PLANNED INSTRUCTION

A PLANNED COURSE FOR:

STEELS: Science, Technology and Engineering,
Environmental Literacy and Sustainability

Curriculum writing committee:

Grade Level: Fourth Grade

Date of Board Approval: _____

Curriculum Map

Overview:
In grade 4, students will make connections between the natural and human-made world through inquiry, problem solving, critical thinking, and authentic exploration. Specific areas of exploration include: Earth's features and processes; animal and plant adaptations; human body, vision and the brain; energy and energy transfer; electricity, light and heat; and sound waves and communication.

Goals:

1. **Marking Period One: Over a 45-day period of time, students will aim to understand:**
   UNIT 1: Earth's Features and Processes (8 weeks)
   - Patterns in fossils and rock layers
   - Make observations and measurements about erosion
   - Analyze and interpret data from maps
   - Generate solutions to reduce the impact of Earth's processes

   UNIT 2: Animal and Plant Adaptations (To be continued in Marking Period Two) (1 weeks)
   - Investigate how internal and external structures of plants and animals work together
   - Use a model to describe how animals respond to different situations

2. **Marking Period Two: Over a 45-day period of time, students will aim to understand:**

   UNIT 2: Animal and Plant Adaptations (Continued) (3 weeks)

   - Investigate how internal and external structures of plants and animals work together
   - Use a model to describe how animals respond to different situations

   UNIT 3: Human Body, Vision, and the Brain (6 weeks)

   - Investigate how internal and external structures in humans work together
   - Describe how humans respond through their senses and process the information in their brains
   - Describe how light reflecting from objects allows objects to be seen

3. **Marking Period Three: Over a 45-day period of time, students will aim to understand:**

UNIT 4: Energy and Energy Transfer (8 weeks)

- Explain the relationship between speed and energy
- Predict outcomes about changes in energy
- Test and refine a device that converts energy from one form to another

UNIT 5: Electricity, Light, and Heat(To be continued in Marking Period Four) (1 week)

- Test and refine a device that converts energy from one form to another
- Recognize that energy can be transferred by sound, light, heat, and electric currents
- Explain that energy and fuels are derived from natural resources
- Explain how the use of natural resources can affect the environment

4. **Marking Period Four: Over a 45-day period of time, students will aim to understand:**

UNIT 5: Electricity, Light, and Heat (Continued) (3 weeks)

- Test and refine a device that converts energy from one form to another
- Recognize that energy can be transferred by sound, light, heat, and electric currents
- Explain that energy and fuels are derived from natural resources
- Explain how the use of natural resources can affect the environment

UNIT 6: Sound, Waves, and Communication

- Describe patterns of amplitude and wavelength
- Recognize that waves can cause objects to move
- Generate and compare multiple solutions that use patterns

Unit 1: Earth's Features and Processes Curriculum Map

Unit Overview
What evidence of patterns and systems do we see in weathering, fossils, and rock formation? In this unit, students investigate features and processes of the Earth's surface. Students explore the rapid process of volca nic eruptions! In contrast, students also explore the gradual Earth processes of weathering and erosion. Students apply their knowledge and design solutions to mitigate the impacts of these processes on humans.

Standards	Understandings	Essential Questions
3.3.4.A Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. (4-ESS1-1) 3.3.4.B Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. (4-ESS2-1) 3.3.4.C Analyze and interpret data from maps to describe patterns of Earth's features. (4-ESS2-2)	We can infer Earth's planetary history by features we observe today. Changes we observe on Earth are the result of energy flowing and matter cycling between interconnected systems (the geosphere, hydrosphere, atmosphere, and biosphere).	How do people reconstruct and date events in Earth's planetary history? How and why is Earth constantly changing?

3.3.4.E Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. (4-ESS3-2)		

Technology & Engineering Standards Alignment and Connections (3 -5)	
Demonstrate essential skills of the engineering design process. (3.5.3-5.M) Evaluate the strengths and weaknesses of existing design solutions, including their own solutions. (3.5.3 -5.P) Illustrate that there are multiple approaches to design. (3.5.3 -5.S) Evaluate designs based on criteria, constraints, and standards. (3.5.3-5.U)	
Environmental Literacy & Sustainability Standards Alignment and Connections (3 -5)	
Students who demonstrate understanding can construct an argument to support whether action is needed on a selected environmental issue and propose possible solutions. (3.4.3 -5.E)	

Textbook and Supplemental Resources

Mystery Science

Unit 1: Earth's Features and Processes Curriculum Plan

Learning Objectives

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Local, regional, and global patterns of rock formations reveal changes over time due to Earth's forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. Living things affect the physical characteristics of their regions. Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. . The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes	Use evidence (e.g., measurements, observations, patterns) to construct an explanation. Apply scientific ideas to solve design problems. Identify the evidence that supports particular points in an explanation. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	Patterns can be used as evidence to support an explanation. Scientific knowledge assumes order and consistency in natural systems. Science assumes consistent patterns in natural systems. Cause and effect relationships are routinely identified, tested, and used to explain change.	DOK Level 3 (Strategic Thinking): Constructing an explanation based on evidence involves reasoning, analyzing patterns or data, and synthesizing information to form a conclusion, requiring deeper thought and application of knowledge. DOK Level 4 (Extended Thinking): Applying scientific ideas to solve design problems involves integrating knowledge, reasoning, and creativity to develop solutions, which requires extended and complex thinking. DOK Level 2 (Skills/Concepts): Identifying supporting evidence involves comprehension and the ability to connect information to specific points, requiring

occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts.			reasoning but not extensive analysis. DOK Level 3 (Strategic Thinking): Making observations and collecting measurements to form evidence requires strategic thinking, as it involves interpreting data and using it to explain a phenomenon.

Core Activities and Corresponding Instructional Methods

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Earth's Features & Processes Unit (Birth of Rocks)	Lesson 0: Anchor Phenomenon: Fossils and Constructing Explanations (create a driving question board via see,think, wonder chart which will be	Analyzing and Interpreting Data Constructing Explanations		IXL X. Earth's Features 1. Identify Earth's land features	8 weeks (2 hours per week)

	referred to throughout the entire unit) Students will: ● Generate observations ● Generate questions about the phenomenon ● Create an initial explanation to explain what killed the prehistoric animals ● Create an initial explanation for changes that happened to the land that uncovered their fossils.	Designing Solutions Developing and Using Models Engaging in Argument from Evidence		using photographs 2. Identify Earth's land features using satellite images 3. Describe and graph water on Earth 4. Read a topographic Map 5. Select Parts of a topographic Map Y. Earth Events: 1. Changes to Earth's surfaces: earthquakes 2. Changes to Earth's surface: volcanic eruptions	
	Lesson 1: Volcanoes and Patterns of Earth's Features Students will: ● Explore the past and present pattern of where Volcanoes exist on Earth ● Plot volcano locations ● Look for patterns of volcano locations ● Analyze maps to look for patterns	Developing and Using Models Constructing Explanations and Designing Solutions Analyzing and Interpreting Data Engaging in Argument from Evidence	Could a mountain turn into a volcano?		
	Lesson 2: Volcanoes and Rock Cycle Students will: ● Investigate how differences in lava types	Constructing Explanations and Designing Solutions	Why does this rock look like a sponge? What is the moon made of?		

	explain differences in the shape and eruption patterns among volcanoes ● Compare two different types of "lava" -- thin and thick ● Infer why volcanoes have different shapes and how the type of lava explains why some volcanoes explode.				
	Lesson 3: Weathering and Erosion Students will: ● Explore how solid rock breaks apart into smaller pieces through a process called weathering (including root-wedging and ice-wedging) ● Perform an experiment with a model to understand the process of weathering and how this process explains why rocks at the tops of mountains are jagged, while those at the bottom are rounded	Planning and Carrying Out Investigations Analyzing and Interpreting Data			

	Lesson 4: Sedimentary Rock and Fossils Students will: ● Gather evidence to describe how environments on Earth have changed over time ● Explore how the process of sedimentary rock formation preserves a record of those past environments ● Observe fossils found within a model canyon and use evidence to support the explanation that the landscape has changed numerous times	Constructing Explanations and Designing Solutions Developing and Using Models	How old is the earth? What's the best place to look for dinosaur fossils?		
	Lesson 5: Erosion, Natural Hazards, and Engineering Students will: ● Students will learn about the types, causes, and dangers of landslides ● Design a solution to protect a house from a landslide and preventing a landslide from happening	Constructing Explanations and Designing Solutions	How do earthquakes happen? Why is it so hard firefighters to put out wildfires?		

	• Use a brainstorming technique to design creative solutions.				

Assessments

Diagnostic	Formative	Summative
See, Think, Wonder Chart Science Journal	Lesson Quick Checks/Exit Tickets Labs/Models Participation	Lesson Assessments Unit 1 Common Assessment

Unit 2: Animal and Plant Adaptations Curriculum Map

Unit Overview
In this unit, students explore the adaptations of animals and plants. Students investigate how the external and internal structures of an organism work together as an interconnected system that aids in their growth and survival. They also use models to explore how a combination of instincts and memories influence animal behavior.

Standards	Understandings	Essential Questions
3.1.4.A Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. (4-LS1-1) 3.1.4.B Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. (4-LS1-2)	Organisms have characteristic structures, functions, and behaviors that allow them to grow, reproduce, and die. Animals have external and internal sensory receptors that detect different kinds of information that then gets processed by the brain.	How do the structures of organisms enable life's functions? How do organisms detect, process, and use information about the environment?

Technology & Engineering Standards Alignment and Connections (3 -5)	
Compare how things found in nature differ from things that are human-made, noting differences and similarities in how they are produced and used (3.5.3-5.FF).	
Environmental Literacy & Sustainability Standards Alignment and Connections (3 -5)	
Students who demonstrate understanding can analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them (3.4.3-5.A)	

Textbook and Supplemental Resources

Unit 2: Animal and Plant Adaptations Curriculum Plan

Learning Objectives

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply… (CCC)	DOK Level(s)
Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.	Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. Develop a model to describe phenomena.	Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena. Cause and effect relationships are routinely identified. Knowledge of relevant scientific concepts and research findings is important in engineering. Similarities and differences in patterns can be used to	DOK Level 3 (Strategic Thinking): Making observations to collect data for evidence involves reasoning and using that data to explain or test a design solution, which requires analysis and interpretation. DOK Level 2 (Skills/Concepts): Asking investigable questions and predicting outcomes based on patterns requires identifying relationships and making logical predictions, which involves reasoning and understanding concepts. DOK Level 3 (Strategic Thinking): Developing a model to describe phenomena requires the application of knowledge, reasoning, and analysis to represent a scientific concept or process.

	Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. Construct an argument with evidence, data, and/or a model. Use a model to test interactions concerning the functioning of a natural system.	sort and classify designed products. A system can be described in terms of its components and their interactions.	DOK Level 4 (Extended Thinking): Generating and comparing multiple solutions requires extended thinking, as it involves evaluating different approaches and determining their effectiveness based on specific criteria and constraints. DOK Level 3 (Strategic Thinking): Constructing an argument based on evidence, data, or a model requires critical thinking and reasoning to synthesize information and support a conclusion. DOK Level 3 (Strategic Thinking): Using a model to test interactions in a natural system involves applying reasoning to simulate and analyze how different factors affect the system, requiring strategic thinking.

Core Activities and Corresponding Instructional Methods

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Animal & Plant Adaptations Unit	Lesson 0: Anchor Phenomenon Animal Adaptations	Engaging in Argument from Evidence		L. Classification	4 weeks (2 hours per week)

(Animal & Plant Adaptations)	Students will: • Identify how slow moving animals will be good at survival			1. Identify living and nonliving things 2. Identify mammals, birds, fish, reptiles, and amphibians 3. Identify vertebrates and invertebrates 4. Use evidence to classify mammals, birds, fish, reptiles, and amphibians 5. Use evidence to classify animals 6. Describe, classify, and compare kingdoms M. Scientific names 1. Identify common and scientific names	
	Lesson 1: Animal Adaptations Students will: • Make observations of an underwater animal • Collect evidence that its external structures serve specific functions • Construct an argument that the frogfish's external and internal structures work together as part of a system • Support their growth and survival.	Engaging in Argument from Evidence	Surfing Sea Otter How Do Jellyfish Sting? Why Can't Fish Breathe on Land? Fastest Ocean Animal		

	Lesson 2: Learned Behavior and Instinct Students will: ● Explore how animals receive information through their senses ● Explore how animals use instincts and memories to guide their behaviors ● Use models to understand how an animal's senses, brain, and memories all work together as a system to influence their behavior and support their survival.	Developing and Using Models Constructing Explanations and Designing Solutions	Do sharks really want to eat people?	2. Origins of scientific names 3. Use scientific names to classify organisms N. Animals 1. Read and construct animal life cycle diagrams 2. Compare animal life cycles O. Plants 1. Classify fruits and vegetables as plant parts 2. Idenitfy plant parts and their functions 3. How do plants make food? 4. Identify flower parts and their functions	
	Lesson 3: Plant Adaptations Students will: ● Students make observations of	Engaging in Argument from Evidence	Why don't all trees lose their leaves in the fall?		

	external and internal parts of trees ● Collect evidence that these structures work together as a system ● Model roots and branches to explore their functions ● Construct an argument about how these structures work together to survive	Developing and Using Models	How do flowers bloom in the spring? Do any plants eat animals?	5. Describe and construct flowering plant life cycles 6. Describe and construct conifer life cycles P. Adaptations 1. Introduction to adaptations 2. Animal adaptations: beaks, mouths, and necks 3. Animal adaptations: feet and limbs 4. Animal adaptations: skins and body coverings R. Cells 1. Identify functions of plant cell parts	

				2. Identify functions of animal cell parts 3. Plant cell diagrams: identify parts 4. Animal cell diagrams: identify parts 5. Plant cell diagrams: label parts 6. Animal cell diagrams: label parts 7. Compare plant and animal cells 8. Cell part functions: true or false	

Assessments

Diagnostic	Formative	Summative
See, Think, Wonder Chart	Lesson Quick Checks/Exit Tickets	Lesson Assessments

Science Journal	Labs/Models Participation	Unit 2 Common Assessment

Unit 3: Human Body, Vision and The Brain Curriculum Map

Unit Overview
In this unit, students investigate structures and functions of the human body. Students explore how our bones and muscles are interconnected, how our eyes interact with light and impact our vision, and how our brain responds to stimuli in our environm ent.

Standards	Understandings	Essential Questions
3.1.4.A. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction (4-LS1-1) 3.1.4.B. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways (4-LS1-2)	Organisms have characteristic structures, functions, and behaviors that allow them to grow, reproduce, and die. Animals have external and internal sensory receptors that detect different kinds of information that then gets processed by the brain.	How are instruments that transmit and detect waves used to extend human senses? How do the structures of organisms enable life's functions? How do organisms detect, process, and use information about the environment?

3.2.4.F. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen (4-PS4-2)		

Technology & Engineering Standards Alignment and Connections (3 -5)	
Use appropriate symbols, numbers and words to communicate key ideas about technological products and systems (3.5.3 -5.A) Follow directions to complete a technological task (3.5.3 -5.C).	
Environmental Literacy & Sustainability Standards Alignment and Connections (3 -5)	
Students who demonstrate understanding can analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them (3.4.3 -5.A.)	

Textbook and Supplemental Resources

Mystery Science

Unit 3: Human Body, Vision, and The Brain Curriculum Plan

Learning Objectives

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Organisms have characteristic structures, functions, and behaviors that allow them to grow, reproduce, and die. Animals have external and internal sensory receptors that detect different kinds of information that then gets processed by the brain. Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.	Use evidence (e.g., measurements, observations, patterns) to construct an explanation. Apply scientific ideas to solve design problems. Identify the evidence that supports particular points in an explanation. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	Patterns can be used as evidence to support an explanation. Scientific knowledge assumes order and consistency in natural systems. Science assumes consistent patterns in natural systems. Cause and effect relationships are routinely identified, tested, and used to explain change.	DOK Level 3 (Strategic Thinking): Constructing an explanation based on evidence involves reasoning, analyzing patterns or data, and synthesizing information to form a conclusion, requiring deeper thought and application of knowledge. DOK Level 4 (Extended Thinking): Applying scientific ideas to solve design problems involves integrating knowledge, reasoning, and creativity to develop solutions, which requires extended and complex thinking. DOK Level 2 (Skills/Concepts): Identifying supporting evidence involves comprehension and the ability to connect information to specific points, requiring

			reasoning but not extensive analysis. DOK Level 3 (Strategic Thinking): Making observations and collecting measurements to form evidence requires strategic thinking, as it involves interpreting data and using it to explain a phenomenon.

Core Activities and Corresponding Instructional Methods

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Human Body, Vision, & The Brain Unit (Human Machine)	Lesson 0: Anchor Phenomenon System Models Students will: ● Generate observations and questions about the phenomenon ● Create an initial model to	Developing and Using Models Planning and Carrying Out Investigations Constructing Explanations Analyzing and Interpreting Data		IXL K - Light How Do We See Objects? How Does Light Travel and Interact with Matter	6 Weeks (2 hours per week)

	explain how the owl's body systems work together to catch prey.				
	Lesson 1: Muscles and Skeleton Students will: ● Students discover the mechanism by which their muscles control their bones to move their bodies. ● Model a human finger ● Observe how pulling on a string (a model for tendons) causes it to bend at the joints.	Developing and Using Models Constructing Explanations and Designing Solutions	Why Do Our Skeletons Have So Many Bones? What Would Happen If You Didn't Have a Skull? How Does You Heart Pump Blood? Why Do We Need Blood? Why Do We Get Hiccups?		
	Lesson 2: Light, Eyes, and Vision	Developing and Using Models	How Do You Know If You Need Glasses?		

	Students will: ● Discover the basics of how their eyes work ● Figure out some of the causes of vision problems ● Develop a working model of a human eye. ● Use a magnifying lens as a model ● explore how the structure of this lens is related to the function of our eyes.	Constructing Explanations and Designing Solutions	How is a Rainbow Made?		
	Lesson 3: Structure and Function of Eyes Students will: ● Explore the function of their iris and pupil ● observe how the changing size of the pupil controls how	Planning and Carrying Out Investigations Developing and Using Models Constructing Explanations and Designing Solutions	Why Do We Have Tears When We Cry?		

	much light enters the eye.				
	Lesson 4: Brain, Nerves, and Information Processing Students will: ● explore the brain's role in receiving information from the senses ● process that information and control the muscles to enable movement ● how we process information in our brains ● interpret and respond to that information in different ways.	Planning and Carrying Out Investigations Analyzing and Interpreting Data	Why Do Some People Get Carsick? How Do Optical Illusions Trick Us?		

Assessments

Diagnostic	Formative	Summative
See, Think, Wonder Chart Science Journal	Lesson Quick Checks/Exit Tickets Labs/Models Participation	Lesson Assessments Unit 3 Common Assessment

Unit 4: Energy and Energy Transfer Curriculum Map

Unit Overview
In this unit, students explore energy! Students investigate how energy is stored, how it can make objects move, and how collisions transfer energy between objects. Students also construct chain reaction machines to explore the many different way s that energy can be transferred.

Standards	Understandings	Essential Questions
3.2.4.A Use evidence to construct an explanation relating the speed of an object to the energy of that object. (4-PS3-1) 3.2.4.C Ask questions and predict outcomes about the changes in energy that occur when objects collide.(4-PS3-3)	Producing energy useful in everyday life means to convert some available energy into a desired form, which is then delivered to users.	How do food and fuel provide energy? If energy is conserved, why do people say it is produced or used? What is meant by conservation of energy?

3.2.4.D Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. (4-PS3-4)	Waves are repeating patterns of motion that transfer energy and information without transferring matter. All materials, energy, and fuels that humans use are derived from natural sources, some of which are renewable over time and others are not.	How is energy transferred between objects or systems?

Technology & Engineering Standards Alignment and Connections (3 -5)	
Practice successful design skills (3.5.3-5.Q) Demonstrate essential skills of the engineering design process. (3.5.3-5.M) Explain how various relationships can exist between technology and engineering and other content areas (3.5.3-5.X).	
Environmental Literacy & Sustainability Standards Alignment and Connections (3 -5)	
Students who demonstrate understanding can critique ways that people depend on and change the environment (3.4.3-5.F)	

Textbook and Supplemental Resources

Unit 4: Energy and Energy Transfer Curriculum Plan

Learning Objectives

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. The expression “produce energy” typically refers to the conversion of stored energy into a desired form for practical use.	Apply scientific ideas to solve design problems. Develop a model using an analogy, example, or abstract representation to describe a scientific principle. Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	Most scientists and engineers work in teams. Science affects everyday life. Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena. Cause and effect relationships are routinely identified, tested, and used to explain change.	DOK Level 4 (Extended Thinking): Applying scientific concepts to solve design problems involves integrating knowledge, reasoning, and creativity to develop solutions, which requires complex and extended thinking. DOK Level 3 (Strategic Thinking): Developing a model using analogies or abstract representations requires reasoning and applying knowledge to represent scientific concepts, which

Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. Testing a solution involves investigating how well it performs under a range of likely conditions.	Analyze and interpret data to make sense of phenomena using logical reasoning. Obtain and combine information from books and other reliable media to explain phenomena. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.	Patterns can be used as evidence to support an explanation. Cause and effect relationships are routinely identified and used to explain change. Knowledge of relevant scientific concepts and research findings is important in engineering.	involves deeper analysis and understanding. DOK Level 3 (Strategic Thinking): Collecting observations and measurements to form evidence requires strategic thinking, as it involves interpreting data and using it to explain a phenomenon. DOK Level 3 (Strategic Thinking): Analyzing and interpreting data involves applying logic and reasoning to draw conclusions about phenomena, requiring critical thinking and deeper analysis. DOK Level 3 (Strategic Thinking): Obtaining and synthesizing information from various sources to explain phenomena requires reasoning and analysis to integrate information from different media, which is a strategic thinking task. DOK Level 4 (Extended Thinking): Generating and comparing multiple solutions involves extended thinking, as it

			requires evaluating different solutions based on criteria and constraints, analyzing their effectiveness, and determining the best approach.

Core Activities and Corresponding Instructional Methods

Be specific. List activities related to materials/resources, include links, article titles etc.

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Energy & Energy Transfer Unit (Energizing Everything)	Lesson 0: Anchor Phenomenon - Energy and Modeling Students will: ● generate observations and questions on the lesson phenomenon, the Rube Goldberg machine	Analyzing and Interpreting Data Developing and Using Models Designing Solutions Constructing Explanations		IXL I.Energy Transformation 1. Energy transformation	8 weeks (2 hours per week)

(Energizing Everything)	Lesson 1: Speed and Energy Students will: ● explore how we use different things as fuel for energy	Analyzing and Interpreting Data Constructing Explanations and Designing Solutions	Energy Scavenger Hunt ELA Connection - Writing about Energy		
	Lesson 2: Gravitational Energy, Speed, and Collisions Students will: ● explore how energy can be stored as height	Developing and Using Models Analyzing and Interpreting Data	Why Don't People Fall Out of Rollercoasters When They Go Upside Down?		
	Lesson 3: Collisions and Energy Transfers Students will: ● investigate how energy transfers when objects collide	Asking Questions and Defining Problems			

	Lesson 4: Energy Transfer and Engineering Students will: ● construct an understanding of how energy is stored, released and transfers in chain reactions	Developing and Using Models			
	Lesson 5: Energy Transfer and Engineering Students will: ● learn how energy is stored, released, and transferred	Developing and Using Models			

Assessments

Diagnostic	Formative	Summative

See, Think, Wonder Chart Science Journal	Lesson Quick Checks/Exit Tickets Labs/Models Participation	Lesson Assessments Unit 4 Common Assessment

Unit 5: Electricity, Light and Heat Curriculum Map

Unit Overview
In this unit, students investigate the different forms of energy! Students obtain information about how heat energy, solar en ergy, wind energy, and water energy can be transformed into electrical energy. They also construct devices that convert energy from one form into another, such as heat into motion and electricity into light.

Standards	Understandings	Essential Questions
3.2.4.D Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. (4-PS3-4) 3.2.4.B Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. (4-PS3-2)	Producing energy useful in everyday life means to convert some available energy into a desired form, which is then delivered to users. Waves are repeating patterns of motion that transfer energy and information without transferring matter.	What is light? How can one explain the varied effects that involve light?

3.3.4.D Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. (4-ESS3-1)	Changes we observe on Earth are the result of energy flowing and matter cycling between interconnected systems. All materials, energy, and fuels that humans use are derived from natural sources, some of which are renewable over time and others are not.	

Technology & Engineering Standards Alignment and Connections (3 -5)	
Compare how things found in nature differ from things that are human-made, noting differences and similarities in how they are produced and used (3.5.3-5.FF) Classify resources used to create technologies as either renewable or nonrenewable (3.5.3-5.F) Explain why responsible use of technology requires sustainable management of resources (3.5.3-5.E)	
Environmental Literacy & Sustainability Standards Alignment and Connections (3 -5)	
Students who demonstrate understanding can investigate how perspectives over the use of resources and the development of technology have changed over time and resulted in conflict over the development of societies and nations (3.4.3-5.G)	

Textbook and Supplemental Resources

Mystery Science

Unit 5: Electricity, Light and Heat Curriculum Plan

Learning Objectives

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. The expression “produce energy” typically refers to the	Apply scientific ideas to solve design problems. Develop a model using an analogy, example, or abstract representation to describe a scientific principle. Make observations and/or measurements to produce data to serve as the basis for	Most scientists and engineers work in teams. Science affects everyday life. Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.	DOK Level 4 (Extended Thinking): Applying scientific concepts to solve design problems involves integrating knowledge, reasoning, and creativity to develop solutions, which requires complex and extended thinking. DOK Level 3 (Strategic Thinking): Developing a model using analogies or abstract

conversion of stored energy into a desired form for practical use. Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. Testing a solution involves investigating how well it performs under a range of likely conditions. Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.	evidence for an explanation of a phenomenon. Analyze and interpret data to make sense of phenomena using logical reasoning. Obtain and combine information from books and other reliable media to explain phenomena. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.	Cause and effect relationships are routinely identified, tested, and used to explain change. Patterns can be used as evidence to support an explanation. Cause and effect relationships are routinely identified and used to explain change. Knowledge of relevant scientific concepts and research findings is important in engineering.	representations requires reasoning and applying knowledge to represent scientific concepts, which involves deeper analysis and understanding. DOK Level 3 (Strategic Thinking): Collecting observations and measurements to form evidence requires strategic thinking, as it involves interpreting data and using it to explain a phenomenon. DOK Level 3 (Strategic Thinking): Analyzing and interpreting data involves applying logic and reasoning to draw conclusions about phenomena, requiring critical thinking and deeper analysis. DOK Level 3 (Strategic Thinking): Obtaining and synthesizing information from various sources to explain phenomena requires reasoning and analysis to integrate information from different media, which is a strategic thinking task.

			DOK Level 4 (Extended Thinking): Generating and comparing multiple solutions involves extended thinking, as it requires evaluating different solutions based on criteria and constraints, analyzing their effectiveness, and determining the best approach.

Core Activities and Corresponding Instructional Methods

Be specific. List activities related to materials/resources, include links, article titles etc.

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Electricity, Light and Heat	Lesson 0: Anchor Phenomenon Electric, Light and Heat Students will: • generate observations and questions	Developing and Using Models Constructing Explanations		IXL D - Heat and Thermal Energy Lesson 1 - Predict heat flow Lesson 2- Predict temperature changes	4 weeks (2 hours per week)

	about the phenomenon ● observe and question the mysterious towers in the desert			Lesson 3- How is temperature related to thermal energy T - Conservation and Natural Resources Lesson 1 - Science Literacy - How can a community protect sea turtles? Lesson 2- Evaluate Natural Energy Sources J-Electricity Lesson 2- Electrical Circuits -Conductors and Insulators	
	Lesson 1: Renewable Energy and Natural Resource Students will: ● explore how a city's electricity is services from a natural resource ● investigate how using different energy resources affects the environment ● obtain and combine informations about different types of renewable energy	Obtaining, Evaluating, and Communicating Information Using Mathematics and Computational Thinking			

	• evaluate the advantages and disadvantages of each energy source				
	Lesson 2: Electrical Energy Students will: • be introduced to electricity as a form of energy • investigate how electrical energy requires a circuit • how circuits work • learn the anatomy of a battery	Constructing Explanations and Designing Solutions Developing and Using Models	How Do Batteries Work? Make a Lemon Battery		
	Lesson 3: Heat Energy and Energy Transfer Students will: • explore how heat is another form of energy	Planning and Carrying Out Investigations	Can You Make a Penny Move?		

	• discover how heat energy can make things move				

Assessments

Diagnostic	Formative	Summative
See, Think, Wonder Chart Science Journal	Lesson Quick Checks/Exit Tickets Labs/Models Participation	Lesson Assessments Unit 5 Common Assessment

Unit 6: Sound, Waves, and Communication Curriculum Map

Unit Overview
In this unit, students investigate the science of sound. Students construct physical devices to feel the vibrations that allo w us to communicate across distances. Students also use digital devices to visualize the characteristics of different sound waves t hat

cause us to hear different things.

Standards	Understandings	Essential Questions
3.2.4.E Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. (4-PS4-1) 3.2.4.G Generate and compare multiple solutions that use patterns to transfer information. (4-PS4-3)	Producing energy useful in everyday life means to convert some available energy into a desired form, which is then delivered to users. Waves are repeating patterns of motion that transfer energy and information without transferring matter.	What other forms of electromagnetic radiation are there? What are the characteristic properties and behaviors of waves?

Technology & Engineering Standards Alignment and Connections (3 -5)	
Judge technologies to determine the best one to use to complete a given task or meet a need (3.5.3-5.K) Describe requirements of designing or making a product or system (3.5.3-5.O).	
Environmental Literacy & Sustainability Standards Alignment and Connections (3 -5)	
Students who demonstrate understanding can investigate how perspectives over the use of resources and the development of	

technology have changed over time and resulted in conflict over the development of societies and nations (3.4.3-5.G).	

Textbook and Supplemental Resources

Mystery Science

Unit 6: Sound, Waves, and Communication Curriculum Plan

Learning Objectives

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave.	Apply scientific ideas to solve design problems. Develop a model using an analogy, example, or abstract representation to describe a scientific principle. Make observations and/or measurements to produce data to serve as the basis for	Most scientists and engineers work in teams. Science affects everyday life. Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.	DOK Level 4 (Extended Thinking): Applying scientific concepts to solve design problems involves integrating knowledge, reasoning, and creativity to develop solutions, which requires complex and extended thinking. DOK Level 3 (Strategic Thinking): Developing a model using analogies or abstract

Testing a solution involves investigating how well it performs under a range of likely conditions.	evidence for an explanation of a phenomenon. Analyze and interpret data to make sense of phenomena using logical reasoning. Obtain and combine information from books and other reliable media to explain phenomena. Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.	Cause and effect relationships are routinely identified, tested, and used to explain change. Patterns can be used as evidence to support an explanation. Cause and effect relationships are routinely identified and used to explain change. Knowledge of relevant scientific concepts and research findings is important in engineering.	representations requires reasoning and applying knowledge to represent scientific concepts, which involves deeper analysis and understanding. DOK Level 3 (Strategic Thinking): Collecting observations and measurements to form evidence requires strategic thinking, as it involves interpreting data and using it to explain a phenomenon. DOK Level 3 (Strategic Thinking): Analyzing and interpreting data involves applying logic and reasoning to draw conclusions about phenomena, requiring critical thinking and deeper analysis. DOK Level 3 (Strategic Thinking): Obtaining and synthesizing information from various sources to explain phenomena requires reasoning and analysis to integrate information from different media, which is a strategic thinking task.

			DOK Level 4 (Extended Thinking): Generating and comparing multiple solutions involves extended thinking, as it requires evaluating different solutions based on criteria and constraints, analyzing their effectiveness, and determining the best approach.

Core Activities and Corresponding Instructional Methods

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Sound, Waves, & Communication Unit (Waves of Sound)	Lesson 0: Anchor Phenomenon Sound Waves and Conceptual Modeling Students will: ● discover a series of devices that showcase visible sound waves	Analyzing and Interpreting Data Constructing Explanations Designing Solutions Engaging in Argument from Evidence		G. Force and motion 4. Compare amplitudes and wavelengths of waves	5 weeks (2 hours per week)

	• generate observations and questions about this phenomenon	Developing and Using Models Plan and Carry Out an Investigation Obtain and Communicate Information			
	Lesson 1: Pattern Transfer and Technology Students will: • explore how digital devices encode complex information so that it can be transferred over long distances • generate their own codes to transfer information	Constructing Explanations and Designing Solutions	How emojis were created? Who invented the alphabet?		

	across the classroom ● compare codes ● evaluate what worked best given the criteria and constraints				
	Lesson 2: Sound, Vibration and Engineering Students will: ● learn about the connection between sounds and vibrations ● modify the design to see if they can improve the sound quality	Developing and Using Models Planning and Carrying Out Investigations	How do phones work?		
	Lesson 3: Sound and Vibrations Students will:	Developing and Using Models			

	• explore the role that air plays in enabling a sound vibration to travel • experiment with sound to understand how it moves through the air • consider what sound would be like in environments with no air				
	Lesson 4: Sound Waves and Wavelengths Students will: • discover that sound is a wave • draw waves that different sounds make	Developing and Using Models	How are waves made in the ocean?		

Assessments

Diagnostic	Formative	Summative
See, Think, Wonder Chart Science Journal	Lesson Quick Checks/Exit Tickets Labs/Models Participation	Lesson Assessments Unit 6 Common Assessment

Checklist to Complete and Submit:
(Scan and email)

Copy of the curriculum using the template entitled “Planned Instruction,” available on the district website.
The primary textbook form(s).
The appropriate payment form, in compliance with the maximum curriculum writing hours noted on the first page of this document.

Each principal and/or department chair has a schedule of First and Second Readers/Reviewers. Each Reader/Reviewer must sign & date below.

First Reader/Reviewer Printed Name _____

First Reader/Reviewer Signature_____ Date _____

Second Reader/Reviewer Printed Name_____

Second Reader/Reviewer Signature _____ Date _____