrates? Name something that vibrates. Sound - What do you use to hear sound? How do things make sound? Investigate "Science in a Snap." **Elaborate**: Define the terms pitch and volume. Listen to a variety of sounds to describe in terms of pitch and volume. Conduct listening session in classroom. **Evaluate:** Record the meaning of vibrate, things that vibrate and describe in terms of pitch and volume in science notebook.	Online Source for listening to different sounds: http://www.findsounds.com/types.html https://www.youtube.com/watch?v=17V-bP1XEao Schoolwide Mentor Texts Loud, Soft, High, and Low Sound and Sounds All Around
Lesson 2 (TG pages 6-7) Investigate Sound NGSS 1-PS4.A Sound can make matter vibrate and vibrating matter can make sound. (1-PS4-1) Objective: Demonstrate that vibrating matter can make sound. 1 Day	**Engage:** Students recall how a guitar string makes a sound. **Explore**: Students add Predictions and Observations tables into their Science Notebook. Preview then read and conduct investigation on pages 6-7. **Explain:** Students share Observations and Conclusions. **Elaborate:** Investigate further with additional rubber bands. **Evaluate:** "Wrap It Up" - Describe and Explain investigation in science notebook.	• Cardboard box • 2 rubber bands of different sizes and thickness • Hand lens • Safety goggles
Lesson 3 (TG pages 8-9b) Think Like a Scientist (Vibration) NGSS (Performance Standard) 1-PS4-1 **Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.** **Objective: Work with a partner to plan and conduct an investigation to provide evidence that vibrating materials make sound. Use evidence from their investigation to explain results to others.** 1 Day	**Engage**: Review concepts from pages 4-7 and discuss how drums make a sound from page 9. Review the investigation structure on page 6-7. Read task on page 8-9. Students develop a plan to complete the investigation. **Explore**: Students add Predictions and Observations tables into their Science Notebook. Students conduct their planned investigation and record findings in their Science Notebook. **Explain**: Students analyze results, revisit question on page 8 and share their results. **Elaborate:** Compare and contrast findings between the two objects investigated. **Evaluate**: Ask Compare and Evaluate Questions. Teacher and students complete rubrics.	• Materials that demonstrate vibration and making a sound (tuning forks, 2-L Bottles, plastic cups, etc – see TG page 8) Schoolwide Mentor Text Sounds All Around (See Sound Activities page 30)

Lesson 4 (TG pages 10-11) Sound Makes Things Vibrate NGSS 1-PS4.A Sound can make matter vibrate and vibrating matter can make sound. (1-PS4-1) Objective: Explain that sound can make matter vibrate. 1 Day	**Engage:** Recall what was learned from the previous investigation. **Explore:** Preview and read page 10. **Explain:** Ask questions about the cause of sound and can we make things vibrate. Recall "Science in a Snap" from page 5 and relate to the drums and walls on page 10. **Elaborate:** View internet videos of water and sound experiements and discuss. **Evaluate:** "Wrap It Up" - Describe and Identify understandings in science notebook.	Internet Videos for Water and Sound Experiments https://www.youtube.com/watch?v=x7rm4yElfpE https://nj.pbslearningmedia.org/resource/phy03.sci.phys.mfe.ztunefork/sound-and-solids-visualizing-vibrations/#.WU1aj2grLcc Schoolwide Mentor Texts Loud, Soft, High, and Low Sound and Sounds All Around
Lesson 5 (TG pages 12-13) Investigate Vibration NGSS 1-PS4.A Sound can make matter vibrate and vibrating matter can make sound. (1-PS4-1) Objective: Demonstrate that sound can make matter vibrate. 1 Day	**Engage:** Recall what was learned from past lessons about feeling vibrations in floors and walls. **Explore:** Students add Predictions and Observations tables into their Science Notebook. Preview then read and conduct investigation on pages 12-13. **Explain:** Students share Observations and Conclusions. **Elaborate:** Investigate further and conclude how voices affect other substances. **Evaluate:** "Wrap It Up" - Describe and Predict understandings from science notebook.	• Inflated balloons • Paper towel tubes Schoolwide Mentor Texts Loud, Soft, High, and Low Sound and Sounds All Around
Lesson 6 (TG pages 14-15b) Think Like a Scientist (Sound Can Make Materials Vibrate) NGSS (Performance Standard) 1-PS4-1 **Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.** Objective: **Work with a partner to plan and conduct an investigation to provide evidence that vibrating materials makes sound can make materials vibrate. Use evidence from their investigation to explain results to others.** **1 Day**	**Engage:** Recall from previous lessons how sound can make matter vibrate. Examine the picture on page 14-15. Review the investigation structure on page 12-13. Read task on page 14-15. Students develop a plan to complete the investigation. **Explore:** Students add Predictions and Observations tables into their Science Notebook. Students conduct their planned investigation and record findings in their Science Notebook. **Explain:** Students analyze results, revisit question on page 14 and share their results. **Elaborate:** Students research to find out about how animals that use vibrations communicate and compare findings with this investigation. **Evaluate**: Ask Identify and Evaluate Questions. Teacher and students complete rubrics.	• Materials that can make sound in order to make another object vibrate (radio, thick sheet of plastic, tin cans, etc – see TG page 14) • Hand lens • Safety Goggles
Lesson 7 **(TG pages 16-17)** **Light** **NGSS PS4.B: Objects can be seen only when light is available to illuminate them. Some objects give off their on light. (1-PS4-2)** **Objective: Identify that light makes it possible to see objects. Classify the**	**Engage:** Discuss why someone turns on a light when they first enter a room. **Explore:** Preview and read pages 16-17. **Explain:** Reread the first paragraph on page 16, analyze the pictures and identify that light makes it possible to see. Reread the second paragraph on	Schoolwide Extra Texts All About Light, Sources of Light(pages10-13)

sun as an object that gives off its own light. **1 Day**	page 16 and classify the sun as an object that gives off light. **Elaborate:** Students conduct their own investigations to study the effect of light on their ability to see objects. **Evaluate:** "Wrap it Up" – Explain and predict understandings in science notebook.	
Lesson 8 (TG pages 18-19) Light to See NGSS PS4.B: Objects can be seen only when light is available to illuminate them. Some objects gives off their own light. (1-PS4-2) Objective: Recognize that objects that give off light can be used to help us see. 1 Day	**Engage:** Recall previous lesson ideas about what makes it possible to see and what objects can be seen in the classroom. **Explore:** Preview and read pages 18-19. **Explain:** Compare photos on page 18-19 to the ones on page 16-17. Study what objects can be seen on pages 18-19 and what would be seen if the diver swam deeper. **Elaborate:** Brainstorm other sources of light. **Evaluate:** "Wrap it Up" – Explain and predict understandings in science notebook.	
Lesson 9 (TG pages 20-21b) Investigate – Light and Dark NGSS 1-PS4-2: Make observations to construct an evidence-based account that objects can be seen only when illuminated. Objective: Observe evidence that objects can be seen only where there is light. Use their observations to construct an evidence-based account that objects can be seen only when illuminated. 1 Day	**Engage:** Discuss how students could darken a room. **Explore:** Students add "Object in the Box" table to their Science Notebook. Preview and read pages 20-21. Complete investigation steps. **Explain:** Share observations and explain results. **Elaborate:** Students suggest and try other ways to see objects more clearly. **Evaluate:** "Wrap it Up" – Recall, Contrast and Generalize understandings in science notebook.	• Collect in Advance: Shoeboxes with lids (see TG page 20 for directions) *flashlights
Lesson 10 (TG pages 22-23) Shining Through NGSS PS4.B: Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. (1-PS4-3) Objective: Define clear as the ability of a material to allow light to pass through it. 1 Day	**Engage:** Recall discussion about the photo on page 18-19 and the source of light. **Explore:** Preview and read pages 22-23. **Explain:** Reread page 22, define the term clear and classify some materials as clear. **Elaborate:** Students imagine designing a new, strong plastic for safety googles. Discuss the importance of it being clear and how it can be tested. **Evaluate:** "Wrap it Up" – Recall and Identify understandings in science notebook.	
Lesson 11 (TG pages 24-25) Blocking Some Light NGSS PS4.B Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond	**Engage:** Recall what it means for an object to be clear. **Explore:** Preview and read pages 24-25. **Explain:** Reread the paragraph on page 24 and determine the main topic.	

them, where the light cannot reach. (1-PS4-3) Objective: Describe materials that allow only some light to pass through them. 1 Day	Discuss light passing through flower petals and a foggy window. **Elaborate:** Students consider other examples of materials that block some light. Research how sunglasses work. **Evaluate:** "Wrap it Up" Recall and Identify understandings in science notebook.	
Lesson 12 (TG pages 26-27) Blocking All Light NGSS PS4.B Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. (1-PS4-3) Objective: Describe materials that block all light. Define a shadow. 1 Day	**Engage:** Describe a shadow and what causes shadows. **Explore:** Preview and read the title and first sentence of page 26 to determine the main topic. Students read pages 26-27 to find out about materials that block all light. **Explain:** Observe the image of the dragonfly and describe how its body blocks light. Define a shadow and what causes it. Investigate shadows in "Science in a Snap." **Elaborate:** Students draw a picture in their Science Notebook and use three different types of tape to cover it and then label how the tape blocks the light. Provide vocabulary to challenge advanced students: transparent, translucent, opague. **Evaluate:** "Wrap it Up" – Define, Explain and Infer understandings in science notebook.	• flashlight • three types of tape: clear, matte and masking Schoolwide supplemental text Shadow, All About Light (pages 26-29)
Lesson 13 (TG pages 28-29) Reflecting Light NGSS PS4.B Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. (1-PS4-3) Objective: Describe how some materials redirect a beam of light. 1 Day	**Engage:** Describe three things that can happen when light shines on an object. **Explore:** Preview the images on pages 28-29 and determine what the lesson is about. Read pages 28-29. **Explain:** Reread the first two sentences on page 28 and define reflect. Read the rest of page 28 and discuss light on smooth and shiny surfaces. Investigate how light reflects off a mirror in "Science in a Snap." **Elaborate:** Students write how they can use a mirror to see around a corner. **Evaluate:** "Wrap it Up" – Explain and Relate understandings in science notebook.	• Flashlights • mirror

Unit Learning Goal and Scale **(Level 2.0 reflects a minimal level of proficiency)**	
Standard(s): **1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]**	
4.0	Students will be able to: **In addition to planning and conducting investigations at 3.0, students can** • **Define pitch and volume and describe sound in terms of different pitches and volumes** • **Explain how animals use vibrations to communicate through further research.**
3.0	Students will be able to: • **Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]**
2.0	Students will be able to: • **Define vibration.** • **Name items that vibrate.** • **Understand that sound can cause vibrations.**
1.0	With help, partial success at level 2.0 content and level 3.0 content:
0.0	Even with help, no success

Standard(s): **1-PS4-2. Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]**	
4.0	**Students will be able to:** **In addition to planning and conducting investigations at 3.0, students can** • **Make observations and construct an evidence-based account about visibility with different degrees of light.** • **Identify various sources of light beyond the sun and a flashlight.**
3.0	Students will be able to: • **Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]**
2.0	Students will be able to: • **Define light.** • **Identify the sun as a source of light.**
1.0	With help, partial success at level 2.0 content and level 3.0 content:
0.0	Even with help, no success

Standard(s): **1-PS4-3. Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]**	
4.0	Students will be able to: **In addition to planning and conducting investigations at 3.0, students can** • **Imagine designing a new, strong plastic to be used for safety googles. Explain the importance of the googles being clear and develop a plan to test its clarity.** • **Plan and conduct investigations to determine how sunglasses work.** • **Define the terms transparent, translucent and opague.**
3.0	Students will be able to: • **Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]**
2.0	Students will be able to: • **Define clear, shadow and reflect.** • **Identify example of items that are clear, items that can make a shadow and items that can reflect light.**
1.0	With help, partial success at level 2.0 content and level 3.0 content:
0.0	Even with help, no success

Standard(s): **1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* [Clarification Statement: Examples of devices could include a light source to** send signals, paper cup and string "telephones," and a pattern of drum beats.] [**Assessment Boundary: Assessment does not include technological details for how communication devices work.]**	
4.0	Students will be able to: **In addition to planning and conducting investigations at 3.0, students can** • **Extend the investigation by increasing the distance of communicating and redesigning and building the device if needed.**
3.0	Students will be able to: • **Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* [Clarification Statement: Examples of devices** could include a light source to send signals, paper cup and string "telephones," and a pattern of **drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]**
2.0	Students will be able to: • **Define communicate, devices, long distances.** • **Name ways people communicate over long distances.**
1.0	With help, partial success at level 2.0 content and level 3.0 content:
0.0	Even with help, no success

Unit Modifications for Special Population Students	
Advanced Learners	• **Allow students to complete Investigations, Think Like a Scientist, Think Like an Engineer independently.** • **Use** "Elaborate" sections of the lessons to extend student thinking. • **Introduce advanced vocabulary (transparent, translucent, opague)**
Struggling Learners	• **Refer to Learning Assessment Masters for pre-made charts to use in science notebook. (Investigations, Think Like a Scientist, Think Like an Engineer)** • **Pair with higher ability students when completing Investigations, Think Like a Scientist and Think Like an Engineer Lessons.** • **Assign different roles for group members in the investigations so all members contribute to the group.**
English Language Learners	• **Vocabulary: vibrate, sound, light, clear, shadow, reflect, communicate (provide visual, verbal and written examples together) (pair related words to these vocabulary words – example light – bright, dim, shine, glow, ray)** • **Help students understand the correct structure of questions and statements (jumble words and have students place in correct structure order depending on whether it is a question or statement).**
Special Needs Learners	• **Refer to Learning Assessment Masters for pre-made charts to use in science notebook. (Investigations, Think Like a Scientist, Think Like an Engineer)** • **Conduct Investigations, Think Like a Scientist, and Think Like an Engineer by dividing into parts or modeling side by side to monitor student understanding.** • Modify steps in the investigations or questions asked in the "Wrap it Up" **section.**

Interdisciplinary Connections

Indicators: Reading: RI.1.1 **Ask and answer questions about key details in a text.** RI.1.2 **Identify the main topic and retell key details of a text**. RI.1.3 **Describe the connection between two individuals, events, ideas, or pieces of information in a text**. RI.1.4 **Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.** RI. 1.5 **Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.**
Writing: W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. **W.1.5** With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed. **W.1.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
Mathematics: **1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.**

Integration of 21st Century Skills

Indicators:
8.2.2.A.4 Choose a product to make and plan the tools and materials needed.
8.2.2.B.1 Identify how technology impacts or improves life.
8.2.2.B.3 Identify products or systems that are designed to meet human needs.
8.2.2.B.4 Identify how the ways people live and work has changed because of technology.
8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product.
8.2.2.C.2 Create a drawing of a product or device that communicates its function to peers and discuss.
8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
8.2.2.D.1 Collaborate and apply a design process to solve a simple problem from everyday experiences.
8.2.2.D.3 Identify the strengths and weaknesses in a product or system.
9.2.4.A.1 Identify different types of work and how work can help people achieve personal and professional goals
9.2.4.A.3 Investigate both tradional and nontradional careersand relate information to personal likes and dislikes.

Unit Title: **Structure, Function, and Information Processing (Life Science) and K-2-ETS1 Engineering Design**

Unit Description: Students will investigate plants and animals. First, students will learn that plants and animals are living things that have parts to help them survive. Then students will explore the idea that plants respond to external inputs such as light, water, and gravity. A life cycle will be studied to demonstrate how life continues with future generations. Next, adults and young plants and animals will be studied for similiarities and differences. Students will identify how animals use their senses to interact with and survive in their habitat. Throughout the unit, students will engage in activities to think like a scientist and engineer. The concept of patterns in animals will be explored. The unit will conclude with a study of the science career of a conservationist.

Unit Duration: **Marking Period 3 (Animals) (Lessons 11-31)**
Marking Period 4 (Plants) (Lessons 1-10)

Desired Results

Standard(s):

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]

1.LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

Indicators:

LS1.A: Structure and Function

- **All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive, grow. (1-LS1-1)**

LS1.B: Growth and Development of Organisms

- **Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)**

LS1.D: Information Processing

- **Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)**

LS3.A: Inheritane of Traits

- **Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1)**

LS3.B: Variation of Traits

- **Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)**

Understandings:
Students will understand that…

- plants are living things that have different parts to survive and grow (roots, stems, leaves).
- flowers and fruits are parts of many plants that help plants survive and grow.
- plants respond to light.
- roots respond to gravity.
- adult plants make young plants like itself in some ways.
- plants grow in a life cycle.
- different animals use their body parts in different ways to help them survive and grow.
- animals use their body parts in different ways to: see, hear, grasp objects, protect themselves, move from place to place, seek and find food, take in water, food and air.
- animals capture and convey different kinds of information needed for survival and growth.
- human problems can be solved by mimicking animal survival skills.
- adult and young animals engage in behaviors to survive. Young animals make noises to let their parents know they need something. Adult animals keep their young warm, move them from place to place and protect them from danger.
- patterns in behavior help offspring survive.
- young animals are very much, but not exactly, like their parents.
- individuals of the same type of animal are similar but can also vary in many ways.
- conservationists help animals survive.

Essential Questions:

- What parts of plants/animals help them survive and grow?
- How do plants/animals respond to their environment?
- How are adult and young plants alike and different?
- What is the life cycle of a plant?
- How do adults and their offspring interact together to survive?
- What does a conservationist do?

Assessment Evidence

Performance Tasks:

Investigate Lessons – Students will practice performance tasks in cooperative groups engaging in scientific steps of an investigation.

- Lesson 4 (TG pages 48-49) – Observe and describe how a plant responds to light.
- Lesson 5 (TG pages 50-51) – Observe and describe how the roots of a plant respond to gravity.

Think Like A Scientist: Plan and Investigate Lessons – Students will engage in performance tasks in cooperative groups to plan and conduct an investigation, provide evidence and use that evidence to explain results. This task will be recorded in their science notebook and evaluated by a Teacher Rubric and Student Rubric.

- Lesson 10 (TG pages 60-63) – Show and use evidence that young plants are like, but not exactly like, their parents.
- Lesson 26 (TG pages 96-97)– Determine patterns in the behavior of parents and offspring that help offspring survive.
- Lesson 30 (TG pages 104-105b)– Show that young animals are like, but not exactly like, their parents.

Think Like An Engineer Lesson: - Students will engage in performance tasks in cooperative groups to design, build and test a prototype device and analyze and improve results. This task will be recorded in their science notebook and evaluated by a Teacher Rubric and Student Rubric.

- Lesson 19 (TG pages 80-83)– Describe how engineers design solutions to human problems by mimicking how animals use their external parts to help them survive, grow, and meet their needs.
- Lesson 20 (TG pages 84-85d)– Design a solution to a human problem by mimicking how animals use their external parts to help them survive.

Other Evidence:

Students will demonstrate their understandings through:

- Science Notebook Entries
- Goals and Scales Analysis
- Unit Tests

Benchmarks:

Benchmarks will be administered twice during the school year (at the end of Marking Period 2 and 4). The benchmark at the end of Marking Period 2 will include concepts from Physical and Earth Science. The benchmark at the end of Marking Period 4 will include concepts from Life Science. Results will be graded on the scale of Secure, Developing and Beginning Skills.

Plants - Unit Test Percentages (Based on 13 questions):

Secure = 77% - 100%

Developing = 54% - 76%

Beginning = Below 54%

Animals – Unit Test Percentages (Based on 23 questions):

Secure = 78% - 100%

Developing = 52% - 77%

Beginning = Below 52%

Learning Plan

Resources: National Geographic Learning: Exploring Science Teacher's Guide, Student Book, Interactive eBook, Website, and Student Science Notebook. Become an Expert "Water Lillies and Bullfrogs" is a supplemental student leveled book that can be used throughout the unit in either a whole group, small group or individual setting. Other texts to related to unit them: Literacy By Design mentor text City Green and Guided Reading Books Planting and Growing Level D, City Dog, Country Dog Level G, Flying Jewels Level H, Dictionary of Animals Level H, A Dictionary of Snake Facts Level I. Schoolwide Short Shared Text Collection articles can be used for lessons about adult animals caring for their young: "Bringing Up Baby" (page 38), "First Dinner Out" (page 39-40), "Panda Baby" (page 41), "Zebra Babies" (page 42)

Learning Activities:

Lesson and Duration	Activties	Supplemental Materials
Lesson 1 (TG pages 42-43) Plants NGSS LS1.A: Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1) Objective: Identify plants as living things. Know that plants have different parts that help them survive. 1 Day	**Engage:** Discuss what students know about different plants and what they have seen. **Explore:** Students look at page 42-43 and observe different plants. Ask probing questions about this exploration. Read pages 42-43. **Explain:** Discuss living and nonliving things. Discuss plants as living things. Define survive. **Elaborate:** Step 1 – Students create a picture of a plant and compare with a partner. Step 2 – Ask questions about their plant characteristics. **Evaluate:** "Wrap it Up" – Define and Recall understandings in Science Notebook.	
Lesson 2 (TG pages 44-45) Roots, Stems, and Leaves NGSS LS1.A: Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1) Objective: Identify the parts of plants. Explain how roots, stems, and leaves help plants survive and grow. 1 Day	**Engage:** Discuss how to drink with a straw and relate it in a plant part (stem). **Explore:** Take a picture walk through pages 44-45 noting the parts of the tree. Students read pages 44-45. **Explain:** Use the pictures on pages 44-45 to identify roots, stems, and leaves. Describe how plants get what they need. **Elaborate:** Students create a T chart listing plant parts and their function. Students draw a picture of a plant that include all of these parts. Students compare two plants with very different leaves (deciduous, evergreen) **Evaluate:** "Wrap it Up" – Recall and Explain understndings in Science Notebook.	
Lesson 3 (TG pages 46-47) Flowers and Fruits NGSS LS1.A: Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)	**Engage:** Recall the parts of plants from lesson 2. **Explore:** Take a picture walk of pages 46-47 noting the cherries, flowers and leaves. Read pages 46-47. **Explain:** Define fruit, flowers, and seeds. Reread the caption about flowers of the cherry tree and discuss why flowers are important.	**Websites: (about seeds traveling)** https://askabiologist.asu.edu/content/how-do-seeds-travel https://www.youtube.com/watch?v=6hcjxaBz8mw

Objective: Identify flowers and fruits as parts of many plants. Explain how flowers and fruits help these plants survive and grow. 1 Day	**Elaborate:** Discuss the flowers of the cherry tree and ask question about flowers turning into cherries and seed turning into trees. Students further investigate how a seed moves from place to place. **Evaluate: "**Wrap it Up" – Describe and explain understandings in Science Notebook.	
Note: Lessons 4 and 5 require students to make observations over a five day period. Continue with the other lessons. Allow for additional lesson periods for the 5th day of each investigation to complete the lesson.		
Lesson 4 (TG pages 48-49) Investigate: Plants and Light NGSS LS1.D: Plants also respond to some external inputs. (1-LS-1) Objective: Observe and describe how a plant responds to light. 5 Days- (To complete observations)	***Note advanced preparation on TG page 48** **Engage:** Revisit lessons 1-3 reviewing parts of a plant. **Explore:** Students add "Plants and Light" table to their Science Notebook. Preview and read pages 48-49. Complete investigation steps. ***Stop lesson here until the 5 day observations are completed.** **Explain:** Students compare results with the class. Groups review predictions and compare with their results. Share explanations as a class. **Elaborate:** Continue the investigation observing the plant longer, rotating it after 1 week, making further predictions and observations and discussing results. **Evaluate:** "Wrap it Up" – Compare and Draw Conclusions of understandings in Science Notebook.	*bean plant in a pot *soil *small pots *boxes
Lesson 5 (TG pages 50-51) Investigate: Root Growth NGSS LS1.D: Plants also respond to some external inputs. (1-LS-1) Objective: Observe and describe how the roots of a plant respond to gravity. 5 Days- (To complete observations)	**Engage:** Recall lesson 2 about roots. **Explore:** Students add "Root Growth" table to their Science Notebook. Preview and read pages 50-51. Complete investigation steps. ***Stop lesson here until the 5 day observations are completed.** **Explain:** Students compare results with the class. Groups review predictions and compare with their results. Share explanations as a class. **Elaborate:** Continue the investigation observing the roots longer, rotating cup A, making further predictions and observations and discussing results **Evaluate:** Wrap it Up" – Describe, Contrast, and Infer understandings in Science Notebook.	*masking tape *plastic cups *black markers *paper towels *bean seeds *plastic spoons *centimeter rulers *clay
Lesson 6 (TG pages 52-53) Life Cycle of a Tomato Plant NGSS LS1.B: Adult plants and animals can have young. (1-LS1-2) Objective: Identify that adult plants can make new young plants. Describe the stages of a tomato plant's life cycle. 1 Day	**Engage:** Review the images on page 46-47 and discuss what happens if a seed sprouts from the tree. **Explore:** Examine the images on pages 52-53 and explore a tomato's life cycle. Read pages 52-53. **Explain:** Define a life cycle. Describe the stages in a tomato plant's life cycle. Compare and contrast these stages.	Website about different tomato types (this site shows pictures of different tomatoes) https://www.youtube.com/watch?v=e3MDP59ZW0s *Literacy By Design extra text Mrs. Spitzer's Garden and Big Book / Multiple copies of How to Grow a Hyacinth / Sunflower

	Elaborate: Students research different types of tomato plants. **Evaluate:** Wrap it Up" – Contrast, and Infer understandings in Science Notebook.	
Lesson 7 (TG pages 54-55) Young Plants Look Like Their Parents NGSS LS3.A: Plants also are very much, but not exactly, like their parents. (1-LS3-1) Objective: Identify that plants are very much, but not exactly, like their parents. 1 Day	**Engage:** Recall the tomato life cycle from pages 54-55. **Explore:** Read the title on page 54 and determine what the lesson is about. Examine the images on pages 55. Read pages 54-55. **Explain:** Read page 54 again and describe how the young plants and their parents are alike and different. **Elaborate:** Students research more about slash pine trees. Extend thinking by discussing own experiences of planting seeds. **Evaluate:** Wrap it Up" – Compare and Contrast understandings in Science Notebook.	Website about slash pine trees https://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=1078 https://www.youtube.com/watch?v=1d7YFJLMTm4
Lesson 8 (TG pages 56-57) Plants Can Be Different NGSS LS3.B: Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1) Objective: Observe that plants of the same kind are similar, but can aslo vary in many ways. 1 Day	**Engage:** Discuss observations about students and their families. **Explore:** Look at the pictures on pages 56-57and ask probing questions about the different flowers. Set purpose to find out about how adult plants of the same type can be different. Read pages 56-57. **Explain:** Identify plant similarities and differences. **Elaborate:** Students research other plants of the same kind and compare. **Evaluate:** Wrap it Up" – Explain and Generalize understandings in Science Notebook.	Websites of different flower types: http://www.mums.org/chrysanthemum-classes/ https://www.thespruce.com/top-pansy-varieties-4126507
Lesson 9 (TG pages 58-59) How Are Plants Alike and Different NGSS LS3.A: Plants also are very much, but not exactly, like their parents. (1-LS3-1) LS3.B: Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1) Objective: Identify that plants are very much, but not exactly, like their parents. Observe that plants of the same kind are similar, but can aslo vary in many ways. 1 Day	**Engage:** Remind students about the slash pine trees on pages 54-55. How were the young and adult plants alike and different? Remind students about the adult zinnia plants on page 56-57. How were the young and adult plants alike and different? **Explore:** Look at the pictures on pages 58-59 noting the small pictures are zoomed in views of the larger picture. Determine which plants are young and which are adult plants. Read pages 58-59. **Explain:** Compare young and adult cabbage plants and lilac plants. **Elaborate:** Follow steps for Share and Compare on page 59. (See website for another lesson plan.) **Evaluate:** Compare, Restate and Predict understandings in Science Notebook.	Website of a lesson plan to replace Elaborate: https://betterlesson.com/lesson/640492/who-s-your-plant-parent

Lesson 10 (TG pages 60-63) Think Like a Scientist (Show that young plants are alike and different from their parents.) NGSS 1-LS3-1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. Objective: Make and record observations to show that young plants are like, but not exactly like, their parents. Use evidence from their observations to explain that young plants are like, but not exactly like, their parents. 1 Day	**Engage:** Ask students what they know about young and adult plants. Read the introduction and steps on pages 60 and 62. In their Science Notebook, students plan an investigation to determine how plants are alike and different. **Explore:** Students add "Comparing Young and Adult Plants" table in their Science Notebook and conduct investigation. **Explain:** Students review their results and revisit the question on page 60. Students record conclusions and share results. **Elaborate:** Students perform the task again using different plants and altering their research methods. **Evaluate:** Students Restate, Explain and Cite Evidence in their Science Notebook. Teacher and students use rubrics.	*variety of books and magazines about young and adult plants *live young and adult plants inside or outdoors *rulers Website to compare young and adult plants: https://betterlesson.com/lesson/resource/3211442/compare-young-and-adult-plants
Lesson 11 (TG pages 64-65) Animal Parts NGSS LS1.A: All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. (1LS1-1) Objective: Explain that different animals use their body parts in different ways. Identify the different body parts of animals that help them survive and grow. 1 Day	**Engage:** Ask students questions about parts of their body that help them survive. Discuss the purpose of a person's mouth. **Explore:** Examine the picture on pages 64-65. Students read pages 64-65. **Explain:** Discuss animals and their parts. Discuss how structure and function are connected in nature and human-made objects. Describe the parts of a Caiman and look closely at its head and skin. **Elaborate:** Find Out More About Caimans: Students conduct further investigations about caimans. Extend Your Thinking About Animal Parts: Students research an animal and learn how their feet or paws help them survive. **Evaluate:** "Wrap it Up" Recall and explain understandings in Science Notebook.	**Websites about caimans:** https://a-z-animals.com/animals/caiman/ **video.nationalgeogrphic.com/video/thorb-caiman-wc** **Visit pebblego.com to research animals further.** *Literacy By Design supplemental text What Do You Do With a Tail Like This, Mentor Text Amazing Animals
Lesson 12 (TG pages 66-67) Animals See and Hear NGSS LS1.A: All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find and take in food, water and air. (1LS1-1)	**Engage:** Students think about how they see and hear and what body parts they use. **Explore:** Students look at heading at the top and take a picture walk on pages 66-67 noticing the animals eyes and ears. Students read pages 66-67. **Explain:** Identify ways animals see and hear. Focus next on the captions	**Websites about how animals see:** http://kidzone.ws/animals/bats/facts8.htm https://www.learner.org/jnorth/tm/worm/WormLife.html *Literacy By Design supplemental text What Do You Do With a Tail Like This, Mentor Text Amazing Animals(pg 8-9)

Objective: Explain that animals use their body parts in different ways to see and hear. 1 Day	first for the sense of sight and second for the sense of hearing. Remind students about animal structures and their function. **Elaborate:** Find out more about animal sight (bats, deep ocean animals, insects, worms, rodents). Extend your thinking about hearing first how people hear and then how different animals hear. Share findings. **Evaluate:** "Wrap it Up" - Identify, Explain and Infer understandings in Science Notebook.	Schoolwide Short Shared Text Collection article "Animals Don't Hear Alike" (page 43-44) "Hearing Sounds Through the Ground" (page 47), "Sound Feelers" (page 53-54)
Lesson 17 (TG pages 76-77) Animals Take in Food, Water and Aired NGSS LS1.A: All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find and take in food, water and air. (1LS1-1) Objective: Explain that animals use their body parts in different ways to take in food, water and air. Identify the different body parts of animals that help them survive and grow. 1 Day	**Engage:** Discuss with students the ways people eat, drink and breathe. **Explore:** Have students look at the picture of the habitat on pages 76-77 and take a picture walk pointing out the different animals and features of the habitat. Set a purpose to find out ways in which animals take in food, water and air to survive. Read pages 76-77. **Explain:** Look at the pictures and reread the text on pages 76-77 and identify parts that help animals take in food, water and air (lion and elephant). Explain how animals eat, drink and breathe to survive. **Elaborate:** Students research animals in the African Savanna to find out how the animal take in food, water and air. Share findings with the class. **Evaluate:** Wrap it Up" – Recall and Contrast understandings in the Science Notebook.	*Literacy By Design supplemental text What Do You Do With a Tail Like This, Mentor Text Amazing Animals(pg 4-5, 12-13, 15)
Lesson 18 (TG pages 78-79) Animal Senses NGSS LS1.D: Animals have body parts that capture and convey different kinds of information needed for growth and survival. (1LS1-1) Objective: Describe how animals capture and convey different kinds of information needed for growth and survival. Identify animal responses to these inputs with behaviors that help them survive. 1 Day	**Engage:** Discuss what senses and body parts people might use to cross a busy street. **Explore:** Have students look at the big picture of the deer on pages 78-79. Ask probing questions to determine what the deer is doing and why. Set a purpose to find out how some animals use their body parts to sense different things around them and react in order to survive. Read pages 78-79. **Explain:** Have students recall what they know about their senses and describe how animals use their senses. Explain how deer respond in order to survive using their senses. **Elaborate:** Students research more about the white-tailed deer and how it survives. **Evaluate:** Wrap it Up" – Identify, Explain and Infer understandings in the Science Notebook.	https://www.realtree.com/deer-hunting/articles/busted-five-things-you-don-t-know-about-deer-senses

Lesson 19 (TG pages 80-83) Think Like An Engineer – A Better Train NGSS 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow and meet their needs. K-2-ETS1-1 Ask questions, make observations and gather information about a situation people want to hange to define a simle problem that can be solved through the development of a new or improved object or tool. ETS1.A Before beginning to design a solution, it is important to clearly understand the problem. Objective: Describe how engineers design solutions to a human problem by mimicking how animals use their external parts to help them survive, grow and meet their needs. 1 Day	**Engage:** Review with students the different ways animals use their body parts to see, hear, grasp, protect, move, find food, sense things and stay safe and survive. **Explore:** Preview pages 80-81 and discuss how Eiji Nakatsu tried to solve the problem of noise on this fast moving train. Set purpose to see how Eiji sought to solve this problem ad read pages 80-83. **Explain:** Reread the text on page 80-81 to identify the problem and what is Eiji's job Identify the solution and how Eiji used animal structures to reach this solution. Determine what the result was for this solution. **Elaborate:** Students research to find out more about the Kingfisher and present findings to the class. **Evaluate:** "Wrap it up" – Relate and Explain understandings in the Science Notebook.	Website about kingfisher https://www.rspb.org.uk/birds-and-wildlife/bird-and-wildlife-guides/bird-a-z/k/kingfisher/ https://www.livingwithbirds.com/tweetapedia/21-facts-on-kingfisher
Lesson 20 - (TG pages 84-85d) Think Like An Engineer – Design a Solution NGSS 1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow and meet their needs. K-2-ETS1-1 Ask questions, make observations and gather information about a situation people want to hange to define a simle problem that can be solved through the development of a new or improved object or tool. ETS1.A Before beginning to design a solution, it is important to clearly understand the problem. Objective: Use materials to design a solution to a human problem by mimicking how animals use their external parts to help them survive. 1 Day	**Engage:** Review how animals use their body parts to protect themselves. Read the introduction on page 84 and discuss why a turtle may need to protect itself from and what body part it would use. Define the problem of how you can protect yourself from danger. **Explore:** Read step 2 on page 84 and design prototype to solve this problem. Students add "Protection From Physical Contact" table to their Science Notebook, read step 3 on page 85 and test their prototype recording their observations. **Explain:** Students examine their results and determine if their prototype protected them. Students make modifications and perform the same tests. Students examine their new results. Students think about how they worked like an engineer. Students share their results. **Elaborate:** Students further revise their prototypes base on class feedback or design a new prototype. **Evaluate:** Students Identify, Compare and Evaluate their understandings in the Science Notebook. Teacher and students complete rubric.	*Provide a wide variety of materials such as cardboard boxes, poster board, construction paper etc- see TG page 84) *Markers *Scissors *Glue *Tape *Magazines and books with pictures of animals *Safety googles
Lesson 21 (TG 86-87) Hear Me NGSS LS1.B: Adults plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in	**Engage:** Ask students to think about a time when they heard a baby cry. What happened and why was the baby crying? **Explore:** Read the title and look at the pictures on pages 86-87. Take a picture walk and ask questions. Set	Website mother fox calling her babies https://www.youtube.com/watch?v=UGS7DKUY94c Animals Sounds Game http://www.kidsplanet.org/games/js/whoami.html

behaviors that help the offspring to survive. (1-LS1.2) Objective: Explain that some young animals make noises to let their parents know that they need something. Describe how some animal parents and their offpring engage in behaviros that help offspring to survive. 1 Day	the purpose to read to find out how different young animals cry for their parents in order to survive. Read pages 86-87. **Explain:** Reread page 86 and discuss that young animals make sounds to call for help referring to the bear, lion and bird. Explain how some parents and young animals communicate for survival. **Elaborate:** Students explore different animals to find out how they communicate. Extend thinking about if all baby animals need parents to survive. **Evaluate:** "Wrap it Up" – Recall and Relate understandings in Science Notebook.	
Lesson 22 (TG pages 88-89) Warm Me NGSS LS1.B: Adults plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LSb-2) Objective: Explain that young animals need help to stay warm. Describe how some animal parents and their offspring engage in behaviors that help offspring to survive. 1 Day	**Engage:** Discuss how people stay warm and remind students that a home is a shelter that provides protection. **Explore:** Students look at the pictures on pages 88-89. Ask probing questions to encourage exploration (what are the young penguins doing?) Set the purpose to read to find out about young animals that need help to stay warm. Read pages 88-89. **Explain:** Reread the text on page 88 and describe how some young animals keep warm (baby chicks, penguins). **Elaborate:** Students research to find out more about emperor penguins. Research how other young animals stay warm. **Evaluate:** "Wrap it Up" – Infer and Explain understandings in Science Notebook	Websites about emperor penguins laying and protecting eggs) https://www.youtube.com/watch?v=k0u67Wk_hJ0 https://www.youtube.com/watch?v=OL7O5O7U4Gs
Lesson 23 (TG pages 90-91) Carry Me NGSS LS1.B: Adults plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LSb-2) Objective: Explain that many young animals need to be carried to move from place to place. Describe how some animal parents and their offspring engage in behaviors that help offspring to survive. 1 Day	**Engage:** Have students think about how a baby moves around. **Explore:** Students look at the picture on page 90-91 and ask probing questions to encourage exploration about how animals carry their young. Set the purpose to read to find out how some parent animals carry offspring from place to place **Explain:** Reread page 90 and explain why some animals carry their young (opossum) **Elaborate:** Students research to find out more about carrying young animals (kangaroos, bears, monkeys). Brainstorm a list of animals and divide into animals that carry and don't carry their young.	Websites about animals carrying their young https://www.youtube.com/watch?v=-CcCZog5Fy4 https://www.youtube.com/watch?v=ys1oE34gxQ4 https://www.youtube.com/watch?v=4Nv3cFiMRvU

	Evaluate: "Wrap it Up" – Describe and Infer understandings in Science Notebook.	
Lesson 24 (TG 92-93) Protect Me NGSS LS1.B: Adults plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LSb-2) Objective: Explain that many adult animals protect their young. Describe how some animal parents and their offspring engage in behaviors that help the offspring to survive. 1 Day	**Engage:** Remind students about the opossums they learned about previously. Ask how the opossum's mother was protecting her young. **Explore:** Students look at the picture of the polar bear on pages 92-93 and ask what they notice about the polar bear. Define what the word protect means. Set the purpose to read how some adult animals protect their young and read pages 92-93. **Explain:** Reread page 92 and describe animals protecting their young. Compare and contrast how the baby polar bear and baby sea turtle are protected. **Elaborate:** Students research to find out other animals who protect their young starting at birth. **Evaluate:** "Wrap it Up" – Recall and Infer understandings in Science Notebook.	**Website about other animals who protect their offspring starting at birth** https://www.youtube.com/watch?v=zM7y0PH2HMU
Lesson 25 (TG 94-95) Meerkat Teachers NGSS LS1.B: Adults plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LSb-2) Objective: Identify that some anmal parents and their offspring engage in behaviors that help the offspring survive. Describe how some young animals learn how to survive from their parents. 1 Day	**Engage:** Lead a discussion about when students were a baby and how little babies can do on their own. **Explore:** Students look at the pictures on pages 94-95 and determine what the meerkats are doing. Set the purpose to read how young meerkats learn how to survive and read pages 94-95. **Explain:** Reread the heading on page 94 and describe what meerkats teach their young to do. Explain how young meerkats learn to survive. **Elaborate:** Students follow the steps on page 95 "Share and Compare" and choose an animal that helps its young survive. **Evaluate:** Recall, Explain and Infer understandings in Science Notebook.	**Website where animals help their young survive** https://www.youtube.com/watch?v=bjEDaqpB8DM

Unit Learning Goal and Scale
(Level 2.0 reflects a minimal level of proficiency)

Standard(s):
1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]
K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

4.0	**Students will be able to:** **In addition to planning and conducting investigations at 3.0, students can** • Revise designs or create an alternative design to solve a human problem based on class and/or teacher feedback.
3.0	**Students will be able to:** • **Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]** • **Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool**
2.0	**Students will be able to:** • Define survive, grow, needs, grasp, protect, senses, respond. • Identify ways plants/animals survive, grow and meet their needs.
1.0	**With help, partial success at level 2.0 content and level 3.0 content:**
0.0	**Even with help, no success**

Standard(s):
1.LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

4.0	**Students will be able to:** **In addition to completing research and determining patterns at 3.0, students can** • Compare and contrast a variety of animals' behavior patterns. • Infer other patterns that may exist among different species.
3.0	**Students will be able to:** • **Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]**
2.0	**Students will be able to:** • Define pattern, offspring, behaviors, survive, communicate, protect. • Identify ways animals help their offspring survive.

1.0	**With help, partial success at level 2.0 content and level 3.0 content:**
0.0	**Even with help, no success**

Standard(s): **1.LS3-1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.**	
4.0	**Students will be able to:** **In addition to planning and conducting investigations at 3.0, students can** • Conduct investigations again with other young plants and animals using different research methods. • Compare these results with the results of the first investigation.
3.0	**Students will be able to:** • **Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.**
2.0	**Students will be able to:** • Define alike, different, adult, young/offspring. • Identify characteristics of different plants and animals.
1.0	**With help, partial success at level 2.0 content and level 3.0 content:**
0.0	**Even with help, no success**

Unit Modifications for Special Population Students	
Advanced Learners	• Vocabulary – deciduous, evergreen • Challenge students to research concepts on their own from the Elaborate Section of each lesson. • Ask probing questions at the beginning of lessons to tap into prior knowledge and allow students to explain their thinking (example – TG page 91)
Struggling Learners	• Provide concrete examples of living and nonliving objects • Revisit pages with key concepts and have students point out and retell what they have learned (provide further information where gaps exist) • Ask questions where students look for pictures in the book to provide an answer • Focus on one animal picture in the student text book for students to discuss (example – TG page 101)
English Language Learners	• Vocabulary – survive, leaves, roots, stems, flowers, fruits, seeds, life cycle, seedling, grasp, protect (provide visual examples with each word) (make flashcards for difficult words) • Ask yes or no questions to help students describe understandings • Provide sentence frames to help students express their ideas (example- TG page 65, 73, 79) • Provide picture cards of the different animals discussed in this unit for students to refer to. • Have students practice asking each other yes or no questions (give animal parts vocabulary as a starting point – example – TG page 103)
Special Needs Learners	• Provide concrete examples when introducing new vocabulary and concepts. • Vocabulary – add unknown words to the student notebook to refer to during the unit. • Provide drawings for students to add to the Science Notebook to name and/or label parts.

Interdisciplinary Connections

Indicators: Reading: RI.1.1 **Ask and answer questions about key details in a text.** RI.1.2 **Identify the main topic and retell key details of a text**. RI.1.3 **Describe the connection between two individuals, events, ideas, or pieces of information in a text**. RI.1.4 **Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.** RI. 1.5 **Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.**
Writing: W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. **W.1.5** With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed. **W.1.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
Mathematics: **1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.**

Integration of 21st Century Skills

Indicators:
8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
8.1.2.D.1 Develop an understanding of ownership of print and nonprint information.
8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
8.2.2.A.5 Collaborate to design a solution to a problem affecting the community.
8.2.2.B.3 Identify products or systems that are designed to meet human needs.
8.2.2.C.1 Brainstorm ideas on how to solve a problem or build a product.
8.2.2.D.1 Collaborate and apply a design process to solve a simple problem from everyday experiences.
8.2.2.D.3 Identify the strengths and weaknesses in a product or system.
9.2.4.A.1 Identify different types of work and how work can help people achieve personal and professional goals
9.2.4.A.3 Investigate both tradional and nontradional careersand relate information to personal likes and dislikes.

Unit Title: **Space Systems: Patterns and Cycles (Earth Science)**

Unit Description: Students will explore patterns and cycles of space systems. First, students will learn about the sun as a star, its apparent motion in the sky and the patterns of day and night. Then students will learn about the moon, its apparent motion in the sky and its patterns. Next, students will learn about stars, the patterns stars make, how people use these patterns and specifically investigate some star patterns. Then, students will study the patterns of seasons and how they affect light and temperature. The unit will conclude with students studying the career of an astronomer.

Unit Duration: Making Period 2

Desired Results

Standard(s):

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]

1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

Indicators:

ESS1.A: The Universe and Its Stars

- **Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)**

ESS1.B: Earth and the Solar System

- **Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)**

Understandings:

Students will understand that…

- the sun is a star that gives off light and heat.
- day and night make a pattern.
- the sun's apparent motion makes a pattern in the sky that is predictable.
- the moon is visible at night when the sky is dark.
- the moon's apparent motion makes a pattern in the sky that is predictable.
- stars are seen on clear nights.
- people make patterns of stars that they can use.
- the shape of the Little Dipper can help locate the North Star.
- Alkaid is located at the end of the Big Dipper and has a pattern of motion.
- Cepheus and the North Star appear to move.
- seasons have a pattern once a year.
- daylight changes with the seasons.
- sunrise and sunset change daily.
- an astronomer studies objects in space.

Essential Questions:

- What are the sun's patterns of day and night?
- What are the moon's pattern in the sky?
- How do people use the stars' patterns?
- How do the changes in the patterns of the sun relate to the different seasons?
- What does an astronomer do?

Assessment Evidence

Performance Tasks:

Investigate Lessons – Students will practice performance tasks in cooperative groups engaging in scientific steps of an investigation.

- Lesson 4 (TG pages 116-117b) – Observe the pattern of the sun in the sky and predict its future pattern.
- Lesson 7 (TG pages 122-123b)– Describe the pattern of the moon in the sky and predict its future pattern.
- Lesson 12(TG pages 132-133b) – Describe how Cepheus and the North Star appear to move.

Think Like A Scientist: Plan and Investigate Lessons – Students will engage in performance tasks in cooperative groups to plan and conduct an investigation, provide evidence and use that evidence to explain results. This task will be recorded in their science notebook and evaluated by a Teacher Rubric and Student Rubric.

- Lesson 15 (TG pages 138-139b) – Observe and record when sunrise and sunset occur at different times of the year. Compare data to relate the amount of daylight to the time of the year.

Other Evidence:

Students will demonstrate their understandings through:

- Science Notebook Entries
- Goals and Scales Analysis
- Unit Tests

Benchmarks:

Benchmarks will be administered twice during the school year (at the end of Marking Period 2 and 4). The benchmark at the end of Marking Period 2 will include concepts from Physical and Earth Science. The benchmark at the end of Marking Period 4 will include concepts from Life Science. Results will be graded on the scale of Secure, Developing and Beginning Skills.

Earth Science Unit Test Percentages (Based on 12 questions):

Secure = 80% - 100%

Developing = 60% - 79%

Beginning = Below 60%

Learning Plan

Resources: National Geographic Learning: Exploring Science Teacher's Guide, Student Book, Interactive eBook, Website and Student Science Notebook. Become an Expert "Day and Night on Cinco de Mayo" is a supplemental student leveled book that can be used throughout the unit in either a whole group, small group or individual setting.

Learning Activities:

Lesson and Duration	Activties	Supplemental Materials
Lesson 1 (TG pages 110-111) The Sun NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe the sun. 1 Day	**Engage:** Ask students about a candle and what it produces. **Explore:** Students observe the picture of the sun on page 110-111 and describe what they see. Ask probing question to encourage exploration. Set a purpose to read to be able to describe the sun. Read pages 110-111.	**Website about different pictures of the sun** http://www.cnn.com/videos/tech/2015/02/16/vo-nasa-solar-dynamics-observatory-5-years.cnn **or google images of the sun** **Literacy By Design Guided Reading Books "Stars in the Sky" Level E and "A Dictionary of Space" Level F**

	Explain: Ask students to find sentences to the questions about stars and the sun. Define the word sun. **Elaborate:** Show different pictures of the sun for students to describe. **Evaluate:** "Wrap it Up" Recall and Observe understandings in Science Notebook.	
Lesson 2 (TG pages 112-113) Day and Night NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe how day and night make a pattern. 1 Day	**Engage:** Students describe the appearance of the sky in the day and night. Recall from previous lesson how the sun appears in the daytime sky. **Explore:** Students observe the pictures on pages 112-113 and ask probing questions to encourage exploration. Set a purpose to read in order to describe how day and night make a pattern. Read pages 112-113. **Explain:** Define the word pattern. Students describe how day and night make a pattern. **Elaborate:** Students find out more about patterns by observing and describing their own activities each day. **Evaluate:** "Wrap it Up" Explain and Observe understandings in Science Notebook.	
Lesson 3 (TG pages 114-115) The Sun in the Sky NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe the pattern of the sun's apparent motion in the sky. 1 Day	**Engage:** Help students recall what causes daylight. **Explore:** Students observe and explain the picture on page 114 and the sequence of pictures on page 115. Set a purpose to read in order to describe the pattern of the sun in the sky. Read pages 114-115. **Explain:** Recall the meaning of a pattern. Describe the pattern of the sun in the sky and predict the sun's pattern for tomorrow. **Elaborate:** Students find out more about the pattern of the sun in the sky by playing a game with the pictures on page 115 and cutout suns. **Evaluate:** "Wrap it Up" Recall and Predict understandings in science notebook.	***Cutout suns for the Elaborate Section.**
Lesson 4 (TG pages 116-117b) Investigate – The Sun NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Observe the pattern of the sun in the sky. Predict the future pattern of the sun in the sky.	**Engage:** Recall the meanings of observe and predict. Refer to the sequence of pictures on page 115 to review the sun's pattern. Ask probing questions to encourage students responses. **Explore:** Guide students through the investigation on pages 116-117. Students record their observations and predictions in their science notebook.	*Paper *Crayons *Paper plates (9x9") cut in half *Earth/Sky scene as a template

1 Day (Elaborate can extend this lesson into weekend acitvities.)	**Explain:** Students share their observations. Ask probing questions to help students draw conclusions. **Elaborate:** Students repeat observations over the weekend about the pattern of the sun in the sky and ask probing questions to encourage students to apply what they have learned. **Evaluate:** "Wrap it Up" Describe, Explain and Predict understandings in science notebook.	
Lesson 5 (TG pages 118-119) The Moon NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe when the moon is visible. 1 Day	**Engage:** Students share experiences with seeing the moon. **Explore:** Students observe the picture of the moon first on page 119 then on page 118. Ask probing questions to encourage exploration. Set a purpose to read in order to describe when the moon is visible. Read pages 118-119. **Explain:** Students find sentences on page 118 to describe the moon. Generate a list of words to describe the moon. **Elaborate:** Students examine more pictures of the moon to further describe. Extend student thinking about the moon by drawing its different shapes. **Evaluate:** "Wrap it Up" Describe and Explain understandings in science notebook.	Website pictures of the moon https://pixabay.com/en/photos/moon / http://aa.usno.navy.mil/faq/docs/moon_phases.php http://www.moonconnection.com/moon_phases.phtml *Literacy By Design "A Dictionary of Space" Level F *Schoolwide Mentor Text Day Light, Night Light.(pg18)
Lesson 6 (TG pages 120-121) The Moon in the Sky NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe the pattern of the moon's apparent motion in the sky. 1 Day	**Engage:** Students recall where in the sky they have seen the moon. Recall from previous lessons when the moon is visible. **Explore:** Students observe the picture of the full moon on page 120 and then the picture of the sequence of the moon in the night sky on page 121. Set a purpose to read to describe the pattern of the moon in the sky. Read pages 120-121. **Explain:** Recall the definition of a pattern. Describe the pattern of the moon in the sky and predict what will happen tomorrow. **Elaborate:** Students find out more about the pattern of the moon in the sky by examining different pictures of the moon and where they would be positioned in the sky. Students extend their thinking about the pattern of the moon in the sky by drawing a sequence of pictures of the apparent movement of the moon. Share with the class. **Evaluate:** "Wrap it Up" Recall and Predict understandings in science notebook.	See above moon websites or google moon images.

Lesson 7 (TG pages 122-123b) Investigate – The Moon NGSS 1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted. Objective: Describe the pattern of the moon in the sky. Predict the future pattern of the moon in the sky. 1 Day (Can extend into observing the moon at home at night)	**Engage:** Recall the meanings of observe and predict. Use illustrations on page 121 to review the pattern of the moon. **Explore:** Guide students through the investigation steps on pages 122-123. **Explain:** Students share their observations and predictions. Students point to their pictures where their observations match and did not match their predictions. Ask what evidence shows the pattern of the moon in the sky and how the students thought like a scientist. **Elaborate:** Students repeat their observations at home at nighttime and predict the moon's pattern. **Evaluate:** "Wrap it Up" Describe and Predict understandings in science notebook.	• Paper • Crayons • Paper plate (9x9") cut in half • Template of the Earth/Sky scene and make copies for students.
Lesson 8 (TG pages 124-125) Stars NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe when you can observe stars. Explain why you can see stars only at night. 1 Day	**Engage:** Ask students to describe observing stars at night. **Explore:** Students observe the photographs on pageg 124-125 and determine how the stars are alike and different. Set a purpose to read in order to describe when you can observe stars. Read pages 124-125. **Explain:** Students describe when you can observe stars and explain why you can see stars only at night. **Elaborate:** Play the song "Twinkle Twinkle Little Star" and identify words that describe stars. Students extend their thinking about stars by looking at different pictures of stars. **Evaluate:** "Wrap it Up" Describe and Explain understandings in science notebook.	*Literacy By Design guided reading book "Stars" https://www.nasa.gov/mission_pages/chandra/images/chandra-samples-galactic-goulash.html *Schoolwide Mentor Text Day Light, Night Light (pg 11)
Lesson 9 (TG pages 126-127) Star Patterns NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe how people use stars to make a pattern. Explain how people use star patterns. 1 Day	**Engage:** Draw dots on the board in the shape of a square and have students imagine connecting the dots to make a square. Define pattern. **Explore:** Observe and discuss the pictures on pages 126-127. Set a purpose to read in order to describe how people use stars to make a pattern. Read pages 126-127. **Explain:** Students describe and explain how people use stars to make a pattern. **Elaborate:** Students find out more about using stars to make patterns by drawing dots on black paper. Extend	*Literacy by Design guided reading book "Stars in the Sky" Level E *black paper *White chalk or crayon *Literacy By Design" Guided Reading Book Stars in the Sky (pg 10-12)

	student thoughts about star patterns by reading Follow the Drinking Gourd by Jeanette Winter. **Evaluate:** "Wrap it Up" Describe, Recall and Explain understandings in science notebook.	
Lesson 10 (TG pages 128-129) Stars in the Sky NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe the Little Dipper and the location of the North Star. Explain how the Little Dipper appears to move in the night sky. 1 Day	**Engage:** Recall the Big Dipper Star Pattern Describe the Big Dipper. What do the stars at the end of the Big Dipper's cup point to? **Explore:** Students observe the picture of the Little Dipper. Read page 128. Ask about the name of the star pattern and what it looks like. Students point and label the North Star. Tell its other name. Students observe the sequence on pg 129. **Explain:** Students read pages 128-129. Ask questions how some stars are like the moon and sun. Students point to the North Star and Little Dipper in the 4 pictures on pg 129. Describe how these stars move. **Elaborate:** Students investigate diagrams of different positions of the Little and Big Dipper on the internet. **Evaluate:** "Wrap it Up" Describe and Predict understandings in science notebook.	
Lesson 11 (TG pages 130-131) Patterns of Motion NGSS ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1) Objective: Describe Alkaid's pattern of motion. 1 Day	**Engage:** Recall how the sun appears to move across the sky. Discuss the path of the sun and remind students about the pattern of the Little Dipper. **Explore:** Students observe the picture and read the caption - pg 130. Discuss term Alkaid and its relation to the picture. Students to look again to identify the fainter group of stars. Read pages 130-131. **Explain:** Students describe Alkaid's motion and question students about this pattern. **Elaborate:** Students find out more about Alkaid's Motion by modeling the apparent movement of the Big Dipper. **Evaluate:** "Wrap it Up" Identify, summarize understandings in science notebook	Modeling materials for the Elaborate portion of this lesson.
Lesson 12 (TG pages 132-133b) Investigate- The Night Sky NGSS ESS1.1 Use observations of the sun, moon, and stars to describe patterns that can be predicted. Objective: Describe how Cepheus appears to move. Describe how the North Star appears to move. 1 Day	**Engage:** Recall Alkaid's pattern of motion and what students learned. Investigate how other star patterns move. **Explore:** Read pages 132-133 and complete steps 1-4. **Explain:** Students share predictions and observations. Teacher asks questions and how students thought like a scientist. **Elaborate:** Students use the night sky model to observe and predict how the North Star appears to move. Compare this to how Cepheus appears to move.	Paper, scissors, sharp pencils, brass fasteners, Blackline Masters from Teacher's Guide.

	Evaluate: "Wrap it Up" Compare, Summarize and Predict understandings in science notebook.	
Lesson 13 TG (Pages 134-135) Seasons NGSS ESS1.B Seasonal patterns of sunrise and sunset can be observed, described and predicted. Objective: Describe the pattern of the seasons. Conclude that each season happens once each year. 1 Day	**Engage:** Ask students to describe their favorite time of year making reference to the weather. **Explore:** Observe the background picture on page 1340-135 and describe the maple tree. Then observe and discuss the tree in the four seasons. Set a purpose to read in order to describe the pattern of the seasons. Read pages 134-135. **Explain:** Define a season. Students name and describe the pattern of the seasons. Conclude that each seasons happens once each year. **Elaborate:** Students find out more about the pattern of the seasons in our area including temperature and precipitation. Students extend their thinking about the pattern of the seasons and how it affects animals. **Evaluate:** "Wrap it Up" Summarize and Conclude understandings in science notebook.	**temperature changes in nj** http://www.usclimatedata.com/climate/new-jersey/united-states/3200
Lesson 14 TG (Pages 136-137) Light and the Seasons NGSS ESS1.B Seasonal patterns of sunrise and sunset can be observed, described and predicted. Objective: Explain how daylight changes with the seasons. Predict how sunrise and sunset will change from one day to the next. 1 Day	**Engage:** Have students share their experiences about the number of hours of daylight in different seasons. **Explore:** Observe and compare the pictures on page 136 and 137. Set a purpose to read in order to explain how daylight changes with the seasons. Read pages 136-137. **Explain:** Draw a picture of a horizon line and define the terms sunrise and sunset. Project the table on TG page 136 and compare daylight hours during the different seasons. Students predict how sunrise and sunset will change from one day to the next. **Elaborate:** Students find out more about daylight and the seasons by examining a table of sunrise and sunset in our area. Students extend their thinking by comparing this table to tables of sunrise and sunset in polar and equatorial regions. **Evaluate:** "Wrap it Up" Recal, Infer and Predict understandings in science notebook.	Choose a city and create a calendar for sunrise and sunset http://sunrisesunset.com/predefined.asp Sunrise / Sunset Times in NJ https://www.timeanddate.com/sun/@5101760 Sunrise / Sunset near Equator https://www.timeanddate.com/sun/equatorial-guinea/malabo
Lesson 15 TG (Pages 138-139b) Think Like a Scientist – Make Observations About Sunrise, Sunset and the Seasons NGSS 1-ESS1-2 Make observations at different time of the year to relate the amount of daylight to the time of year.	**Engage:** Students share what they learned in the previous lesson about how daylight changes with the seasons. Read pages 138-139 to find out how they will make observations and think like a scientist. Reread step 1 to determine what Sheena observed and what question she asked.	***paper** ***crayons**

Objective: Observe and record when sunrise and sunset occur at different times of the year. Compare data to relate the amount of daylight to the time of year. 1 Day (The investigation takes one day however collecting results requires students to do it through the year.)	**Explore:** Students begin planning their own investigation rereading step 2 on page 138. Guide students in carrying out their plans by asking questions. See questions on TG page 139. Students add "Sunrise and Sunset in Fall" table to add to their science notebook. **Explain:** Students analyze their results referring back to the investigation question "Could the time of sunrise and sunset change? And "What evidence supports your findings?" **Elaborate:** Find out more about how the time of sunrise and sunset change by observing and recording changes over a week's time. **Evaluate:** Students Summarize and Infer understandings in science notebook. Teacher and students use rubrics.	
Lesson 16 TG (Pages 140-141) Science Career – Astronomer NGSS Scientists look for patterns and order when making observations about the world. Objective: Connect the concept of patterns of motion of the sun, moon, stars, and planets with the career of an astronomer. 1 Day	**Engage:** Students share experiences they have with using a telescope or visiting an observatory with a large telescope. **Explore:** On page 141 read about Knicole Colon and determine her career. Discuss what she wants to discover. Examine the pictures on page 141. Set a purpose to read to connect the concept of patterns of motion of the sun, moon, stars and planets to the career of an astronomer. Read page 140-141. **Explain:** Describe the work of an astronomer by referring back to sentences in the text. Connect the science concepts of the moon's pattern to the career of an astronomer. Students ponder if this is a career they would like to pursue and why. **Elaborate:** Students research more about the career of an astronomer. **Evaluate:** Students Recall, Explain and Predict understandings in science notebook.	**Websites about an astronomer.** http://www.nationalgeographic.com/explorers/bios/knicole-colon/

Unit Learning Goal and Scale *(Level 2.0 reflects a minimal level of proficiency)*	
Standard(s): **1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]**	
4.0	Students will be able to: **In addition to completing research and determining patterns at 3.0, students can** • Conduct repeated observations of the sun, moon and stars over several days to describe and extend patterns and make future predictions.
3.0	Students will be able to: • **Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]**
2.0	Students will be able to: • Define stars, sun, pattern, apparent motion, moon, appeared. • Identify changes in the sun, moon and stars.
1.0	With help, partial success at level 2.0 content and level 3.0 content:
0.0	Even with help, no success

Standard(s): **1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]**	
4.0	**Students will be able to:** **In addition to completing research and determining patterns at 3.0, students can** • Conduct further observations over several consecutive days to determine the amount of daylight. • Predict a pattern of daylight within a given season.
3.0	**Students will be able to:** • **Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]**
2.0	**Students will be able to:** • Define seasons, patterns, year, sunrise, sunset, daylight. • Identify the amount of daylight in a given day.
1.0	**With help, partial success at level 2.0 content and level 3.0 content:**
0.0	**Even with help, no success**

Unit Modifications for Special Population Students	
Advanced Learners	• Students make comparison drawings to extend thinking. (Examples on TG pages 115) • Extend the idea of apparent motion with kinestic activities. (Example on TG pages 129) • Students make different charts or graphs to depict differences. (Example on TG page 137) • Students extend thinking in the Elaborate section of lessons.
Struggling Learners	• Direct students to make more concrete drawings to understand concepts (Examples on TG pages 115, 129, 137) • Group students by ability to differentiate instruction or mix abilities to provide exposure to advanced thinking.
English Language Learners	• Vocabulary: pattern, moon, seasons, sunrise, sunset • Ask yes or no questions when seeking understandings. (Examples on TG pages 119, 125) • Provide sentence frames to assist with articulation of concepts.(Examples on TG pages 119, 125) • Give students sentence stems to complete. (Examples on TG pages 119, 125)
Special Needs Learners	• Pre-cut and/or Pre-assemble models students will need to study. • Limit questions to the core content of the lessons. • Provide tables for students to add to the science notebook.

Interdisciplinary Connections

Indicators:
8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
8.2.2.B.1 Identify how technology impacts or improves life.
8.2.2.B.3 Identify products or systems that are designed to meet human needs.
9.2.4.A.1 Identify different types of work and how work can help people achieve personal and professional goals
9.2.4.A.3 Investigate both tradional and nontradional careersand relate information to personal likes and dislikes.

Integration of 21st Century Skills

Indicators: Reading: RI.1.1 **Ask and answer questions about key details in a text.** RI.1.2 **Identify the main topic and retell key details of a text**. RI.1.3 **Describe the connection between two individuals, events, ideas, or pieces of information in a text**. RI.1.4 **Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.** RI. 1.5 **Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text.**
Writing: W.1.2 Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. **W.1.5** With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed. **W.1.8** With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
Mathematics: **1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.**