

First Grade SCIENCE Curriculum Pacing & Curriculum Guide 2019-2020

First Nine Weeks			Second Nine Weeks		
Week	Topics	Content	Week	Topics	Content
1-3	Social Studies		1-3	Social Studies	
4-6	Science	<p>Ecosystem: Interactions, Energy, and Dynamics 1.LS.2 2) Obtain and communicate information to classify plants by where they grow (water, land) and the plant's physical characteristics. 3) Recognize how plants depend on their surroundings and other living things to meet their needs in the places they live. R2BR The Great Kapok Tree R2BR Crinkleroots R2BR I See a Kokkaburra</p>	4	Science	<p>Engineering Design 1.ETS1: 1) Solve scientific problems by asking testable questions, making short-term and long-term observations and gathering information. Links Among Engineering, Technology, Science, and Society 2.ETS2: 1) Use appropriate tools to make observations, record data and refine design ideas. R2BR Muncha! Muncha! Muncha!</p>
7-9	Social Studies		5-7	Social Studies	
			8		The Grinch (no book purchased but use old version rated G)
Third Nine Weeks			Fourth Nine Weeks		
Week	Topics	Content	Week	Topics	Content
1	Social Studies		1-2	Science	<p>From Molecules to Organisms; Structures and Processes 1.LS1: 1) Recognize the structure of plants (roots, stems, leaves, flowers, fruits) and describe the function of the parts. (taking in water and air, producing food, making new plants) 2) Illustrate and summarize the life cycles of plants 3) Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways. 1.LS2: 1) Conduct an experiment to show how plants depend on air, water, minerals from soil, and light to grow and thrive. R2BR NGR: Seed to Plant R2BR The Gardener</p>
2-4	Science	<p>Earth's Place in the Universe 1.ESS1: 1) Use observations or models of the sun, moon, and stars to describe patterns that can be predicted. 2) Observe natural objects in the sky that can be seen from Earth with the naked eye and recognize that a telescope used as a tool, can provide greater detail of objects in the sky. 3) Analyze data to predict patterns between sunrise and sunset, and the change of seasons. Energy 1.PS3: 1) Make observations to determine how sunlight warms Earth's surfaces (sand, soil, rocks, and water.) R2BR-What Makes Day & Night R2BR Moon Cake & The Moon Book R2BR The Sun is Kind of a Big Deal</p>	3	Science	<p>(Frogs) 1.ESS1: 3) Analyze data to predict patterns between sunrise and sunset, and the change of seasons. R2BR Frog on His Own</p>
5-8	Social Studies		4-5	Social Studies	
9	Read Across America Week	Teacher's Choice	6-8	Science Social Studies	<p>(Science Grades-tree, flower, bird, animal) FAMILY LIFE</p>
10	Science	<p>Waves and Their Application in Technologies for Information Transfer 1.PS4: 1) Use a model to describe how light is required to make objects visible. Summarize how illumination could be from an external light source by an object giving off its own light. 2) Determine the effect of placing objects made with different materials (transparent, translucent, opaque, and reflective) in the path of a beam of light. R2BR The Energy We See: A Look at Light</p>	9	Social Studies	History-Memorial Day, Independence Day

First Quarter				
TN State Standards	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 1-3 Government and Civics (Recognizing good citizenship; discussing the purpose of laws and rules, patriotic traditions.)				
Week 4-6 Science-- Ecosystem: Interactions, Energy, and Dynamics				
<p>1.LS.2 1) Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways. Component Idea: D. Information Procession</p> <p>2) Obtain and communicate information to classify plants by where they grow (water, land) and the plant's physical characteristics. Component Idea: A. Interdependent Relationships in Ecosystems</p> <p>3) Recognize how plants depend on their surroundings and other living things to meet their needs in the places they live. Component Idea: A. Interdependent Relationships in Ecosystems</p>	<ul style="list-style-type: none"> • rain forest • canopy • understory • wither • desert • smoldering • ruined • oxygen • pollen/pollinate • gash • lulled • wetland • woodland • grassland • drylands 	<p>EXPLANATION: Due to their lack of mobility, students may have the misconception that plants cannot sense or respond to changes in their environment. The focus of this standard is to uncover responses that plants may have to changes in their environment. Keep in mind: These responses are changes initiated by the plant and result from chemical signals and pathways within the plant. Examples may include plants leaning towards sunlight, leaves wilting from lack of water, leaves changing color in autumn, and trees shedding leaves. (The focus of this standard is on responses a single plant may have to changes in its environment, not changes to a species over time.)</p> <p>EXPLANATION: Recognizing that plants have requirements for life, students can then explore how different availabilities of sunlight, water, and nutrients define ecosystems. Students can then relate these differences in ecosystems to physical characteristics of plants in those ecosystems. Examples of plants growing in water may include phytoplankton in the ocean, algae in lakes, cattail in ponds, and river grasses. Examples of plants growing on land may include cacti in the desert, wildflowers on mountains, mosses toward mountain tops, and deciduous trees in forests.</p> <p>EXPLANATION: Interactions between living organisms in an ecosystem provide energy and matter. The materials needed for plant survival are used and re- used by plants and animals. Examples may include earthworms to aerate the soil, animals to disperse seeds, bees and other insects to help pollinate, and surroundings that offer the right amount of sunlight, water, and type of soil.</p>	<p>Houghton Mifflin Harcourt: Unit 4: Plants Lesson 1: What Do Plants Need? Lesson 2: Why Do Plants Grow? Lesson 4: How Are Plants Different? Unit 5: Plants & Their Environments Lesson 2: How Do Plants Need Their Environments? Lesson 3: Can Plants Survive in Different Environments?</p> <p>Leveled Readers: Where Do Plants & Animals Live? Weird & Wacky Plants</p> <p>Brain Pop Jr.: Plant Adaptations Rainforests Deserts Soil</p> <p>R2BR Text(s): The Great Kapok Tree by Lynne Cherry I See a Kookaburra by S. Jenkins & R. Page Crinkleroots by Jim Amosky</p> <p>R2BR Resources: Virtual Field Trip Rainforest Rainforest Facts Sheet Plants That Store Water Habitat Song Plant Life Cycle</p> <p>Discovery Education: How Plants Grow (19:00) Plants (10:27)</p> <p>Studies Weekly: SW4 Landforms</p> <p>Other Resources: http://tntel.tnsos.org/curricular.htm Click on the World Book Encyclopedia icon. Click on Early World of Learning. Click on Read. Click on Know It! Move dial until you get to plants. Group Project Idea: Sort students into small groups and assign an ecosystem to each group. Students will create a 3-D ecosystem with a shoe box highlighting at least 3 types of plants. Students will present their diorama and share facts about their ecosystem.</p>	<p>CROSSCUTTING CONCEPT:</p> <p>Cause and Effect--Students identify cause and effect relationships through observable patterns, utilizing simple tests to provide evidence that supports or refutes their ideas.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Analyzing and interpreting data. Students set a foundation for data analysis by recording their thoughts and observations about patterns and events in a manner that can be shared with others.</p> <p>CROSSCUTTING CONCEPT:</p> <p>Pattern--Students recognize, classify, and record the patterns they observe in nature or man-made objects.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Obtaining, evaluating, and communicating information (Obtain/Evaluate) Students read and utilize the information, features, and structure of grade-appropriate texts and media to obtain scientific information useful in forming or supporting a scientific claim. (Communicate) Students utilize writing, drawing, and modeling to communicate information.</p>
Week 7-9 Geography (Map Skills), History (Columbus Day)				

Second Quarter

TN State Standards	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 1-3 Government and Civics				
Week 4 Science Engineering Design, Links Among Engineering, Technology, Science, and Society (History 1.26 Identify and describe the events or people celebrated during the following national holidays and examine why we celebrate them.) Thanksgiving Day				
<p>1.ETS1: 1) Solve scientific problems by asking testable questions, making short-term and long-term observations and gathering information.</p> <p>2.ETS2: 1) Use appropriate tools make observations, record data and refine design ideas.</p>	<ul style="list-style-type: none"> • howed • sowed • gnawed • hurdle • trench • twitch 	<p>EXPLANATION: As part of the design process, students should begin to understand that there can be multiple solutions to a single problem. In later grades, students will evaluate competing solutions based on their ability to work with criteria for success and constraints. In first grade, students should be preparing for this process by making observations before they begin to design a solution. Students can be given a problem to solve and tasked with making relevant observations. An example could be “How long does it take an ice cream bar to melt?” Students would observe the ice cream bar every 30 minutes.</p>	<p>Houghton Mifflin Harcourt: Unit 2: Technology All Around Us Lesson 1: How do Engineers Work? Lesson 2: How Can We Solve a Problem? **Inquiry Flipchart People in Science: Dr. Eugene Tssui (architect)</p> <p>Leveled Readers: How Do Engineers Solve Problems? Design a Home for a Pet</p> <p>Brain Pop Jr: Engineering & Design Process Making & Testing Predictions Making Observations</p> <p>R2BR Text(s): Turn your volume off and Read <i>Muncha! Muncha! Muncha!</i> to children from the video: https://youtu.be/jEZnpXVI6L4</p> <p>R2BR Resources: What's an Engineer?</p> <p>Discovery Education: What is Engineering? (video segment 3:04)</p> <p>Studies Weekly: SW16 Thanksgiving</p>	<p>CROSSCUTTING CONCEPT: Systems and System Models Students identify and describe parts and their roles in the inner workings as part of a larger system/object.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Analyzing and interpreting data Students analyze observations and measurements for a device to ensure it satisfies specifications.</p>
Week 5-7 Culture				
Week 8 The Grinch (old version) (Rated G)				

Third Quarter

TN State Standards	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 1 Economics, Culture				
Weeks 2-4 Science Earth's Place in the Universe				
<p>1.ESS1: 1) Use observations or models of the sun, moon, and stars to describe patterns that can be predicted. Component Idea: A. The Universe and Its Stars</p> <p>2) Observe natural objects in the sky that can be seen from Earth with the naked eye and recognize that a telescope, used as a tool, can provide greater detail of objects in the sky. Component Idea: A. The Universe and Its Stars</p> <p>3) Analyze data to predict patterns between sunrise and sunset, and the change of seasons. Component Idea: B. Earth and the Solar System</p>	<ul style="list-style-type: none"> • earth • rotate • revolve • axis – tilted • sunrise/sunset • orbit • cycle • dawn/dusk • star • astronomers • satellite • rotation • binoculars • telescope • observatory • craters • phases • waxing • waning • crescent • gibbous moon • full moon • quarter moon • lunar eclipse • lunar • tides • sunrise • sunset • axis • revolve • tilt • northern hemisphere 	<p>EXPLANATION: This is the first point in their education where students will consider events in space. The focus should be on making observations that reinforce that celestial bodies are changing and in motion. Examples of patterns may include the sun and moon appearing to rise in one part of the sky move across the sky and set, the shape and presence of the moon changing in a manner different than the sun, stars twinkling, and stars other than the sun are visible at night but not the day. <i>(Students should focus on patterns for the shapes of the moon, rather than rote memorization of the names of lunar phases.)</i></p> <p>EXPLANATION: Students should be led to the realization that observations with their naked eye are limited and that the vastness of space can be revealed to an even greater degree using a telescope. Examples may include students journaling their findings by observing the night sky with their naked eye.</p> <p>Telescopes have two primary benefits, they allow us to distinguish light from stars that might otherwise go unnoticed with the naked eye, and also allow us to perceive details in the surface of the moon or other celestial bodies. A field trip to an observatory or setting up a simple telescope may help students learn that a telescope will help them see objects in the sky in greater detail.</p> <p>EXPLANATION: This standard can build on observations from kindergarten where students observed temperature variations across the seasons. Coupled with physical science investigations on energy, students are prepared to explain the temperature variations observed in kindergarten. The emphasis of this standard should be on a relative comparison of the length of daylight hours in each season. Students can collect this data on an on-going</p>	<p>Houghton Mifflin Harcourt: Unit 6: Objects in the Sky Lesson 1: What Can We See in the Sky? Lesson 2: How Does the Sky Seem to Change? Lesson 3: How Does the Sun Seem to Move? **Inquiry Flipchart Lesson 4: What Are Seasons? Lesson 5: How Can We Analyze Patterns for Seasonal Change? **Inquiry Flipchart</p> <p>Leveled Readers: How Does the Sky Seem to Change? A Closer Look at Telescopes</p> <p>Brain Pop Jr.: Earth Sun Solar System Moon Seasons Winter Spring Summer Fall</p> <p>R2BR Texts: What Makes Day and Night by Franklyn M. Branley Moon Cake by Frank Asch The Moon Book Goodnight Moon by Margaret Wise Brown The Sun is Kind of a Big Deal</p> <p>R2BR Small Group Text(s): Day and Night The Sun Let's Go to The Moon</p> <p>R2BR Resources: Earth's Rotation & Revolution (4:00)</p> <p>Discovery Education: The Movement of the Earth (segment 4:18)</p>	<p>CROSSCUTTING CONCEPT: Pattern--Students recognize, classify, and record the patterns they observe in nature or man-made objects.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Analyzing and interpreting data. Students set a foundation for data analysis by recording their thoughts and observations about patterns and events in a manner that can be shared with others.</p> <p>CROSSCUTTING CONCEPT: Scale, Proportion, and Quantity Students make comparisons using relative scales. (e.g., bigger or smaller, closer or further, sooner or later)</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Analyzing and interpreting data Students set a foundation for data analysis by recording their thoughts and observations about patterns and events in a manner that can be shared with others.</p>

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	<ul style="list-style-type: none"> • southern hemisphere • winter solstice • summer solstice • seasons 	<p>basis. This can be accomplished through direct observation during some parts of the year, or through daily news publications . <i>(In first grade, students should infer that there is some cause for the patterns in their data, but discussions of a mechanism for seasonal changes in daylight hours due to the tilt of the earth's axis will be addressed in fourth grade.)</i></p>	<p>Rotation of Earth (1:24) Physical Characteristics of the Moon (2:27) Phases of the Moon (2:30) Our Moon (2:14) Astronomy (1:08) The Sun (2:03) Earth Doesn't Sit Still, Why Should You? (5:27) Hot Sand, Cool Water (5:14)</p> <p>Studies Weekly: SW10 MLK Jr.</p>	
Week 5-8 Multiculturalism				
Week 9 Read Across America Week				
Week 10 Science Waves and Their Application in Technologies for Information Transfer				
<p>Waves and Their Application in Technologies for Information Transfer</p> <p>1.PS4: 1) Use a model to describe how light is required to make objects visible. Summarize how illumination could be from an external light source or by an object giving off its own light.</p> <p>2) Determine the effect of placing objects made with different materials (transparent, translucent, opaque, and reflective) in the path of a beam of light.</p>	<ul style="list-style-type: none"> • artificial • natural • electricity • energy • reflect • wave • opaque • transparent • translucent • shadow • refract 	<p>EXPLANATION: Objects become visible when light from an external light source is reflected off the surface of an object. In the absence of any external light source, no light reflects off the surface of the object, and we cannot detect the object using our sense of sight. Some objects (such as fires, or the Sun) get hot enough that they can give off their own sources of light. Example experiences may include the inability to observe objects in a completely dark room. Pinhole viewers may be constructed using tubes from paper towel rolls or empty tubes from chips and used to observe a candelabra light bulb or trees or objects outdoors. Students can then diagram the events necessary to create the image projected on the back of the pinhole camera/viewer. <i>(The speed of light and wave properties should not be discussed, merely the idea that light travels in straight paths.)</i></p> <p>EXPLANATION: Some objects may appear invisible (such as glass) when they do not absorb any light, others may absorb all light and therefore be easier to see, while others can redirect the pathway of light allowing the otherwise straight path to be diverted. If pinhole viewers are constructed, students can place these materials in front of the pinhole and observe the effects. Shadows are created when the path of light is blocked before it strikes a surface, but mirrored surfaces can be used to redirect a beam of light around obstacles. <i>(The scattering of light by rough surfaces may be discussed but is not a principle part of this standard.)</i></p>	<p>Houghton Mifflin Harcourt: Unit 3: Light Lesson 1: What Are Ways We Use Light? Lesson 2: How Do Different Materials Affect the Path of Light? **Inquiry Flipchart STEM: See the Light/Bright Ideas</p> <p>Leveled Readers: What Are Forces and Energy?</p> <p>Brain Pop Jr.: Energy Sources Light</p> <p>R2BR Text(s): The Energy We See: A Look at Light</p> <p>R2BR Resources: Refraction (experiment) Lights On (light source sort FREE)</p> <p>Discovery Education What's in a Shadow? (14:31) What is Light? (9:59)</p>	<p>CROSSCUTTING CONCEPT: Pattern Students recognize, classify, and record the patterns they observe in nature or man-made objects.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Developing and using models Students make drawings, displays, and simple representations for events they experience through their senses, incorporating relative scales when appropriate.</p> <p>CROSSCUTTING CONCEPT: Cause and Effect Students identify cause and effect relationships through observable patterns, utilizing simple tests to provide evidence that supports or refutes their ideas.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Analyzing and interpreting data</p> <p>Students set a foundation for data analysis by recording their thoughts and observations about patterns and events in a manner that can be shared with others.</p>

Fourth Quarter

TN State Standards	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 1-2 Science From Molecules to Organisms; Structures and Processes				
<p>1LS1: 1) Recognize the structure of plants (roots, stems, leaves, flowers, fruits) and describe the function of the parts.(taking in water and air, producing food, making new plants) Component Idea: A. Structure and Function</p> <p>2) Illustrate and summarize the life cycles of plants 3) Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways. Component Idea: B. Growth and Development of Organisms</p> <p>1LS2: 1) Conduct an experiment to show how plants depend on air, water, minerals from soil, and light to grow and thrive. Component Idea: A. Interdependent Relationships in Ecosystems</p>	<ul style="list-style-type: none"> • pollination • nectar • fruit/pod • seed coat • germination • cycle <p style="margin-left: 40px;">flower parts:</p> <ul style="list-style-type: none"> • petal • stigma • pollen • stem • roots • shoot • flower • buds <ul style="list-style-type: none"> • germination • pollination • seedling • soil 	<p>EXPLANATION: All organisms have external structure with specific functions which aid in their survival. The focus of this standard is to examine these structures in plants exclusively and builds on kindergarten investigations where students compared the structural differences between plants and animals.</p> <p>Examples may include: the roots anchor the plant and take in water and nutrients, the stem takes water and nutrients to the rest of the plant, the leaves make food for the plant and take in air through openings in the leaves, the flower makes plant seeds, and the fruit protects the plant seeds</p> <p>EXPLANATION: There are predictable changes that accompany each stage of life, and these changes are similar across unrelated organisms. Adult organisms can reproduce and have their own young. For example, plants sprout with one or two leaves emerging first, or a flower will wither and fall off a plant after being pollinated. Further examples may include different ways plants: grow (e.g., increase in size, produce new part), reproduce (e.g., develop seeds and spores, root runners), and die (e.g., length of life). There are also characteristics of adults and offspring that aid in their reproductive successes, such as producing of hardened seeds, attracting pollinators, germinating under favorable conditions, or flower buds opening at during the same times as other related plants.</p>	<p>Houghton Mifflin Harcourt: Unit 4: Plants Lesson 3: What Are Some Parts of Plants? Unit 5: Plants and Their Environments Lesson 1: What Are Some Plant Life Cycles? People in Science: George Washington Carver</p> <p>Leveled Readers: What is a Plant? Soil for Our Garden</p> <p>Brain Pop Jr.: Parts of a Plant Plant Life Cycle Soil</p> <p>R2BR Text(s): NGR: Seed to Plant The Gardener by Sarah Stewart</p> <p>R2BR Small Group Text(s): From Seed to Plant from Gail Gibbons A Tree is a Plant</p> <p>R2BR Resources: Nearpod "We Eat Plant Parts" Nearpod "Parts of a Plant"</p> <p>Discovery Education: Plant Parts and Their Uses (11:35) Bees- Pollination (1:13) Germination (2:25) Plant Life Cycles (1:54) Why Plants are Important (1:37) Plant Parts and Needs (1:23) Steps to Plant a Garden (2:08) Pollination (1:05)</p>	<p>CROSSCUTTING CONCEPT: Structure and Function--Students investigate how the roles of specific components of a system affect the functioning of the larger system.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Constructing explanations and designing solutions--Students generate explanations for natural phenomena that incorporate relevant evidence.</p> <p>CROSSCUTTING CONCEPT: Stability and Change Students begin to track and describe changes in a system using relative scales</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Developing and using models --Students make drawings, displays, and simple representations for events they experience through their senses, incorporating relative scales when appropriate.</p>

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		<p>EXPLANATION: Plants are unique in an ecosystem because they are able to sustain life without eating. Plant roots prevent them from moving to more favorable locations so certain plants will survive better in different settings with varying amounts of water, minerals, and light. Understanding why specific organisms survive only in certain areas requires that students understand the reliance of plants on air, water, and minerals from the soil. Experiments with plants may include comparing results of a variable such as growth with and without air, or light, or water, or minerals from soil (e.g., nitrogen, phosphorous, etc.).</p>		
Week 3 Frogs				
<p>Frogs 1.ESS1: 3) Analyze data to predict patterns between sunrise and sunset, and the change of seasons.</p>	<ul style="list-style-type: none"> • Right (correct) • Spring • autumn • Winter • Budge • Pardon me • Edge • Seasons • hibernate • migrate • temperature 	<p>EXPLANATION: As part of the design process, students should begin to understand that there can be multiple solutions to a single problem. In later grades, students will evaluate competing solutions based on their ability to work with criteria for success and constraints. In first grade, students should be preparing for this process by making observations before they begin to design a solution. Students can be given a problem to solve and tasked with making relevant observations. An example could be “How long does it take an ice cream bar to melt?” Students would observe the ice cream bar every 30 minutes.</p>	<p>Houghton Mifflin Harcourt: Unit 1: How Scientists Work <u>Lesson 1:</u> What Are Senses and Other Tools? <u>Lesson 2:</u> How Can We Use Our Senses? <u>Lesson 3:</u> What Are Inquiry Skills? <u>Lesson 4:</u> How Do We Use Inquiry Skills? **Inquiry Flipchart <u>Lesson 5:</u> How Do Scientists Work?</p> <p>HMH Leveled Readers: How Do You Investigate</p> <p>Brain Pop Jr.: Scientific Method Science Projects Making Observations</p> <p>R2BR Text(s): Frog on His Own</p>	<p>CROSCUTTING CONCEPT: Systems and System Models Students identify and describe parts and their roles in the inner workings as part of a larger system/object.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Analyzing and interpreting data Students analyze observations and measurements for a device to ensure it satisfies specifications.</p>
Week 4-5 Economics				
Week 6-8 Economics, Geography, Government and Civics (Tennessee) Family Life Week (Science Grades-TN state tree, flower, bird, animal) and Family Life				
Week 9 History				