

Second Grade Science Curriculum Guide

Bartlett City Schools (May 2018)

Second Grade Science Curriculum Pacing Guide 2018-2019

First Nine Weeks			Second Nine Weeks		
Week	Topics	Content	Week	Topics	Content
1-2	Social Studies		1	2.ETS1: Engineering Design	R2BR – Rosie Revere, Engineer
3-5	2.ESS1 Earth’s Place in the Universe 2.ESS2 Earth’s Systems	R2BR-A Walk in the Desert (R.S.), Erosion-Changing Earth’s Surface, SSW 2 Where is the U.S.?	2-6	Social Studies	
6-7	Social Studies		7-8	2.PS4 Waves and Their Applications in Technologies for Information Transfer 2.ETS1 Engineering Design	R2BR-All About Sound, Light is All Around Us
8-9	2.LS1 From Molecules to Organisms: Structures and Processes 2.LS2 Ecosystems: Interactions, Energy, and Dynamics	R2BR-Spiders, Anansi Goes Fishing, Anansi and the Moss Covered Rock, Spider and the Fly			

Third Nine Weeks			Fourth Nine Weeks		
Week	Topics	Content	Week	Topics	Content
1-2	2.LS2 From Molecules to Organisms: Structures and Processes 2.LS2 Ecosystems: Interactions, Energy, and Dynamics	R2BR-The Wolves Are Back, A Drop Around the World, SSW 11 Changes in the Community	1-2	2.LS1 From Molecules to Organisms: Structures and Processes 2.LS2 Ecosystems: Interactions, Energy and Dynamics 2LS3 Heredity: Inheritance and Variation of Traits	R2BR-Frogs, The Mysterious Tadpole
3-7	Social Studies		3-4	Social Studies	
8	Social Studies		5	TCAP	
9	2.PS2 Motion and Stability: Forces and Interactions 2.PS3 Energy 2.ETS2: Links Among Engineering, Technology, Science and Society	R2BR-Give it a Push! Give it a Pull!	6-7	(Cinderella-culture) *R2BR	
			8-9	2.LS1 From Molecules to Organisms: Structures and Processes	R2BR - Charlotte’s Web
			10	Last week of school	

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First Nine Weeks				
TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 1 What If Everybody Did That? SSW Week 1-Welcome to 2 nd Grade, SSW Week 4-Good Citizens				
Week 2 The Name Jar, Iris & Walter, SSW Week 3-Rules and Responsibilities, SSW Week 5-History and Time				
Week 3 A Walk in the Desert Erosion				
DCI: 2.ESS1: Earth's Place in The Universe				
<p>2.ESS1.1 Recognize that some of Earth's natural processes are cyclical while other have a beginning and an end. Some events happen quickly, while others occur slowly over time.</p> <p><u>COMPONENT IDEA:</u> <i>C. The History of Planet Earth</i></p>	<p>R2BR – crust mantle outer core inner core erosion weathering stream flashflood riverbank landscape bank shore cliffs expand glacier dune desert</p> <p>evaporate water vapor condense water cycle precipitation erosion earthquake landslide volcano</p>	<p>EXPLANATION: Some processes taking place on the Earth occur within a single day. However, the age of the Earth is so much greater than our lifespans that gradual changes to the Earth often go undetected, yet their cumulative effects have led to the variety of Earth's surface features, such as canyons and mountain ranges. Events such as earthquakes that occur quickly can contribute to gradual changes to Earth. It is essential that students begin to build an understanding for these prolonged changes to grasp discussions of other standards in second grade and beyond. Cyclic events might include day turning to night, compared to non-cyclic events such as volcanic eruptions or other natural hazards.</p>	<p>McGraw-Hill (2002) Unit C Chapter 5, Lesson 1, pgs. C2-C11 Unit C Chapter 5 Lesson 2, pgs. C12-C17 Unit C Chapter 5 Lesson 3, pgs. C18-C23</p> <p>Brain Pop - Slow Land Changes</p> <p>Additional Read Alouds</p>	<p>CROSSCUTTING CONCEPT: Scale, Proportion, and Quantity <i>Students make comparisons using relative scales (e.g., bigger or smaller, closer or further, sooner or later).</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Using mathematics and computational thinking <i>Students recognize patterns and make comparisons using counting and number lines.</i></p>

First Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
<p>Week 4 Erosion-Changing Earth's Surface (Possible AimsWeb Testing)</p>				
<p>DCI: 2.ESS2: Earth's Systems</p>				
<p>2.ESS2.1 Compare the effectiveness of multiple solutions designed to slow or prevent wind or water from changing the shape of the land.</p> <p>COMPONENT IDEA: <i>E. Biogeology</i></p>	<p>R2BR- volcanoes glaciers mountains valleys erupt basalt – lava rock sediment weathering expand contract dunes rock formations splash erosion runoff saturate currents boulders valleys coast cliff pebbles bridge arch sea stack glacier iceberg</p>	<p>EXPLANATION: Carrying out this activity is designed to introduce students to the impact that humans can have on the Earth's geologic processes. Producing models of their solutions can be used to introduce the students to a qualitative sense of scale as they consider appropriate selections of materials to test their solutions. In later grades, students will explore the role that living organisms have in producing soils or transforming Earth's atmosphere. Solutions to be compared may include different designs of dikes/windbreaks and different designs for using shrubs, grass, or trees to prevent erosion.</p>	<p>McGraw-Hill (2002) Unit C Chapter 5 Lesson 2, pgs. C12-C17</p> <p>Cause and Effect on the Land (download pdf)</p> <p>How Can Water Change the Shape of the Land?</p> <p>Brain Pop - Erosion</p> <p>Additional Read Alouds</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: Using mathematics and computational thinking Students compare two different solutions to a problem from collected data.</p>

First Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 5 <u>Weathering and Erosion</u> SSW Week 2 Where in the U.S.?				
DCI: 2.ESS2: Earth's Systems				
<p>2.ESS2.2 2) Observe and analyze how blowing wind and flowing water can move Earth materials (soil, rocks) from one place to another, changing the shape of a landform and affecting the habitats of living things.</p> <p>COMPONENT IDEA: <i>A. Earth Materials and Systems</i></p> <p>2.ESS2.2 3) Compare simple maps of different land areas to observe the shapes and kind of land (rock, soil, sand) and water (river, stream, lake, pond).</p> <p>4) Use information obtained from reliable sources to explain that water is found in the ocean, rivers, streams, lakes, and ponds, and may be solid or liquid.</p>	<p>R2BR- natural disaster plates earthquake landslides tsunami force topsoil nutrients ranchers loggers brainstorming model windbreak landslide levee ditches variable prediction observation</p>	<p>EXPLANATION: The focus of this standard is to begin a discussion of how Earth's systems interact and cause changes over time. This standard explores interactions within the atmosphere, hydrosphere, geosphere, and biosphere. Over long periods of time, such interactions have contributed to the diversity of organisms on Earth. Examples of types of landforms may include hills, river banks, valleys, and dunes.</p>	<p>McGraw-Hill (2002) Unit C Chapter 5, Lesson 3, pgs. C18-C27</p> <p>Landform Experts Research</p> <p>NASA Models of Land/Water</p> <p>Erosion Lesson</p> <p>Additional Read Alouds</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: Constructing explanations and designing solutions Students generate explanations for natural phenomena that incorporate relevant evidence.</p>
Week 6 Maps & Globes, Henry & Mudge, SSW Week 13 Maps and Globes, SSW Week 14 Using Maps				
Week 7 Week 7 Beginner's World Atlas, SSW Week 15 Earth				

First Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
<p>Week 8 Spiders, Anansi Goes Fishing, Spiders, Spider and the Fly</p>				
<p>DCI: 2.LS1: From Molecules to Organisms: Structures and Processes</p>				
<p>2.LS1.1 Use evidence and observations to explain that many animals use their body parts and senses 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.</p> <p>COMPONENT IDEA: <i>A. Structure and Function</i></p>	<p>R2BR- lurk vibrations pounces prey* venom fangs digestive juices cephalothorax abdomen spinnerets molting molting armor</p>	<p>EXPLANATION: Early in their life sciences education, students should be making the connection that external structures on organisms have specific functions to aid in their survival. In later grades, this idea will be extended to internal organs, and finally to cellular structures. Examples may include grizzly bears using their long claws to dig winter dens and break apart logs to find insects to eat; the eyes and nose of crocodiles stick up above its head so it can hide under water and still keep a lookout for prey; and rhinos use their ears like radar because they have poor eyesight. <i>(Both first-hand observations and texts can be used as evidence.)</i></p>	<p>McGraw-Hill (2002) Unit A Chapter 2 Lesson 5, pgs. A32-A35</p> <p>Amazing Animal Senses - website</p> <p>Additional Read Alouds</p>	<p>CROSSCUTTING CONCEPT: Systems and System Models <i>Students identify and describe parts and their roles in the inner workings as part of a larger system/object.</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Engaging in argument from evidence <i>Students create and identify evidence-based arguments and consider degree to which an argument is supported by evidence.</i></p>

First Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 9 Anansi and the Moss Covered Rock, Spider & the Fly				
DCI: 2.LS1: From Molecules to Organisms: Structures and Processes DCI: 2.LS2: Ecosystems: Interactions, Energy, Dynamics				
<p>2.LS1.1 Use evidence and observations to explain that many animals use their body parts and senses 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.</p> <p>COMPONENT IDEA: <i>A. Structure and Function</i></p> <p>2.LS1.2 Obtain and communicate information to classify animals (vertebrates- mammals, birds, amphibians, reptiles, fish, invertebrates- insects) based on their physical characteristics.</p> <p>COMPONENT IDEA: <i>A. Structure and Function</i></p>	<p>R2BR- lurk vibrations pounces prey* venom fangs digestive juices cephalothorax abdomen spinnerets molting molting armor</p> <p>vertebrates mammals birds amphibians reptiles fish invertebrates insects classification</p>	<p>EXPLANATION: Early in their life sciences education, students should be making the connection that external structures on organisms have specific functions to aid in their survival. In later grades, this idea will be extended to internal organs, and finally to cellular structures. Examples may include grizzly bears using their long claws to dig winter dens and break apart logs to find insects to eat; the eyes and nose of crocodiles stick up above its head so it can hide under water and still keep a lookout for prey; and rhinos use their ears like radar because they have poor eyesight. <i>(Both first-hand observations and texts can be used as evidence.)</i></p> <p>EXPLANATION: Organisms survive in their habitat because they have features that provide them advantages. By examining a variety of different animals facing different environmental pressures, students can begin to identify common adaptations that have developed over time. Examples may include that vertebrates have backbones and invertebrates do not, birds have beaks, reptiles have scales, amphibians have permeable skin, and fish have gills. <i>(Criteria for classification should be limited to observable differences in anatomy or life cycle and address anatomical features, but not physiological functions.)</i></p>	<p>McGraw-Hill (2002) Unit A Chapter 2, Lesson 2, pgs. A36-A43 Unit A Chapter 2, Lesson 3, pgs. A44-A49</p> <p>Animal Senses - website</p> <p>Additional Read Alouds</p> <p>McGraw-Hill (2002) Unit A Chapter 2 Lesson 5, pgs. C32-A35</p> <p>Brain Pop - Classifying</p> <p>Animal Classification - lesson</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: Engaging in argument from evidence Students create and identify evidence-based arguments and consider degree to which an argument is supported by evidence.</p> <p>CROSSCUTTING CONCEPT: Pattern <i>Students recognize, classify, and record the patterns they observe in nature or man-made objects.</i></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. <i>(Communicate)</i> Students utilize writing, drawing, and modeling to communicate information.</p>

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Second Nine Weeks				
TN State Standards (Next Generation)	Vocabulary	Guiding Questions	Learning Outcomes	Content
Week 1 Rosie Revere, Engineer, SSW Week 7 Technology, Exploring Space as an Astronaut, SSW Week 8 Explorers				
<i>DCI: 2.ETS1: Engineering Design</i>				
<p>2.ETS1.1 Define a simple problem that can be solved through the development of a new or improved object or tool by asking questions, making observations, and gathering accurate information about a situation people want to change</p> <p><u>COMPONENT IDEA:</u> <i>A. Defining and Delimiting and Engineering Problems</i></p>	<p>R2BR – not available yet</p>	<p>EXPLANATION: In earlier grades, students have been presented with a problem and worked to make observations that were relevant to the process of formulating that problem. Students should now be presented the opportunity to take a situation or object that can be improved and create a design problem around this improvement. Asking questions, making observations, and gathering accurate data to come up with a solution for a new or improved tool to solve problems may include examples arising from what happens to animals when the environment changes due to temperature fluctuations, cutting down trees, wildfires, pollution, salinity changes, and the effects of drought. Computers or tablet devices are effective tools to research accurate data from reliable resources, and programs may be used to help organize the data found.</p>	<p style="text-align: center;">Additional Read Alouds</p>	<p><u>CROSSCUTTING CONCEPT:</u> <i>Systems and System Models Students identify and describe parts and their roles in the inner workings as part of a larger system/object.</i></p> <p><u>SCIENCE AND ENGINEERING PRINCIPLE:</u> <i>Asking questions (for science) and defining problems (for engineering) Students explicitly describe a design problem that can be solved using an new object or device.</i></p>
Week 2 If You Lived with a Cherokee, Turtle’s Race, SSW 9				
Week 3 Jingle Dancer (read aloud from Textbook) Sequoyah (R.W.)				
Week 4 Molly’s Pilgrim, SSW Week 10 The Pilgrims Come to America				
Week 5 Molly’s Pilgrim, The Quilt Story, SSW Week 12 Changes for American Indians				
Week 6 SSW Week 19 American Cultures (Possible Aims Web Testing				

Second Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 7 All About Sound				
DCI: 2.PS4: Waves and Their Applications in technologies for Information Transfer				
<p>2.PS4.1 Plan and conduct investigations to demonstrate the cause and effect relationship between vibrating materials (tuning forks, water, bells) and sound.</p> <p>COMPONENT IDEA: <i>A. Wave Properties: Mechanical and Electromagnetic</i></p> <p>2.PS4.2 Use tools and materials to design and build a device to understand that light and sound travel in waves and can send signals over distances.</p> <p>COMPONENT IDEA: <i>C. Information Technologies and Instrumentation</i></p> <p>2.ETS1.2 Develop a simple sketch, drawing, or physical model that communicates solutions to others.</p> <p>COMPONENT IDEA: <i>B. Developing Possible Solutions</i></p> <p>2.ETS1.3 Recognize that to solve a problem, one may need to break the problem into parts, address each part, and then bring the parts back together.</p> <p>COMPONENT IDEA: <i>B. Developing Possible Solutions</i></p>	<p>R2BR – not available yet</p> <p>tuning forks</p> <p>sound waves vibrate</p> <p>pitch</p>	<p><small>EXPLANATION: All waves are repeating patterns of highs and lows that transfer energy from one place to another. Investigations of waves moving across the surface of a pool of water should result in students noting that objects (such as corks) floating on the surface of the water move up and down as the wave passes beneath them, but the objects do not travel along with the wave. Students might note that surfers or objects caught near the shore move back and forth. Such instances are not exceptions and can be explained by differentiating between waves in relatively deep or shallow water. In the case of sound, it is a variation between high pressure pockets of air and low-pressure pockets of air. Students should focus on the connection that when objects vibrate back and forth, they make sound. Stopping the vibration causes the sound to end. Examples of vibrating materials that make sound may include a tuning fork or plucking a stretched rubber band or guitar string. To observe sound making an object vibrate, hold a piece of paper next to a speaker playing loud music.</small></p> <p><small>EXPLANATION: Since early times, humans have been communicating over long distances through systems such as smoke signals or Morse code. There are several historical lessons on information theory, such as those found on Khan Academy, which discuss unique approaches to sending messages over distance. Now, digital signals can be sent using waves. Students might devise a device which is capable of transmitting a message (spoken or encoded) over a distance. Options may include, flashes of light in a darkened room, two cups joined by a string, or even a focused light source shining on a solar cell connected to an amplified speaker. Challenges to this activity to inspire creativity might include increasing the complexity of the message, or using the device to conduct a two-way exchange resulting in some action taken from the recipients at either end.</small></p>	<p>McGraw-Hill (2002) Unit E Chapter 10 Lesson 6, pgs. E42-E49</p> <p>Brain Pop Jr - Sound</p> <p>Light, Heat, and Sound Lesson Materials</p> <p>Sound Vibrations</p> <p>Additional Read Alouds</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: Planning and carrying out controlled investigations Students carry out investigations in groups, making decisions about suitable measurements for data collection in order to answer a question.</p> <p>CROSSCUTTING CONCEPT: Structure and Function 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: Constructing explanations and designing solutions Students design and/or build a device that solves a specific given problem and evaluate competing solutions.</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: Obtaining, evaluating, and communicating information (Communicate) Students utilize writing, drawing, and modeling to communicate information.</p> <p>CROSSCUTTING CONCEPT: Energy and Matter Students understand that objects can be deconstructed and reassembled in the same or different ways to form a foundation for understanding transformations of energy and matter.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Planning and carrying out controlled investigations Students determine whether a proposed object or tool will meet criteria for success based on past experiences, observations or measurements.</p>

Second Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 8 Light is All Around Us				
DCI: 2.PS4: Waves and Their Applications in Technologies for Information Transfer				
<p>2.PS4.3 Observe and demonstrate that waves move in regular patterns of motion by disturbing the surface of shallow and deep water.</p> <p><u>COMPONENT IDEA:</u> A. Wave Properties: Mechanical and Electromagnetic</p>	<p>R2BR – not available yet</p> <p>light reflect refraction</p>	<p>EXPLANATION: Deep or shallow waters are relative to the height of a wave, not an absolute measured depth. Water can be described as deep whenever its depth is greater than half the wave amplitude. Waves moving through deep water cause the surface of the water to move up and down as the wave passes. Individual water molecules don't travel away from their original position; they move in place, in a circular pattern. An object floating on the surface of this water will bob up and down and shift right to left in the same pattern as the water particles beneath it. However, over a period of time, it can be seen that the object never travels across the surface of the water. Table tennis balls and under-bed storage bins can be used as demonstrations. If a wave travels into shallow water (water that is <math><1/2</math> of the wave's amplitude), it will topple (e.g., waves rolling onto beaches, or a boat wake at the edge of a river or lake.</p>	<p>McGraw-Hill (2002) Unit E Chapter 10 Lesson 5, pgs. E36-E41</p> <p>Mystic Mirrors (download pdf)</p> <p>Additional Read Alouds</p>	<p><u>CROSSCUTTING CONCEPT:</u> Pattern Students recognize, classify, and record the patterns they observe in nature or man-made objects.</p> <p><u>SCIENCE AND ENGINEERING PRINCIPLE:</u> Developing and using models Students make drawings, displays, and simple representations for events they experience through their senses, incorporating relative scales when appropriate.</p>

Third Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 1 The Wolves Are Back				
DCI: 2.LS1: From Molecules to Organisms: Structures and Processes				
<p>2.LS2.1 Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.</p> <p><u>COMPONENT IDEA:</u> A. Interdependent Relationships in Ecosystems</p>	<p>R2BR – not available yet</p> <p>habitat woodland forest migrate rain forest desert Arctic pond stream ocean food web pollution recycle</p>	<p>EXPLANATION: To survive, animals must find sources of food, as well as protection from other animals or the environment. In first grade, students learned that plants need sunlight, water and air to grow. Animals must eat plants or other animals to fulfill their needs. Some examples may include: a picture of a bear with a stream near its home with arrows pointing to the cave, stream, and bushes (eating and dispersing seeds) labeling shelter and food, a group of fish schooling together to avoid being eaten; and bees using nectar from flowers and flowers being pollinated by bees.</p>	<p>McGraw-Hill (2002) Unit B Chapter 3/4 Lessons 1-7, pgs. B4-B43</p> <p>Flight of the Pollinators - video clip</p> <p>Additional Read Alouds</p>	<p><u>CROSSCUTTING CONCEPT:</u> 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><u>SCIENCE AND ENGINEERING PRINCIPLE:</u> Engaging in argument from evidence Students create and identify evidence- based arguments and consider degree to which an argument is supported by evidence.</p>

Third Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 2 A Drop Around the World, SS Week 11 Changes in the Community				
DCI: 2. LS2 Ecosystems: Interactions, Energy, and Dynamics				
<p>2.LS2.2 Predict what happens to animals when the environment changes (temperature, cutting down trees, wildfires, pollution, salinity, drought, land preservation)</p> <p>COMPONENT IDEA: C. Ecosystem Dynamics, Functioning, and Resilience</p> <p>2.ETS2.2 Predict and explain how human life and the natural world would be different without current technologies.</p> <p>COMPONENT IDEA: B. Influence of Engineering, Technology, and Science on Society and the Natural World</p>	<p>R2BR – not available yet</p> <p>temperature pollution salinity drought land preservation recycle oil spill</p>	<p>EXPLANATION: The organisms in an environment thrive because they have adaptations suitable to particular conditions. Changes in environmental conditions may cause an organism to move into or out of a region or cause changes in the relative sizes of different populations within that system. Examples of what might happen to animals when the environment changes may include animals adjusting to temperature changes by changing their location, such as fish changing depth in the water or reptiles sunning themselves on rocks on cool days. When trees are cut down or wildfires occur animals lose their homes, they have to compete with other animals for survival, they relocate changing the makeup of an area, or they don't survive.</p>	<p>McGraw-Hill (2002) Unit B Chapter 4 Lesson 8, pgs. B44-B49</p> <p>Why Do We Need Bees?</p> <p>Additional Read Alouds</p>	<p>CROSSCUTTING CONCEPT: Stability and Change Students begin to question causes for stability and change and why some systems do not change.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Constructing explanations and designing solutions Students generate explanations for natural phenomena that incorporate relevant evidence. (Communicate) Students utilize writing, drawing, and modeling to communicate information.</p> <p>CROSSCUTTING CONCEPT: Systems and System Models <i>Students investigate how the roles of specific components of a system affect the functioning of the larger system.</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Engaging in argument from evidence <i>Students can make and support claims about a proposed device or solution.</i></p>
Week 3 The Live Poems About Famous Americans				
Week 4 Ruby Bridges, Helen Keller and the Big Storm				
Week 5 RW-Jackie Robinson, RW-Wilma Rudolph, Just Like Josh Gibson, SSW Week 29 TN Voices				
Week 6 When Marian Sand, A Weed is a Flower, SSW Week 23 Scientists, Artists, Inventors				
Week 7 Amelia and Eleanor, George Washington (EPIC), One Dark Night, SSW 16 Presidents				
Week 8 O Say Can You See! Red, White and Blue (S.F.), SSW Week 17 Celebrate America, SSW Week 18 Landmarks, SSW 21 Govt/Citizenship				

Third Nine Weeks				
TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 9 Give it a Push! Give it a Pull!				
DCI: 2.PS2 Motion and Stability: Forces and Interactions				
DCI: 2.PS3 Energy				
DCI: 2.ETS2: Links Among Engineering, Technology, Science, and Society				
<p>2.PS2.1 Analyze the push or the pull that occurs when objects collide or are connected.</p> <p>COMPONENT IDEA: A. Forces, Fields, and Motion</p> <p>2.ETS2.1 Use appropriate tools to make observations, record data, and refine design ideas.</p> <p>COMPONENT IDEA: A. Interdependence of Science, Technology, Engineering, and Math</p> <p>2.PS2.2 Evaluate the effects of different strengths and directions of a push or a pull on the motion of an object.</p> <p>COMPONENT IDEA: A. Forces, Fields, and Motion</p>	<p>R2BR – not available yet</p> <p>motion</p> <p>push</p> <p>pull</p> <p>force</p> <p>gravity</p> <p>friction</p> <p>lever</p> <p>fulcrum</p> <p>ramp</p>	<p>EXPLANATION: Students should consider that when two objects are in contact, they act with equal forces on one another. Analysis of the push or pull should include considering that forces have both a size (called "magnitude" in later grades) and a direction. This is true for objects at rest or in motion. Evidence for this observation can be collected by placing two bathroom scales between a pair of students and having them push off of one another, or two students pulling backwards on a pair of spring scales. Even in instances where one student may be seated in a rolling chair or on a skateboard, the two scales will give the same readings. <i>(Students should only focus on relative values of the scale readings, which will always be equal.)</i></p> <p>EXPLANATION: Students may use different systems and methods to create pushes and pulls from different directions. The same size force may be applied to large and small objects, considering differences in outcome. In addition to forces which cause an object to begin to move, forces applied to objects already in motion may also be addressed and their changes to speed and direction of travel. Forces parallel to an object's motion cause the object to speed up or slow down, while forces perpendicular to an object's motion change the direction of the object's motion. Objects that are at rest on a surface or sliding across a surface experience friction forces that always oppose their own motion. Avoid discussions of friction related to rolling objects due to the difficulty in differentiating between static friction that causes rolling motion and rolling resistance which opposes the motion of a rolling object. <i>(Forces that are not either parallel or perpendicular to an object's motion are beyond the scope of this standard due to the complexity of resolving such forces.)</i></p>	<p>McGraw-Hill (2002) Unit F Chapter 11 Lesson 1/2, pgs. F4 – F17</p> <p>Force and Motion - video clip</p> <p>Additional Read Alouds</p> <p>McGraw-Hill (2002) Unit F Chapter 11 Lesson 3/4, pgs. F18- F29</p> <p>Brain Pop Jr - Push/Pull</p>	<p>CROSSCUTTING CONCEPT: Scale, Proportion, and Quantity <i>Students make comparisons using relative scales. (e.g., bigger or smaller, closer or further, sooner or later)</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Analyzing and interpreting data <i>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.</i></p> <p>CROSSCUTTING CONCEPT: Scale, Proportion, and Quantity <i>Students make comparisons using relative scales. (e.g. bigger or smaller, closer or further, sooner or later)</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Analyzing and interpreting data. <i>Students analyze observations and measurements for a device to ensure it satisfies specifications.</i></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: Planning and carrying out controlled investigations Students carry out investigations in groups, making decisions about suitable measurements for data collection in order to answer a question.</p>

<p>2.PS2.3 Recognize the effect of multiple pushes and pulls on an object's movement or non-movement.</p> <p><u>COMPONENT IDEA:</u> C. Stability and Instability in Physical Systems</p>	<p>R2BR – not available yet</p>	<p>EXPLANATION: Students should consider instances of objects at rest and in motion and form explanations for causes of rest or motion. Force diagrams are a powerful model which can be used to help student create explanations for why some objects may slide down a slope, while other objects might remain at rest on the same slope. Objects might also include those suspended from vertical wires or those resting against a wall. Using the bristled portion of a broom, sweep across the top of a bowling ball to change its motion and observe the forces/sweeps required to cause the bowling ball to follow certain paths (e.g., around a circle, through a maze). <i>(Students can use symbols such as arrows of different sizes/lengths to represent relative sizes of forces without actual measurements.)</i></p>	<p>Brain Pop - Force</p> <p>Additional Read Alouds</p>	<p><u>CROSSCUTTING CONCEPT:</u> Stability and Change <i>Students begin to question causes for stability and change and why some systems do not change.</i></p> <p><u>SCIENCE AND ENGINEERING PRINCIPLE:</u> Constructing explanations and designing solutions <i>Students generate explanations for natural phenomena that incorporate relevant evidence.</i></p>
<p>2.PS3.1 Demonstrate how a stronger push or pull makes things go faster and how faster speeds during a collision can cause a bigger change in the shape of the colliding objects.</p> <p><u>COMPONENT IDEA:</u></p>	<p>R2BR – not available yet</p>	<p>EXPLANATION: Students are setting a foundation to understand that forces are a method to transfer energy from one object to another. At this grade level, specific types of energy (e.g., kinetic energy) are not appropriate so it is sufficient to simply describe the effects of forces on the motion or shape. Building on the first-grade metaphor of energy as a substance-like quantity that can be stored or transferred, students have the</p>	<p>Brain Pop - Newton's Laws</p> <p>Additional Read Alouds</p>	<p><u>CROSSCUTTING CONCEPT:</u> 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><u>SCIENCE AND ENGINEERING PRINCIPLE:</u> Analyzing and interpreting data Students set a foundation for data analysis by recording their</p>

<p>C. Relationship Between Energy and Forces and Fields</p> <p>2.ETS1.1 Define a simple problem that can be solved through the development of a new or improved object or tool by asking questions, making observations, and gathering accurate information about a situation people want to change</p> <p>COMPONENT IDEA: A. Defining and Delimiting and Engineering Problems</p>		<p>opportunity to consider that objects store different amounts of energy as they move at different speeds. Transferring more energy to an object by pushing it harder results in greater changes to the objects motion. Energy transfer during a collision results in a greater deformation to the objects involved in the collision. Examples of this behavior can be observed by dropping small balls (e.g., golf balls) into beds of play dough and observing the different amounts of deformation of the play dough based on the speed of the golf ball at the time of the collision. <i>(Measurements can be relative comparisons of the degree to which an object is deformed during a collision.)</i></p>	<p>Building Block Designs in Different Ways</p>	<p>thoughts and observations about patterns and events in a manner that can be shared with others.</p> <p>CROSSCUTTING CONCEPT: Systems and System Models <i>Students identify and describe parts and their roles in the inner workings as part of a larger system/object</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Asking questions (for science) and defining problems (for engineering) <i>Students explicitly describe a design problem that can be solved using a new object or device.</i></p>
<p>2.PS3.2 Make observations and conduct experiments to provide evidence that friction produces heat and reduces or increases the motion of an object.</p> <p>COMPONENT IDEA: D. Energy in Chemical Processes and Everyday Life</p> <p>2.ETS1.4</p>	<p>R2BR – not available yet</p> <p>fuel energy heat</p>	<p>EXPLANATION: In first grade, students see that transferring energy causes the temperature of a surface to increase. Building on this understanding, students can understand that processes such as rubbing their hands together which cause a surface to warm up must be the result of energy transfer to the surface of your hands. Recognizing that rubbing and warming their hands increases the thermal energy stored in their hands can be used to facilitate discussions of where that energy was transferred from, and where the energy is transferred as their hands cool back down. These ideas also explain how friction can cause a sliding object to come to rest, and have energy conserved. Design challenges associated with this standard might ask students to minimize the effects of friction, or evaluate two similar devices that have varying degrees of effectiveness due to frictional losses. Examples may also include investigating how changes to an object's motion correlate with surfaces warming or cooling. <i>(Observations of temperature changes</i></p>	<p>McGraw-Hill (2002) Unit E Chapter 10, Lesson 4, pgs. E30-E35</p> <p>Fish Force Game</p> <p>Additional Read Alouds</p>	<p>CROSSCUTTING CONCEPT: Systems and System Models <i>Students identify and describe parts and their roles in the inner workings as part of a larger system/object.</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Developing and using models <i>Students make drawings, displays, and simple representations for events they experience through their senses, incorporating relative scales when appropriate.</i></p> <p>CROSSCUTTING CONCEPT: Cause and Effect</p>

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<p>Compare and contrast solutions to a design problem by using evidence to point out strengths and weaknesses of the design.</p> <p><u>COMPONENT IDEA:</u> <i>C. Optimizing the Solution Design</i></p>		<p><i>can be limited to qualitative observations.)</i></p> <p>EXPLANATION: A design problem will have multiple solutions. Selecting from a group of solutions is deliberate and requires compromises. Students should evaluate multiple solutions to a process by carrying out tests of the solutions and gather evidence used in a discussion of strengths and weaknesses of particular solutions.</p>		<p><i>Students identify cause and effect relationships through observable patterns, utilizing simple tests to provide evidence that supports or refutes their ideas.</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Using mathematics and computational thinking <i>Students compare two different solutions to a problem from collected data.</i></p>
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Fourth Nine Weeks				
TN State Standards	Vocabulary	Objectives/Learning	Instructional Resources	Crosscutting Concept and Science and

(Next Generation)	Targets			Engineering Principles
Week 1 Frogs				
DCI: 2.LS1 From Molecules to Organisms: Structures and Processes DCI: 2.LS2 Ecosystems: Interactions, Energy, and Dynamics				
<p>2.LS1.3 Use simple graphical representations to show that species have unique and diverse life cycles.</p> <p>COMPONENT IDEA: B. Growth and Development of Organisms</p> <p>2.LS2.1 Develop and use models to compare how animals depend on their surroundings and other living things to meet their needs in the places they live.</p> <p>COMPONENT IDEA: A. Interdependent Relationships in Ecosystems</p> <p>2.ETS1.2 Develop a simple sketch, drawing, or physical model that communicates solutions to others.</p> <p>COMPONENT IDEA: B. Developing Possible Solutions</p>	<p>R2BR- Jellylike Spawn Embryos Gills Algae Oxygen Bulges Vegetarians Lungs Shed Amphibian Cold-blooded transparent Camouflage Vibrate Hibernation Herpetologist</p> <p>life cycle adult pupa larva egg</p>	<p>EXPLANATION: Organisms can appear remarkably similar to or unimaginably different from other organisms. Despite differences in appearance, organisms pass through a common progression of birth, growth and reproduction, and death. At different points along this progression there are common characteristics and abilities, such as the ability to reproduce marking entrance to adulthood. Examples may include different ways animals are born (live birth, from an egg), grow (increase in size and weight, produce new parts through metamorphosis), reproduce (mate and lay eggs that hatch) and die (e.g., length of life).</p> <p>EXPLANATION: To survive, animals must find sources of food, as well as protection from other animals or the environment. In first grade, students learned that plants need sunlight, water and air to grow. Animals must eat plants or other animals to fulfill their needs. Some examples may include: a picture of a bear with a stream near its home with arrows pointing to the cave, stream, and bushes (eating and dispersing seeds) labeling shelter and food, a group of fish schooling together to avoid being eaten; and bees using nectar from flowers and flowers being pollinated by bees.</p>	<p>McGraw-Hill (2002) Unit A Chapter 2 Lesson 7, pgs. A44-A49</p> <p>Brain Pop Jr - Butterflies</p> <p>Brain Pop Jr - Frogs</p> <p>Additional Read Alouds</p> <p>McGraw-Hill (2002) Unit A Chapter 2 Lesson 6, pgs. A36-A43</p> <p>Name That Connection (download pdf)</p> <p>Additional Read Alouds</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: 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: Engaging in argument from evidence Students create and identify evidence-based arguments and consider degree to which an argument is supported by evidence.</p> <p>CROSSCUTTING CONCEPT: Energy and Matter <i>Students understand that objects can be deconstructed and reassembled in the same or different ways to form a foundation for understanding transformations of energy and matter.</i></p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Planning and carrying out controlled investigations <i>Students determine whether a proposed object or tool will meet criteria for success based on past experiences, observations or measurements.</i></p>

Fourth Nine Weeks

TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 2 The Mysterious Tadpole				
DCI: 2.LS2 Ecosystems: Interactions, Energy, and Dynamics DCI: 2.LS3 Heredity: Inheritance and Variation of Traits				
<p>2.LS2.2 Predict what happens to animals when the environment changes (temperature, cutting down trees, wildfires, pollution, salinity, drought, land preservation)</p> <p><u>COMPONENT IDEA:</u> C. Ecosystem Dynamics, Functioning, and Resilience</p> <p>2.LS3.1 Use evidence to explain that living things have physical traits inherited from parents and that variations of these traits exist in groups of similar organisms</p> <p><u>COMPONENT IDEA:</u> B. Variation of Traits</p>	<p>R2BR- Text has no new science related words</p> <p>pollution recycle</p>	<p>EXPLANATION: The organisms in an environment thrive because they have adaptations suitable to particular conditions. Changes in environmental conditions may cause an organism to move into or out of a region or cause changes in the relative sizes of different populations within that system. Examples of what might happen to animals when the environment changes may include animals adjusting to temperature changes by changing their location, such as fish changing depth in the water or reptiles sunning themselves on rocks on cool days. When trees are cut down or wildfires occur animals lose their homes, they have to compete with other animals for survival, they relocate changing the makeup of an area, or they don't survive.</p> <p>EXPLANATION: The complicated understanding of inheritance that students will gain by high school explains mechanisms by which parents are able to pass on genetic information to offspring. These molecular understandings grew out of a need to explain why offspring look like their parents, and why some organisms that are not related by birth still look similar to each other. At this grade level, students should be presented opportunities to uncover patterns in appearance. Examples of physical traits may include a baby giraffe has its parent's long neck, long legs, and fur color. Also, that there are still similarities between two giraffe that are not related by birth. Similarly, oak tree offspring inherit leaf type, bark type, and the ability to produce acorns for reproduction. However, different types of oak trees may have different types of acorns.</p>	<p>McGraw-Hill (2002) Unit B Chapter 4 Lesson 8, pgs. B44 – B49</p> <p>Tadpoles</p> <p>Two Scoops are Better Than One</p> <p>Additional Read Alouds</p>	<p><u>CROSSCUTTING CONCEPT:</u> Stability and Change Students begin to question causes for stability and change and why some systems do not change.</p> <p>SCIENCE AND ENGINEERING PRINCIPLE: Constructing explanations and designing solutions Students generate explanations for natural phenomena that incorporate relevant evidence. (Communicate) Students utilize writing, drawing, and modeling to communicate information.</p> <p><u>CROSSCUTTING CONCEPT:</u> Pattern Students recognize, classify, and record the patterns they observe in nature or man-made objects.</p> <p><u>SCIENCE AND ENGINEERING PRINCIPLE:</u> Engaging in argument from evidence Students create and identify evidence-based arguments and consider degree to which an argument is supported by evidence.</p>
Fourth Nine Weeks				
TN State Standards	Vocabulary	Objectives/Learning	Instructional Resources	Crosscutting Concept and Science and

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(Next Generation)	Targets			Engineering Principles
Week 3 Ox Cart Man, SSW 25 Families and Trade, SSW Week 26 Resources and Choices, SSW Week 27 Goods and Services				
Week 4 The Paper Crane, The Signmaker's Assistant, SSW Week 28, Money and Markets				
Week 5 TCAP Review Week				
Week 6 Cinderella, SS Week 22 Rights and Responsibilities (possible TCAP)				
Week 7 Domitila				
Week 8 Charlotte's Web, SS Week 20 TN Folktale, SS Week 6 TN Place in History				
DCI: 2.LS1: From Molecules to Organisms: Structures and Processes				
<p>2.LS1.3 Use simple graphical representations to show that species have unique and diverse life cycles.</p> <p><u>COMPONENT IDEA:</u> <i>B. Growth and Development of Organisms</i></p>	<p>R2B2: not available yet</p> <p>life cycle pollen seeds fruit flower minerals oxygen</p>	<p>EXPLANATION: Organisms can appear remarkably similar to or unimaginably different from other organisms. Despite differences in appearance, organisms pass through a common progression of birth, growth and reproduction, and death. At different points along this progression there are common characteristics and abilities, such as the ability to reproduce marking entrance to adulthood. Examples may include different ways animals are born (live birth, from an egg), grow (increase in size and weight, produce new parts through metamorphosis), reproduce (mate and lay eggs that hatch) and die (e.g., length of life).</p>	<p>McGraw-Hill (2002) Unit A Chapter 1 Lesson 2 pgs. A10-A13 Unit A Chapter 1 Lesson 3 pgs. A14-A19</p> <p>Life Cycle Game Additional Read Alouds</p>	<p><u>CROSSCUTTING CONCEPT:</u> Pattern <i>Students recognize, classify, and record the patterns they observe in nature or man-made objects.</i></p> <p><u>SCIENCE AND ENGINEERING PRINCIPLE:</u> Developing and using models <i>Students make drawings, displays, and simple representations for events they experience through their senses, incorporating relative scales when appropriate.</i></p>
Fourth Nine Weeks				
Week 9 Charlotte's Web				

DCI: 2.LS1.3 : From Molecules to Organisms: Structures and Processes				
TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
<p>2.LS1.3 Use simple graphical representations to show that species have unique and diverse life cycles.</p> <p><u>COMPONENT IDEA:</u> <i>B. Growth and Development of Organisms</i></p>		<p>EXPLANATION: Organisms can appear remarkably similar to or unimaginably different from other organisms. Despite differences in appearance, organisms pass through a common progression of birth, growth and reproduction, and death. At different points along this progression there are common characteristics and abilities, such as the ability to reproduce marking entrance to adulthood. Examples may include different ways animals are born (live birth, from an egg), grow (increase in size and weight, produce new parts through metamorphosis), reproduce (mate and lay eggs that hatch) and die (e.g., length of life).</p>	<p><u>Additional Read Alouds</u></p>	<p><u>CROSSCUTTING CONCEPT:</u> Pattern <i>Students recognize, classify, and record the patterns they observe in nature or man-made objects.</i></p> <p><u>SCIENCE AND ENGINEERING PRINCIPLE:</u> Developing and using models <i>Students make drawings, displays, and simple representations for events they experience through their senses, incorporating relative scales when appropriate</i></p>
Week 10-Last Week of School				