Department of Teaching & Learning
Third Grade Science Curriculum Guide

Third Grade Pacing Guide 2019-2020 (updated June)

First Nine Weeks	
Units	**Topics**
Life Science Unit 6	1. Plant Life Cycle 2. Animal Life Cycle 3. How Living Things Change
Resources & Relationships Unit 6	4. Structural Adaptations 5. Physical Adaptations 6. Behavioral Adaptations
Ecosystems & Interactions **Unit 7**	1. What are Ecosystems 2. What's in Ecosystems 3. What is a Food Chain 4. What are some Food Chains
Ecosystems & Interactions **Unit 7**	5. How Environmental Changes Affect Living Things

Second Nine Weeks	
Units	**Topics**
Solar System Unit 8	1. Why is the Sun Important to Life on Earth 2. What are Planets in Solar System 3. Model the Sun and Planets
Water Cycle Unit 9	1. What is the Water Cycle
Weather **Unit 9**	1. What is Weather 2. How Can We Measure Weather
Climate **Unit 9**	3. What is Climate

Third Nine Weeks	
Units	
Physical Properties & States of Matter Unit 3	1. Physical Properties 2. States of Matter
Changes to Matter Unit 3	1. Physical Properties observed 2. Changes to Matter 3. Changes Observed
Magnets **Unit 4**	1. What are Magnets 2. How Do Magnets Attract
Energy **Unit 5**	1. Types of Energy 2. Sound 3. Electric Circuits 4. Electric Circuits, Conductors, and Insulators 5. Electricity

Fourth Nine Weeks	
Units	
Engineering & Technology 9 weeks **Earth's Surface** **Unit 10** Unit 1 Unit 2	1. What are Landforms 2. Earth's Surface Slow Change 3. Model Erosion 4. Earth's Surface Quick Change Investigating Questions Engineering Process

Science Training Materials (Go to Teacher Training Materials and Resources and download 3rd grade's materials.) SEP- Science and Engineering Practice; DCI- Disciplinary Core Idea; CCC- Crosscutting Concept

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Guiding Question: How are plant and animal cells organized to carry on the processes of life?

Life Science	**1st Nine Weeks-Plants and Animals (3 weeks)**		
DCI: *3.LS1: From Molecules to Organisms: Structures and Processes*			
TN State Standards	**Objectives/Learning Targets** **Explanation**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.LS1.1 **Analyze the internal and external structures that aquatic and land animals and plants have to support survival, growth, behavior, and reproduction.** **COMPONENT IDEA:** *A. Structure and Function*	**EXPLANATION:** In earlier grades, students have examined external structures of plants (first grade) and animals (second grade). The functions of the external structures were generalized to processes such as reproduction, protection, or sensing. **Mirroring discussions in the physical science discipline, students should consider internal structures that may not be visible. External animal structures may include legs, wings, feathers, trunks, claws, fins, horns, and antennae. Animal organs might include eyes, ears, nose, heart, stomach, lungs, brain, and skin. Plant structures might include seeds, leaves, roots, stems, bark, and flowers.** *(Instruction should not include any microscopic processes, such as exchanges of gas within the lungs, merely the macroscopic function of breathing.)* **What are some plant life cycles?** **What are some animal life cycles?** **How do living things change?**	**Unit 6 221-280** **Lesson 1 223-232** **Lesson 2 233-244** **Lesson 3 245-246** https://packs.eb.com/science/226690 -/pinboard **Brainpop Jr.** Parts of a Plant Plant Life Cycles Discovery Education Utube **Lesson 4 247-260** **Lesson 5 261-262** https://packs.eb.com/science/188486 - /pinboard **Brainpop Jr.** Camouflage Plant Adaptations Discovery Education Utube Unit 6 Leveled Readers How are Living Things Connected to their Ecosystem? **B** Rain Forest Adventure. **G** How are Living Things Connected to their Ecosystem? **R**	**Crosscutting Concept: Structure and Function** Students begin to recognize that objects have smaller substructures which determine the property of a material or system. **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** Students can create evidence based explanations for relationships seen in the natural world as well as identify evidence that supports other explanations. **Crosscutting Concept:** **Cause and Effect** Students routinely search for cause and effect relationships in systems they study. **SCIENCE AND ENGINEERING PRINCIPLE:** **Engaging in argument from evidence** Students create and identify evidence- based arguments and consider whether an argument is supported by evidence or relies on opinions or incomplete representations of relevant evidence.
3.LS4.2 **Infer that plant and animal adaptations help them survive in land and aquatic biomes.** **COMPONENT IDEA**: *A. Adaptation*	**EXPLANATION:** The idea of this standard as compared to 3.LS1.1 is that when variations of a trait occur, some of these variations help an organism to survive as compared to others within their species. **Some adaptations could include; blubber, dense feathers, and thick fur for warmth; ability to burrow underground, nocturnal, and drought tolerant to escape heat, spines or thorns to avoid being eaten, large beaks or appendages that can grab fruit from tree tops, shallow roots to absorb water quickly, waxy leaves to protect water, and gills for taking in oxygen.** **What are structural adaptations?** **How can we model a physical adaptation?** **What are behavioral Adaptations?**		

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Guiding Question: How do living things interact with one another and with the non-living elements of their environment?

1st Nine Weeks-Resources and Relationships (2 weeks)			
3.LS2: Ecosystems: Interactions, Energy, and Dynamics			
TN State Standards	**Objectives/Learning Targets** **Explanation**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.LS2.1 **Construct an argument to explain why some animals benefit from forming groups.** **COMPONENT IDEA:** *D. Social Interaction and Group Behavior*	**EXPLANATION:** In later grades, students will look within an organism to investigate how groups of cells work collectively as tissues and organs to increase efficiency in tasks such as collecting, transporting, and removing materials throughout a larger system. **Third grade lessons investigate a larger scale, examining the effects of organisms working collectively and how grouping benefits both individuals and the group.** Forming groups provides a way for an individual to cope with change. Discussions of groups should also **include general structures within a group (e.g., equality amongst all individuals, hierarchy, family groups, gender groups, age groups)**. **Examples** of animals benefiting from forming groups may include dolphins surrounding a school of fish and then taking turns darting into the center to eat the fish trapped in the middle or animals living in groups for protection, such as baboons. One single baboon might not be able to fight off a leopard, but a troop of baboons often would be able to do so. Additional benefits may include movement as a group creating confusion for the predator. **What are behavioral adaptations?**	**Unit 6** **Lesson 6 263-274** S.T.E.M. pages 275-276 https://packs.eb.com/science/363585 - /pinboard **Brainpop Jr.** Hibernation Migration Discovery Education Utube Unit 6 Leveled Readers How Do Living Things Change and Grow? **B** Surprising Adaptations. **R** How Do Living Things Change and Grow? **G**	**Crosscutting Concept:** **Systems and System Models** Students group and describe interactions of the components that define a larger system. **SCIENCE AND ENGINEERING PRINCIPLE:** **Engaging in argument from evidence** Students create and identify evidence-based arguments and consider whether an argument is supported by evidence or relies on opinions or incomplete representations of relevant evidence.

Guiding Questions: What adaptations help living things survive in changing environments?

1st Nine Weeks-Environments and Relationships (2 weeks)			
3.LS4: Biological Change: Unity and Diversity			
TN State Standards	**Objectives/Learning Targets** **Explanation**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.LS4.1 **Explain the cause and effect relationship between a naturally changing environment and an organism's ability to survive.** **COMPONENT IDEA:** *C. Adaptation*	**EXPLANATION: Changes to an environment can happen suddenly or occur gradually. At times these changes can be harmful to living organism**. Detrimental changes **can cause organisms to struggle to find food, water, or clean air and may cause some to die**. Examples should include needs of a specific organism, characteristics of a particular environment, and how the two support each other. **Examples may include** alligators now thriving after all these years in their habitat; polar bears losing their sea ice habitat, causing their population to be threatened; and the dodo bird which is now extinct partly due to predators introduced by humans. **What are ecosystems ?** **What's in an ecosystem?** **What is a food chain?** **What are some food chains?**	**Unit 7 281-334** **Lesson 1 283-294** **Lesson 2 295-298** **Lesson 3 299-310** **Lesson 4 311-312** https://packs.eb.com/science?grade=3-5&tag=&query=Ecosystems https://packs.eb.com/science/220479-/pinboard	**Crosscutting Concept:** **Systems and System Models** Students begin to recognize that objects have smaller substructures which determine the property of a material or system. **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** Students can create evidence-based explanations for relationships seen in the natural world as well as identify evidence that supports other explanations.

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Guiding Question: How do environmental changes influence living things?

1st Nine Weeks-Environments and Survival (2 weeks)

3.LS4: Biological Change: Unity and Diversity **and** ***3.ESS3: Earth and Human Activity***

TN State Standards	Objectives/Learning Targets Explanation	Instructional Resources Houghton Mifflin Harcourt	Crosscutting Concepts and Science and Engineering Principles
3.LS4.3 **Explain how changes to an environment's biodiversity influence human resources.** **COMPONENT IDEA:** *D. Biodiversity and Humans*	**EXPLANATION:** Changes to biodiversity can be **brought on by habitat destruction, pollution, introduction to invasive species, or overuse of shared resources.** Healthy ecosystems provide humans with natural resources and perform various ecosystem services. Examples of how an environment's biodiversity can influence human resources may include food, medicines, and functions (such as scrubbing carbon dioxide from the atmosphere). When a species is threatened due to overexploitation is can lead to a decrease in a human resource. An example of this is the overexploitation of fish leaving a shrinking population of food. **How do environmental changes affect living things?**	**Unit 7** **Lesson 5 313-328** **Brainpop Jr.** Fast Land Changes Slow Land Changes Natural Resources https://packs.eb.com/science/226731-/pinboard	**Crosscutting Concept:** **Systems and System Models** Students group and describe interactions of the components that define a larger system. **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** Student models begin to become abstract and metaphorical, incorporating relationships between events and predictive aspects for recurring events.

First Nine Weeks Resources
Vocabulary: structures, roots, nutrients, stem, leaf, leaf vein, edible, lungs, skin, pores, life cycle, seed, embryo, flower, pollination, fruit, cone, egg, larva, pupa, metamorphosis, offspring, environment, resources, competition, organism, food chain, producers, consumers, energy, heredity, inherited and learned traits, offspring, desert, forest, ocean, wetland, camouflage, nocturnal, mimicry, hibernate, migrate, natural disaster, species, exotic and invasive species, pollution, population, endangered, extinct, threatened, and thriving, decomposer, predator, prey, **photosynthesis, stomata, transpiration, respiration, cone, spores, stimulus, response, structural adaptations, internal structures, respiratory systems, external structures**
Inquiry Skills: predict, record data, observe, infer, communicate, classify, make a model, compare, draw conclusions

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Guiding Question: What big ideas guide human understanding about the origin and structure of the universe, Earth's place in the cosmos, and observable motions and patters in the sky?

Earth Science	**2nd Nine Weeks-Solar System (2 weeks)**		
3.ESS1: Earth's Place in the Universe			
TN State Standards	**Objectives/Learning Targets Explanations**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.ESS1.1 **Use data to categorize the planets in the solar system as inner or outer planets according to their physical properties.** **COMPONENT IDEA:** *B. Earth and the Solar System* **3ETS2.1** **Identify and demonstrate how technology can be used for different purposes.** **COMPONENT IDEA:** *A. Interdependence of Science, Technology, Engineering, and Math*	**EXPLANATION:** The orbital path a planet follows around the sun is dictated by a combination of the mass of the planet and how fast it travels through space. **Students should be led to make comparisons about these factors (e.g., Planets closer to the sun must either be very small, orbit very quickly, or a combination of the two.)** On a particular planet, the duration of its day is determined by how quickly it spins on its axis. Additionally**, students should collect data which can be used to create a classification system for planets.** **What are the planets in our solar system?** **How can we model the sun and planets?** **EXPLANATION:** As scientific understanding of the natural world increases, these understandings can lead to improvements in engineered objects. In turn, improvements the tools produced by engineers can enable further discovery by scientists. Scientists utilize devices produced by engineers in innovative ways that may have never been considered initially. Examples of this concept might include using a cell phone as an interactive map of the night sky or apps such as eBird (Cornell University) which can be used to track and catalog sightings of birds using the user's GPS location. **What do you think space scientists study?**	**Unit 8 335-372** **Lesson 1 349-362** **Lesson 2 365-366** Unit 8 Leveled Readers What Objects Are In Space? **B** A Trip to the Planetarium. **G** What Objects Are In Space? **R** **Brainpop Jr.** Solar System https://packs.eb.com/science/237094 -/pinboard NASA website **S.T.E.M** **Pages 363-364** **Pages 367-368** **Brainpop Jr.** Engineering and Design Process Making and Testing Predictions Discovery Education Utube	**Crosscutting Concept:** **Scale, Proportion, and Quantity** Students become familiar with sizes immensely large or small or durations extremely short or long. **SCIENCE AND ENGINEERING PRINCIPLE:** **Choose a SEP** (Obtain/Evaluate) Students can read and summarize text and embedded, non-text elements from multiple sources synthesizing an understanding on a scientific idea. Students can communicate scientific information in writing utilizing embedded elements. **Crosscutting Concept:** **Pattern** Students use patterns as evidence in an argument or to make predictions, construct explanations, and engage in arguments. **SCIENCE AND ENGINEERING PRINCIPLE:** **Using mathematics and computational thinking** Students can make measurements for the purpose of testing and comparing competing design solutions or understanding the effects of modifications to an existing device

Guiding Question: What is the water cycle?

2nd Nine Weeks -Water Cycle (2 weeks)			
3.ESS2: Earth's Systems			
TN State Standards	**Objectives/Learning Targets**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.ESS2.1 **Explain the cycle of water on Earth.** **COMPONENT IDEA:** *A. Earth Materials and Systems*	**EXPLANATION:** In second grade, students examined reservoirs for Earth's surface waters and interactions between Earth's systems. **In third grade, students are introduced to the particulate nature of matter and to transformations of energy. These new concepts provide necessary understandings to explore water in its gaseous phase and its transformations throughout the hydrosphere.** Students should address changes in state and energy throughout the water cycle as well as water's transport of materials as it succumbs to gravity. Consideration should be given to relative abundances of water and fresh water and its distribution between the various stores. Students should begin to explore the interactions between the hydrosphere and other earth systems such as the biosphere and geosphere. **What is the water cycle?**	**Unit 9 373-418** **Lesson 1 375-386** **Pages 387-388 Hydrologists** https://packs.eb.com/science/213982 -/pinboard **Brainpop Jr.** Water Cycle Discovery Education Utube	**Crosscutting Concept:** **Systems and System Models** Students group and describe interactions of the components that define a larger system. **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** Student models begin to become abstract and metaphorical, incorporating relationships between events and predictive aspects for recurring events

Guiding Question: What is the relationship between weather conditions and major cloud types?

2nd Nine Weeks- Weather and Clouds (2 weeks)			
3.ESS2: Earth's Systems			
TN State Standards	**Objectives/Learning Targets** **Explanation**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.ESS2.2 **Associate major cloud types (nimbus, cumulus, cirrus, and stratus) with weather conditions.** **COMPONENT IDEA:** *A. Earth Materials and Systems*	**EXPLANATION:** As air masses are transported by winds, clouds interact with landforms giving rise to weather patterns. Students should collect observations of cloud types and subsequent weather to build a predictive model for weather. **What is weather?**	**Unit 9** **Lesson 2 389-400** **Lesson 3 401-402** **S.T.E.M.** **Pages 403-404** Unit 9 Leveled Readers How can We Describe Weather? **B** Double Danger: Thunderstorms and Tornadoes. **G** How can We Describe Weather? **R** https://packs.eb.com/science/202199 -/pinboard Discovery Education Utube	**Crosscutting Concept: Pattern** Students recognize, classify, and record patterns involving rates of change. **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** Student models begin to become abstract and metaphorical, incorporating relationships between events and predictive aspects for recurring events.

What is weather, and what is the difference between weather and climate?

2nd Nine Weeks-Weather (2 weeks)

3.ESS2: Earth's Systems

TN State Standards	Objectives/Learning Targets Explanation	Instructional Resources Houghton Mifflin Harcourt	Crosscutting Concepts and Science and Engineering Principles
3.ESS2.3 **Use tables, graphs, and tools to describe precipitation, temperature, and wind (direction and speed) to determine local weather and climate.** **COMPONENT IDEA:** *D. Weather and Climate* **3.ESS2.4** **Incorporate weather data to describe major climates (polar, temperate, and tropical) in different regions of the world.** **COMPONENT IDEA:** *D. Weather and Climate*	**EXPLANATION: Clarification may be needed to differentiate between the terms weather and climate.** Weather scientists record data at different times of the day/year and also in different areas. By analyzing pattern in their data, it is possible for scientists to make weather predictions. **Students should become familiar with the tools and techniques used to monitor weather.** These measurements should be gathered and organized to permit classification of their climate as well as making short term predictions such as probable weather that accompanies wind from a particular direction. **How can we measure weather?** **What is Climate?** **EXPLANATION:** Classification of different climates should be based on weather differences. **Students should be explicit in the differences between timeframe and geographic scale of weather compared to climate.** As part of these differences in scale there should be recognition that changes in climate may not be apparent during the span of their lives. **How are weather and climate different?** **What are some factors that can influence the climate of a particular region?**	**Unit 9** **Lesson 3 401-402** **S.T.E.M. 403-404** https://packs.eb.com/science?query=weather and climate **Lesson 4 405-414**	.**Crosscutting Concept: Pattern** Students recognize, classify, and record patterns involving rates of change **SCIENCE AND ENGINEERING PRINCIPLE:** **Analyzing and interpreting data.** Students organize data (observations and measurements) in a manner which facilitates further analysis and comparisons. **Crosscutting Concept:** **Scale, Proportion, and Quantity** Students become familiar with sizes immensely large or small or durations extremely short or long. **SCIENCE AND ENGINEERING PRINCIPLE:** **Obtaining, evaluating, and communicating information** (Obtain/Evaluate) Students can read and summarize text and embedded, non-text elements from multiple sources synthesizing an understanding on a scientific idea. Students can communicate scientific information in writing utilizing embedded elements.

Second Nine Weeks Resources
Vocabulary: moon phases, orbit, planets, rotation, solar system, inner planets, outer planets, ocean, continent, landform, natural resources, atmosphere, oxygen, weather, temperature, Cirrus, Cumulonimbus, Cumulus, Stratus, thermometer, rain gauge, wind vane, climate, polar, temperate, tropical, water cycle, evaporation, condensation, precipitation, **meteorology**
Inquiry Skills: observe, infer, communicate, classify, put things in order, make a model, compare, draw conclusion, predict

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Guiding Question: How does the structure of matter influence its physical and chemical behavior?

Physical Science	**3rd Nine Weeks-Physical Properties and Mixture (3 weeks)**		
3.PS1: Matter and Its Interactions			
TN State Standards	**Objectives/Learning Targets**	**Instructional Resources**	**Crosscutting Concepts and Science and Engineering Principles**
3.PS1.1 **Describe the properties of solids, liquids, and gases and identify that matter is made up of particles too small to be seen.** **COMPONENT IDEA**: *A. Structure and Properties of Matter* **3.PS1.3** **Describe and compare the physical properties of matter including color, texture, shape, length, mass, temperature, volume, state, hardness, and flexibility.** **COMPONENT IDEA**: *A. Structure and Properties of Matter*	**Explanations** **EXPLANATION:** Students should focus on two different aspects of matter in a variety of materials in order to lead into discussions of intermolecular forces in later grades. **Properties of materials which might be observed include: hardness, visibility, flexibility, and the ability to stand up independently**. **Additionally students should understand that all phases are constructed of invisible particles**. Though gases are seldom seen, students are prepared to consider the idea that the sense of smell requires that particles of a substance must touch our olfactory nerves in order to be detected. **Other phenomena such as leaves blowing in the wind, the formation of "sweat" on the side of a glass provide evidence for the existence of invisible particles**. Their existence can be further inferred by actions such as blowing up a balloon, or even by tracking the weight of objects that seem to disappear. **(Students are not responsible for explaining the interactions between molecules which govern the processes of evaporation and condensation.)** **What are some physical properties?** **What are some states of matter?** **EXPLANATION:** In addition to **familiarizing students with base units of measure, this standard helps prepare students to justify when chemical reactions have or have not occurred, in later grades.** Scientists use changes in certain physical properties of a material, such as color, as evidence of chemical reactions. In addition to properties explicitly mentioned in the standard**, students may also consider: reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility**. (Quantitative comparisons should involve only base measurements and not derived quantities such as density.) **What physical properties can we observe?**	Houghton Mifflin Harcourt **Unit 3 89-140** **Lesson 1 91-104** **Lesson 2 105-116** https://packs.eb.com/science/208078-/pinboard https://packs.eb.com/science/208077-/pinboard Unit 3 Leveled Readers How Can You Describe Matter? **B** Engineering Materials. **G** How Can You Describe Matter? **R** **Lesson 3 117-118** **Brainpop Jr.** Solids, Liquids, and Gases Discovery Education Utube	**Crosscutting Concept:** **Pattern** *Students use patterns as evidence in an argument or to make predictions, construct explanations, and engage in arguments.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and Using Models** *Student models begin to become abstract and metaphorical, incorporating relationships between events and predictive aspects for recurring events.* **Crosscutting Concept:** **Scale, Proportion, and Quantity** *Students make measurements of physical properties of objects using base units.* **SCIENCE AND ENGINEERING PRINCIPLE:** **Planning and carrying out controlled investigations** *Students carry out investigations in groups, where conditions and variables are controlled, utilize appropriate instruments, and deliberately plan multiple trials.*

Guiding Question: What basic energy related ideas are essentials for understand the dependency of the natural and man-made worlds on energy?

3rd Nine Weeks-Heat (2 weeks)			
3.PS1: Matter and Its Interactions			
TN State Standards	**Objectives/Learning Targets** **Explanation**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.PSI.2 **Differentiate between changes caused by heating or cooling that can be reversed and that cannot.** **COMPONENT IDEA:** *B. Chemical Processes*	**EXPLANATION:** The purpose of this standard is to prepare students to justify when **chemical reactions** have or have not occurred in later grades. **Examples of reversible changes may include ice and butter in an ice cube tray melting outside and then refreezing back in the tray to original shape. Examples of irreversible changes may include taking a raw egg, cooking or hard boiling it, and trying to refreeze it to go back to raw, or taking a piece of paper and burning it. (Students should be limited to observations they can make directly with their senses.)** **What are some changes to matter?** **What changes can we observe?**	**Unit 3** **Lesson 4 119-132** **Lesson 5 133-134** **S.T.E.M. 135-136** **Brainpop Jr.** Changes of Matter Physical and Chemical Changes Discovery Education Utube	**Crosscutting Concept: Cause and Effect** Students routinely search for cause and effect relationships in systems they study. **SCIENCE AND ENGINEERING PRINCIPLE:** **Engaging in argument from evidence** Students can create evidence based explanations for relationships seen in the natural world as well as identify evidence that supports other explanations.

Guiding Question: What are scientific principles that explain magnets?

3rd Nine Weeks-Magnets (2 weeks)			
3.PS3: Energy			
TN State Standards	**Objectives/Learning Targets** **Explanation**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.PS2.1 **Explain the cause and effect relationship of magnets.** **COMPONENT IDEA:** *B. Types of Interactions* **3.PS2.2** **Solve a problem by applying the use of the interactions between two magnets.** **COMPONENT IDEA:** *B. Types of Interactions* **3.PS3.3** **Evaluate how magnets cause changes in the motion and position of objects, even when the objects are not touching the magnet.** **COMPONENT IDEA:** *C. Relationship Between Energy and Forces and Fields*	**EXPLANATION: A major focus of the investigations of magnets should be on the idea that there are forces that can be exerted without objects actually coming into contact**. This idea will develop as students explore electrical interactions and gravity in later grades. **Student investigations can include the interactions of two permanent magnets or electromagnets and magnetic materials such as paperclips**. Students may vary investigations by considering the effects of distance on the strength of the attraction, the effects of multiple magnets, the orientations of the magnets, or the number of loops or material used to make an electromagnet. The force between an electromagnet and steel paperclips, and the force exerted by one magnet verses the force exerted by two magnets. **Students can record their observations** using arrows to represent forces. The relative sizes of arrows can be used to represent forces of differing strengths, and the direction of the forces can be designated using the arrowheads. (Only qualitative data should be collected for the sizes of forces.) **What are magnets?** **EXPLANATION:** Possible problems may include creating a latch mechanism, utilizing two magnets to keep surfaces from touching, separating a mixture of different materials, or sorting metals for recycling based on magnetic properties. **EXPLANATION:** Forces can be exerted when objects touch or through fields. Students should be given the opportunity to observe that motion of an object can change without being touched because the object interacts with a magnetic field. The object which is set into motion gains energy of motion. This energy was formerly stored by the magnetic field based on changes in the relative positions of the object in the field and the object creating the field. Therefore the transfer process can be viewed as transferring energy from the magnetic field to the object now in motion. Students should try using magnets to slow down an object as well as speed up the object. **How do magnets attract objects?**	**Unit 4 141-164** **Lesson 1 143-156** **Lesson 2 157-158** https://packs.eb.com/science/250430-/pinboard **S.T.E.M. 159-160** **Brainpop Jr.** Discovery Education Utube Unit 4 Leveled Readers How Do We Use Machines? **B** Building With Machines. **G** How Do We Use Machines? **R**	**Crosscutting Concept:** **Cause and Effect** Students use patterns as evidence in an argument or to make predictions, construct explanations, and engage in arguments. **SCIENCE AND ENGINEERING PRINCIPLE:** **Planning and carrying out controlled investigations** Students carry out investigations in groups, where conditions and variables are controlled, utilize appropriate instruments, and deliberately plan multiple trials. **Crosscutting Concept:** **Structure and Function** Students begin to attribute the shapes of sub-components to the function of the part. **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** Students can design a device utilizing scientific ideas as well as compare competing solutions based on constraints and criteria for success. **Crosscutting Concept:** **Cause and Effect** Students routinely search for cause and effect relationships in systems they study. **SCIENCE AND ENGINEERING PRINCIPLE:** **Analyzing and interpreting data.** Students should be able to organize experimental data to reveal patterns and utilize data using simple graph to form explanations.

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Guiding Question: What causes objects to move differently under different circumstances?

Physical Science	**3rd Nine Weeks- Energy (3 weeks)**		
3.PS2: Motion and Stability: Forces and Interactions			
TN State Standards	**Objectives/Learning Targets** **Explanation**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**
3.PS3.1 **Recognize that energy is present when objects move; describe the effects of energy transfer from one object to another.** **COMPONENT IDEA:** *B. Conservation of Energy and Energy Transfer* **3.PS3.2** **Apply scientific ideas to design, test, and refine a device that converts electrical energy to another form of energy, using open or closed simple circuits.** **COMPONENT IDEA:** *B. Conservation of Energy and Energy Transfer*	**EXPLANATION: When objects are in motion, they possess energy and the faster they are traveling, the more energy it possesses.** Changes in motion mean that the amount of energy changes as well. **To understand collisions, students must also understand that energy is present whenever sound, light, or heat is present.** However, these three phenomena should not be considered types of energy. Energy can be transferred by waves (such as sound, mechanical, electromagnetic radiation) or electric currents. During a collision between a moving object and an object at rest, the energy of the moving object will decrease as the collision results in the transfer of that energy to the previously stationary object. Collisions generally produce some heat and sound, which is energy lost from the system during the transfer. Simple bar graphs of a system before and after a collision are an effective way to keep track of energy exchanges. **(Students are only responsible for recognizing qualitative changes in energy.)** **What are some types of energy?** **How are sounds made?** **EXPLANATION:** Building on the idea that moving objects possess energy and that this energy can be transferred during a collision, **students are to construct a device which turns stored electrical energy into another form. These forms could include: motion, sound, light, or heat.** Electric circuits can be viewed as a way to move energy from the stored energy to some sort of output (motor, speaker, bulb, heating element). It should also be noted that the energy of motion is able to produce electrical energy in devices such as generators or turbines in hydroelectric applications. **What is an electric circuit?** **What are electric circuits, conductors, and insulators?** **How do we use electricity?**	**Unit 5 165** **Lesson 1 167-182** **Lesson 2 183-184** Unit 5 Leveled Readers What Are Some Forms of Energy? **B** Which Instrument Will She Play? **G** What Are Some Forms of Energy? **R** **Brainpop Jr.** Pushes and Pulls Energy Sources Heat Light Sound https://packs.eb.com/science?grade=3-5&tag=&query=energy **Lesson 3 185-186** **Lesson 4 187-202** **Lesson 5 203-214** **S.T.E.M 3.ETS2.1** **Pages 215-216** Discovery Education Utube https://packs.eb.com/science/208083 -/pinboard	**Crosscutting Concept:** **Energy and Matter** Students begin to recognize types of energy present in a system and the ability to transfer this energy between objects. **SCIENCE AND ENGINEERING PRINCIPLE:** **Developing and using models** Student models begin to become abstract and metaphorical, incorporating relationships between events and predictive aspects for recurring events. **Crosscutting Concept:** **Energy and Matter** Students begin to recognize types of energy present in a system and the ability to transfer this energy between objects. **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** Students can design a device utilizing scientific ideas as well as compare competing solutions based on constraints and criteria for success

Third Nine Weeks Resources

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Department of Teaching & Learning
Third Grade Science Curriculum Guide

Vocabulary: physical properties, matter, mass, volume, temperature, hardness, flexibility, solid, liquid, evaporation, condensation, physical change, reversible change, mixture, solution, dissolve, chemical change, irreversible change, heat, conductor, conduction, **energy, potential energy, mechanical energy, kinetic energy, electrical energy, chemical energy, simple circuits, series circuit, parallel circuit, open circuit, closed circuit,** vibrate, unbalanced forces, magnet, magnetic field, motor, magnetic pole, **electromagnet**

Inquiry Skills: classify, compare, contrast, draw conclusion, infer, investigate, make a model, observation, predict, reasoning, scientific inquiry

Guiding Question: How do science concepts, engineering skills, and applications of technology improve the quality of life?

Engineering and Technology 4th Nine Weeks- Engineering Design (9 weeks)

3.ETS1: Engineering Design

TN State Standards	Objectives/Learning Targets Explanation	Instructional Resources Houghton Mifflin Harcourt	Crosscutting Concepts and Science and Engineering Principles
3.ESS3.1 **Explain how natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) impact humans and the environment.** **COMPONENT IDEA:** *B. Natural Hazards* **3.ESS3.2** **Design solutions to reduce the impact of natural hazards (fires, landslides, earthquakes, volcanic eruptions, floods) on the environment.** **COMPONENT IDEA:** *B. Natural Hazards*	**EXPLANATION:** The focus of this standard should be on the idea that natural hazards will occur, and will have effects on humans. Each of these hazards originates from natural processes. The goal of studying natural hazards is to decrease their negative impacts. Understanding specific effects on humans and the environments provides information needed to define engineering problems and consider appropriate constraints. **What are some Landforms?** **How does Earth's surface change slowly?** **How can we model erosion?** **EXPLANATION:** Examples of designs may include using a model of a sediment tray to illustrate the effects of a landslide, flood, or lost vegetation by running water and creating a solution to slow the impact of these hazards on the environment. **How does Earth's surface change**	**Unit 10 419-466** **Lesson 1 419-432** **Lesson 2 433-442** **Lesson 3 335-446** https://packs.eb.com/science/202179-/pinboard Unit 10 Leveled Readers How Does Earth's Surface Change? **B** Hawaii's Volcanoes. **G** How Does Earth's Surface Change? **R** Brainpop Jr. Fast Land Changes Slow Land Changes Natural Resources **Lesson 4 447-462** Discovery Education Utube	**Crosscutting Concept: Cause and Effect** Students routinely search for cause and effect relationships in systems they study. **SCIENCE AND ENGINEERING PRINCIPLE:** **Obtaining, evaluating, and communicating information** (O/E) Students can read and summarize text and embedded, non-text elements from multiple sources synthesizing an understanding on a scientific idea. (C) Students can communicate scientific information in writing utilizing embedded elements. **Crosscutting Concept:** **Systems and System Models** Students group and describe interactions of the components that define a larger system. **SCIENCE AND ENGINEERING PRINCIPLE:**

	quickly?		**Constructing explanations and designing solutions** Students can design a device utilizing scientific ideas as well as compare competing solutions based on constraints and criteria for success.

Guiding Question: ***How do science concepts, engineering skills, and applications of technology improve the quality of life?***

Engineering & Technology	**4th Nine Weeks- Engineering Design (9 weeks)**		
3.ETS2: Links Among Engineering, Technology, Science, and Society			
TN State Standards	**Objectives/Learning Targets** **Explanation**	**Instructional Resources** Houghton Mifflin Harcourt	**Crosscutting Concepts and Science and Engineering Principles**

3ETS1.1 **Design a solution to a real-world problem that includes specified criteria for constraints.** **COMPONENT IDEA:** *A. Defining and Deliminating and Engineering Problems* **3.ETS.2** **Apply evidence or research to support a design solution.** **COMPONENT IDEA:** *A. Defining and Deliminating and Engineering Problems*	**EXPLANATION:** In K-2 students developed the ability to define engineering problems that incorporated observations about the environment or conditions associated with the problem. These observations are incorporated in both determining the criteria for a successful design as well as constraints that limit design possibilities. Constraints might include limited availability of either materials or resources. Students also learned to communicate their initial ideas using drawings. **Understanding these constraints, students can now undertake the task of evaluating proposals for design solutions and then consider how well the proposals meet criteria for success and work within the constraints.** **EXPLANATION:** Supporting a design solution is dependent on gathering evidence or conducting research. The focus in these efforts should be to compare the solution to the criteria and constraints that were established when the problem was initially defined.	Unit 1 Investigating Questions Unit 2 Engineering Process **Lesson 1 155-66** **Lesson 2 67-68** **Lesson 3 69-80** Leveled Readers How Do You Do Science? **B** How a Scientist Works? **G** How Do You Do Science? **R** https://packs.eb.com/science/250421 -/pinboard **Brainpop Jr.** Engineering and Design Process **Lesson 4 81-85** **S.T.E.M.** **Pages 443-444** Leveled Readers How Does the Design Process Help Us? **B** Designing Amusement Park Rides. **G** How Does the Design Process Help Us? **R** Discovery Education Utube	**Crosscutting Concept: Systems and System Models** Students group and describe interactions of the components that define a larger system. **SCIENCE AND ENGINEERING PRINCIPLE:** **Constructing explanations and designing solutions** Students can design a device utilizing scientific ideas as well as compare competing solutions based on constraints and criteria for success. **Crosscutting Concept:** Students group and describe interactions of the components that define a larger system. **SCIENCE AND ENGINEERING PRINCIPLE:** **Obtaining, evaluating, and communicating information** (O/E) Students can read and summarize text and embedded, non-text elements from multiple sources synthesizing an understanding on a scientific idea. (C) Students can communicate scientific information in writing utilizing embedded elements.

Fourth Nine Weeks Resources
Vocabulary: observe, infer, predict, investigation, hypothesis, experiment, variable, microscope, graduated cylinder, data, evidence, data, data table, chart, bar graph, map, model, design process, technology
Inquiry Skills: classify, compare, contrast, cause and effect, draw conclusion, infer, investigate, make a model, observation, predict, reasoning, scientific inquiry