Second Grade Science Curriculum and Pacing Guide
Bartlett City Schools (Revised May 2019)

First Nine Weeks		
Week	Topics	Content
1-2	Social Studies	
3-4	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!
5-8	Social Studies	
9	Catch Up Week due to AimsWeb Testing Review Skills	

Second Nine Weeks		
Week	Topics	Content
1-2	2.LS1: From Molecules to Organisms: Structures & Processes, 2.LS3: Heredity: Inheritance and Variation of Traits	R2BR-The Spider and the Fly
3-4	Social Studies	(Life Cycle of a Turkey)
5-7	2.ESS1: Earth's Place in the Universe, 2.ESS2: Earth's Systems, 2.LS2 Ecosystems: Interactions, Energy and Dynamics	R2BR-Erosion: Changing Earth's Surface R2BR-Weather and Erosion R2BR-Earth's Changing Surface
8	Social Studies	

Third Nine Weeks		
Week	Topics	Content
1-2	2.PS4: Waves and Their Applications in Technologies for Information Transfer, 2.ETS2: Links Among Engineering, Technology, Science and Society	R2BR-All About Sound R2BR-Light is All Around Us
3-5	Social Studies	
6-7	2.LS2 Ecosystems: Interactions, Energy and Dynamics	R2BR-The Wolves Are Back R2BR-A Drop Around the World
8-9	Social Studies Read Across America	
10	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 R2BR-The Mysterious Tadpole

Fourth Nine Weeks		
Week	Topics	Content
1-3	Social Studies	
4	2.ETS1: Engineering Design, 2.ETS2: Links Amonth Engineering, Technology, Science and Society	R2BR Rosie Revere, Engineer
5-9		R2BR - Charlotte's Web Novel Study

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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?				
Week 2 The Name Jar				
Week 3 & 4 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				
2.PS2.1 Analyze the push or the pull that occurs when objects collide or are connected. **COMPONENT IDEA:** A. Forces, Fields, and Motion **2.ETS2.1** Use appropriate tools to make observations, record data, and refine design ideas. **COMPONENT IDEA:** A. Interdependence of Science, Technology, Engineering, and Math **2.PS2.2** Evaluate the effects of different strengths and directions of a push or a pull on the motion of an object. **COMPONENT IDEA:** A. Forces, Fields, and Motion	**R2BR-** motion push pull force gravity friction lever fulcrum ramp magnetism direction	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. *(Students should only focus on relative values of the scale readings, which will always be equal.)* 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 with opposes the motion of a rolling object. *(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.)*	**HMH (2019)** Unit 3: Forces & Motion Lesson 1: What Are Forces? p. 79-90 Lesson 2 Inquiry: How Do Forces Make Objects Move? p. 91-94 Lesson 3: What is Friction? p. 95-102 Unit 3 Review: p. 103 **HMH Leveled Readers:** (Extra Support/On Level) *"How Do We Use Energy, Motion, and Magnets in Our Lives?"* (Enrichment) "*Magnificent Magnets*" **Going Deeper - HMH Leveled Readers:** (Extra Support/On Level) *"What Can We Learn About Matter?"* (Enrichment) "*Making Coins*" Force and Motion - video clip	**CROSSCUTTING CONCEPT:** Scale, Proportion, and Quantity *Students make comparisons using relative scales. (e.g., bigger or smaller, closer or further, sooner or later)* **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.* **CROSSCUTTING CONCEPT:** Scale, Proportion, and Quantity *Students make comparisons using relative scales. (e.g. bigger or smaller, closer or further, sooner or later)* **SCIENCE AND ENGINEERING PRINCIPLE:** Analyzing and interpreting data. *Students analyze observations and measurements for a device to ensure it satisfies specifications.* 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. 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.

			Brain Pop Jr - Push/Pull Brain Pop - Force Brain Pop - Newton's Laws Fish Force Game **R2BR-** Give it a Push! Give It a Pull! **Small Group:** Push and Pull Additional Read Alouds	
2.PS2.3 Recognize the effect of multiple pushes and pulls on an object's movement or non-movement. **COMPONENT IDEA:** C. Stability and Instability in Physical Systems		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). *(Students can use symbols such as arrows of different sizes/lengths to represent relative sizes of forces without actual measurements.)*		**CROSSCUTTING CONCEPT:** Stability and Change *Students begin to question causes for stability and change and why some systems do not change.* **SCIENCE AND ENGINEERING PRINCIPLE:** Constructing explanations and designing solutions *Students generate explanations for natural phenomena that incorporate relevant evidence.*
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. **COMPONENT IDEA:** C. Relationship Between Energy and Forces and Fields **2.ETS1.1** Define a simple problem that can be solved through the development		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 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. *(Measurements can be relative comparisons of the degree to which an object is deformed during a collision.)*		**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. **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. **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* **SCIENCE AND ENGINEERING PRINCIPLE:** Asking questions (for science) and defining problems (for engineering) *Students explicitly describe a design problem that can be solved using a new object or device.*

of a new or improved object or tool by asking questions, making observations, and gathering accurate information about a situation people want to change **COMPONENT IDEA:** A. Defining and Delaminating and Engineering Problems				
2.PS3.2 Make observations and conduct experiments to provide evidence that friction produces heat and reduces or increases the motion of an object. **COMPONENT IDEA:** D. Energy in Chemical Processes and Everyday Life 2.ETS1.4 Compare and contrast solutions to a design problem by using evidence to point out strengths and weaknesses of the design. COMPONENT IDEA: *C. Optimizing the Solution Design*	fuel energy heat	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. *(Observationsoftemperature changescanbelimitedtoqualitativeobservations.)* **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.		**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. **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. 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.* SCIENCE AND ENGINEERING PRINCIPLE: Using mathematics and computational thinking *Students compare two different solutions to a problem from collected data.*
Week 5-8 Maps and Globes, Beginner's World Atlas,				
Week 9 Catch up Week Due to AimsWeb Testing, Review Skills				
Second Nine Weeks				

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TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 1 & 2 The Spider and the Fly				
DCI: 2.LS1: From Molecules to Organisms: Structures and Processes				
DCI: 2.LS2: Ecosystems: Interactions, Energy, Dynamics				
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. **COMPONENT IDEA:** *A. Structure and Functions* **2.LS1.2** Obtain and communicate information to classify animals (vertebrates- mammals, birds, amphibians, reptiles, fish, invertebrates- insects) based on their physical characteristics. **COMPONENT IDEA:** *A. Structure and Function*	**R2BR-** lurk vibrations pounces prey* venom fangs digestive juices cephalothorax abdomen spinnerets molting molting armor vertebrates mammals birds amphibians reptiles fish invertebrates insects classification	**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. *(Both first-hand observations and texts can be used as evidence.)* **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. *(Criteria for classifications should be limited to observable differences in anatomy or lifecycle and address anatomical features, but not physiological functions.)*	**HMH (2019)** Unit 5: All About Animals Lesson 2: What Are Some Kinds of Animals? p. 151-162 Lesson 3 Inquiry: How Do Body Coverings Help Animals? p. 163-164 **HMH Leveled Readers:** (Extra Support/On Level) *"What Are Some Characteristics of Animals and Plants?"* (Enrichment) "*Animal Fashion Show"* Animal Senses - website Brain Pop - Classifying Animal Classification - lesson **R2BR:** The Spider and the Fly **Small Group:** Spiders Additional Read Alouds	**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.* **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.* **CROSSCUTTING CONCEPT:** **Pattern** *Students recognize, classify, and record the patterns they observe in nature or man-made objects.* **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.*
Week 3 & 4 If You Lived With the Cherokee, Molly's Pilgrim				

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Week 5 Erosion-Changing Earth's Surface

DCI: 2.ESS2: Earth's Systems

2.ESS2.1 Compare the effectiveness of multiple solutions designed to slow or prevent wind or water from changing the shape of the land. **COMPONENT IDEA:** *E. Biology*	**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 stream	**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.	**HMH (2019)** Unit 6: Our Earth Lessom 3 Inquiry: How Can We Measure Parcipitation? p.231-235 **HMH Leveled Readers:** (Extra Support/On Level) *"Why Are Resources Important?"* (Enrichment) "*All About Rocks"* **HMH Leveled Readers:** (Extra Support/On Level) *"What Is Weather Important?"* (Enrichment) "*The American Weather Hall of Fame"* Cause and Effect on the Land (download pdf) How Can Water Change the Shape of the Land? Brain Pop - Erosion **R2BR:** Changing Earth's Surface Additional Read Alouds	**CROSSCUTTING CONCEPT:** **Scale, Proportion, and Quantity** Students make comparisons using relative scales (e.g., bigger or smaller, closer or further, sooner or later). **SCIENCE AND ENGINEERING PRINCIPLE:** **Using mathematics and computational thinking** Students compare two different solutions to a problem from collected data.

Week 6 Weathering and Erosion

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DCI: 2.ESS2: Earth's Systems				
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. **COMPONENT IDEA:** *A. Earth Materials and Systems* **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). 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.	**R2BR-** natural disaster plates earthquake landslides valleys tsunami current force topsoil nutrients ranchers loggers brainstorming model windbreak landslide levee ditches variable prediction contract observation sediment	**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.	**HMH (2019)** Unit 6: Our Earth Lesson 4: What Changes Earth? p.235-248 **HMH Leveled Readers:** (Extra Support/On Level) *"Why Are Resources Important?"* (Enrichment) "*All About Rocks*" **HMH Leveled Readers:** (Extra Support/On Level) *"What Is Weather Important?"* (Enrichment) "*The American Weather Hall of Fame*" Landform Experts Research NASA Models of Land/Water Erosion Lesson **R2BR:** Weathering & Erosion Additional Read Alouds	**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. **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** Students generate explanations for natural phenomena that incorporate relevant evidence.
Week 7 Earth's Changing Surface				
DCI: 2.ESS1: Earth's Place in The Universe				

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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. COMPONENT IDEA: *C. The History of Planet Earth*	**R2BR –** crust mantle outer core inner core erosion weathering stream flashflood riverbank landscape bank shore cliffs expand glacier dune desert fault evaporate water vapor condense water cycle precipitation erosion earthquake landslide volcano	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.	**HMH (2019)** Unit 6: Our Earth Lesson 1: How Do Environments Change Overtime? p. 209-220 Lesson 2: What Are Some Weather Patterns? p. 221-230 Unit 6 Review p. 269 **HMH Leveled Readers:** (Extra Support/On Level) *"Why Are Resources Important?"* (Enrichment) "*All About Rocks"* **HMH Leveled Readers:** (Extra Support/On Level) *"What Is Weather Important?"* (Enrichment) "*American Weather Hall of Fame"* **Going Deeper - HMH Leveled Readers:** (Extra Support/On Level) *"What is Our Solar System?"* (Enrichment) "*Moon Phases"* Brain Pop - Slow Land Changes **R2BR:** Earth's Changing Surface Additional Read Alouds	**CROSSCUTTING CONCEPT:** **Scale, Proportion, and Quantity** *Students make comparisons using relative scales (e.g., bigger or smaller, closer or further, sooner or later).* **SCIENCE AND ENGINEERING PRINCIPLE:** **Using mathematics and computational thinking** *Students recognize patterns and make comparisons using counting and number lines.*
Week 8 Rosa and Blanca				

THIRD Nine Weeks

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TN State Standards (Next Generation)	Vocabulary	Objectives/Learning Targets	Instructional Resources	Crosscutting Concept and Science and Engineering Principles
Week 1 All About Sound				
DCI: 2.PS4: Waves and Their Applications in technologies for Information Transfer				
2.PS4.1 Plan and conduct investigations to demonstrate the cause and effect relationship between vibrating materials (tuning forks, water, bells) and sound. **COMPONENT IDEA:** *A. Wave Properties: Mechanical and Electromagnetic* **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. **COMPONENT IDEA:** C. Information Technologies and Instrumentation **2.ETS1.2** Develop a simple sketch, drawing, or physical model that communicates solutions to others. **COMPONENT IDEA:** *B. Developing Possible Solutions* **2.ETS1.3** Recognize that to solve a problem, one may need to	**R2BR-** tuning forks sound waves vibrate pitch absorb sound waves	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 observed sound making an object vibrate, hold a piece of paper next to a speaker playing loud music. EXPLANATION: Since earlytimes, 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.	**HMH (2019)** Unit 4: Sound and Light Lesson 1: What is Sound? p.109-120 Lesson 4 Inquiry: How Do We Make Sound? p.129-132 **HMH Leveled Readers:** (Extra Support/On Level) *"How Do We Use Energy, Motion, and Magnets in Our Lives?"* (Enrichment) "*Magnificent Magnets"* Brain Pop Jr - Sound Light, Heat, and Sound Lesson Materials Sound Vibrations **R2BR:** All About Sound **Small Group:** Sound Additional Read Alouds	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. 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. CROSSCUTTING CONCEPT: Structure and Function Students identify and describe parts and their roles in the inner workings as part of a larger system/object. 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. 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 SCIENCE AND ENGINEERING PRINCIPLE: Obtaining, evaluating, and communicating information (Communicate) Students utilize writing, drawing, and modeling to communicate information. 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. 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.

break the problem into parts, address each part, and then bring the parts back together. **COMPONENT IDEA:** *B. Developing Possible Solutions*				
Week 2 Light is All Around Us				
DCI: 2.PS4: Waves and Their Applications in Technologies for Information Transfer				
2.PS4.3 Observe and demonstrate that waves move in regular patterns of motion by disturbing the surface of shallow and deep water. COMPONENT IDEA: A. Wave Properties: Mechanical and Electromagnetic	**R2BR-** Light Light waves reflect refraction lumens chemical light electromagnetic-radiation	**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 <1/2 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.	**HMH (2019)** Unit 4: Sound and Light Lesson 2 Inquiry: How Can Sound Waves Be Seen? p.121-122 Lesson 3: How Does Sound and Light Travel? p.123-128 Unit 4 Review: p. 133 **HMH Leveled Readers:** (Extra Support/On Level) *"How Do We Use Energy, Motion, and Magnets in Our Lives?"* (Enrichment) "*Magnificent Magnets"* **Going Deeper - HMH Leveled Readers:** (Extra Support/On Level) *"What is Our Solar System?"* (Enrichment) "*Moon Phases"* Mystic Mirrors (download pdf) **R2BR:**Light is All Around Us **Small Group:** What are Light Waves	**CROSSCUTTING CONCEPT:** **Pattern** Students recognize, classify, and record the patterns they observe in nature or man-made objects. **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.

			Additional Read Alouds	
Week 3-5 Lives: Poems About Famous Americans, The Story of Ruby Bridges, When Marian Sang, Amelia and Eleanor Go For a Ride				
Week 6 The Wolves Are Back				
DCI: 2.LS1: From Molecules to Organisms: Structures and Processes				
2.LS2.1 Develop and use models to compare how animals depend on their surroundings and other livingthings to meet their needs in the placesthey live. **COMPONENT IDEA:** A. Interdependent Relationships in Ecosystems	**R2BR-** habitat woodland forest migrate rain forest desert Arctic pond stream ocean food web pollution recycle yearned consumer decomposer producer tranquil	**EXPLANATION:** Tosurvive,animalsmust findsourcesoffood,aswellas 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.	**HMH (2019)** Unit 5: All About Animals Lesson 1: What Are Animals Needs? p.139-150 **HMH Leveled Readers:** (Extra Support/On Level) *"What Do Plants and Animals Need?"* (Enrichment) "*My Science Fair Project"* **HMH Leveled Readers:** (Extra Support/On Level) *"How Do Living Things Survive in their Environment?"* (Enrichment) "*Meet the Amazing Monarch Butterfly"* Flight of the Pollinators - video clip **R2BR:**The Wolves Are Back Additional Read Alouds	**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. **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.
Week 7 A Drop Around the World				
DCI: 2. LS2 Ecosystems: Interactions, Energy, and Dynamics				

2.LS2.2 Predict what happens to animals when the environment changes (temperature, cutting down trees, wildfires, pollution, salinity, drought, land preservation) **COMPONENT IDEA:** C. Ecosystem Dynamics, Functioning, and Resilience **2.ETS2.2** Predict and explain how human life and the natural world would be different without current technologies. **COMPONENT IDEA:** B. Influence of Engineering, Technology, and Science on Society and the Natural World	**R2BR-** temperature pollution salinity drought land preservation recycle oil spill reservoir airy seep purified	**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.	**HMH (2019)** Unit 5: All About Animals Lesson 4: How Are Living Things Adapted to Their Environments? p.165-178 **HMH Leveled Readers:** (Extra Support/On Level) *"How Do Living Things Survive in their Environment?"* (Enrichment) "*Meet the Amazing Monarch Butterfly"* Why Do We Need Bees? **R2BR:** A Drop Around the World Additional Read Alouds	**CROSSCUTTING CONCEPT:** **Stability and Change** Students begin to question causes for stability and change and why some systems do not change. **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. **CROSSCUTTING CONCEPT:** Systems and System Models *Students investigate how the roles of specific components of a system affect the functioning of the larger system.* **SCIENCE AND ENGINEERING PRINCIPLE:** Engaging in argument from evidence *Students can make and support claims about a proposed device or solution.*
Week 8 & 9 Read Across America Week, Ox Cart Man				
Week 10 Frogs, Mysterious Tadpoles				
DCI: 2.LS1 From Molecules to Organisms: Structures and Processes ***DCI: 2.LS2 Ecosystems: Interactions, Energy, and Dynamics*** ***DCI: 2.LS3 Heredity: Inheritance and Variation of Traits***				
2.LS1.3 Use simple graphical representations to show that species have unique and diverse life cycles. **COMPONENT IDEA:** B. Growth and Development of Organisms **2.LS2.1** Develop and use models to compare how animals depend on their	**R2BR-** Jellylike Spawn Embryos Gills Algae Oxygen Bulges Vegetarians Lungs Shed Amphibian	**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). 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	**HMH (2019)** Unit 5: All About Animals Lesson 5: What Are Some Animal Life Cycles? p.179-190 Lesson 6: How Are Living Things Like Their Parents? p.191-202 Unit 5 Review: p. 203 **HMH Leveled Readers:** (Extra Support/On Level)	**CROSSCUTTING CONCEPT:** Pattern Students recognize, classify, and record the patterns they observe in nature or man-made objects. **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. **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.

surroundings and otherl livingthings to meet their needs in the placesthey live. **COMPONENT IDEA:** A. Interdependent Relationships in Ecosystems **2.ETS1.2** Developa simple sketch, drawing, orphysical model that communicates solutions to others. **COMPONENT IDEA:** B. Developing Possible Solutions 2.LS2.2 Predictwhat happens to animals when the environment changes (temperature, cutting down trees, wildfires, pollution, salinity, drought, land preservation) COMPONENT IDEA: C. Ecosystem Dynamics, Functioning, and Resilience 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 COMPONENT IDEA: B. Variation of Traits	Cold-blooded transparent Camouflage Vibrate Hibernation Herpetologist life cycle adult pupa larva egg pollution recycle	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. 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. 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.	*"What Are Some Characteristics of Animals and Plants?"* (Enrichment) "*Animal Fashion Show*" Brain Pop Jr - Butterflies Brain Pop Jr - Frogs Name That Connection (download pdf) Tadpoles Two Scoops are Better Than One **R2BR:** Frogs **R2BR:** The Mysterious Tadpole **Small Group: Tadpoles to Frogs** Additional Read Alouds	**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. **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.* **SCIENCE AND ENGINEERING PRINCIPLE:** Planningand carrying outcontrolled investigations *Students determine whether a proposed object or tool will meet criteria for success based on past experiences, observations or measurements.* CROSSCUTTING CONCEPT: Stability and Change Students begin to question causes for stability and change and why some systems do not change. SCIENCE AND ENGINEERING PRINCIPLE: Constructingexplanationsand designing solutions Students generate explanations for natural phenomena that incorporate relevant evidence. (Communicate) Students utilize writing, drawing, and modeling to communicate information. CROSSCUTTING CONCEPT: Pattern Students recognize, classify, and record the patterns they observe in nature or man-made objects. 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.

Second Grade Science Curriculum and Pacing Guide
Bartlett City Schools (Revised May 2019)

Week 1-3 O, Say Can You See,				

Week 4 Rosie Revere, Engineer				
DCI: 2.ETS1: Engineering Design				
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 COMPONENT IDEA: *A. Defining and Deliminating and Engineering Problems*	**R2BR-** Gizmos Flop Engineer Gadgets dismayed	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.	**HMH (2019)** Unit 1: Work Like A Scientist Lesson 1: How Do We Use Inquiry Skills? p.3-13 Lesson 4: How Do Scientists Think? p.25-34 Lesson 5 Inquiry: How Do We Solve a Problem? p.35-36 Unit 1 Review: p. 37 Unit 2: Technology and Our World Lesson 1: What is The Design Process? p. 43-54 Lesson 2 Inquiry: How Can We Use the Design Process? p. 55-56 Unit 1 Review: p. 73 **HMH Leveled Readers:** (Extra Support/On Level) *"How Can I Think Like a Scientist?"* (Enrichment)	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.* SCIENCE AND ENGINEERING PRINCIPLE: 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.*

			"*How Scientists Explore Our World*" **HMH Leveled Readers:** (Extra Support/On Level) *"How Do Engineers Solve Problems?"* (Enrichment) "*Ben's Engineering Project*" **R2BR:** Rosie Revere Engineer **Small Group:** Ben Franklin and His First Kite Additional Read Alouds **Studies Weekly:** #12 Primary and Secondary Sources	
Novel Study-Charlotte's Web				