PLANNED INSTRUCTION

A PLANNED COURSE FOR:

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

Curriculum writing committee:
Gail Atchison, Melinda Luhrs, and Corinne Matthews

Grade Level: Fifth Grade

Date of Board Approval: _____

Curriculum Map

Overview:

Introduction

Science, Technology & Engineering, and Environmental Literacy & Sustainability (STEELS) Standards guide the study of the natural and human-made world through inquiry, problem-solving, critical thinking, and authentic exploration. This document displays a curriculum framework for Grade 5 Science. It is designed to focus curriculum and teaching, provide guidance for multiple approaches to curriculum development, encourage less reliance on textbooks as curriculum, and avoid activity-oriented teaching without focus/purpose.

Science Long Term Transfer Goals

In support of the Curriculum Framework, Long Term Transfer Goals (LTTG) provide the overarching practices that ground the foundation for a robust curriculum; thus, all curriculum should relate to one or more of the LTTGs detailed below – as they highlight the effective uses of understanding, knowledge, and skill that we seek in the long run; i.e., what we want students to be able to do when they confront new challenges – both in and outside of school.

Students will be able to engage as technological and engineering literate members of a global society, using their learning to:

- approach science as a reliable and tentative way of knowing and explaining the natural world and designed world.
- weigh evidence and use scientific approaches to ask questions, investigate, and make informed decisions.
- make and use observations to analyze relationships and patterns in order to explain phenomena, develop models, and make predictions.
- evaluate systems, in order to connect how form determines function and how any change to one component affects the entire system.
- explain how the natural and designed worlds are interrelated and the application of scientific knowledge and technology can have beneficial, detrimental, or unintended consequences.

Marking Period One: **Time Range - 8 ½ weeks / 45 days**

Unit 0: What is Science? 3 days / 1 week (1 lesson per week)

Overview: The science year begins with a brief overview of how science incorporates reasoning, analysis, tools, processes, procedures, systems, models, and patterns in observing the natural world around us.

Goals:

1. Know that science is a way of understanding the natural world through inquiry, observation, and verification.
2. Know that natural and human-made objects are made up of parts.
3. Know models as useful simplifications of objects or processes.
4. Illustrate patterns that regularly occur and reoccur in nature.
5. Know that scale is an important attribute of natural and human-made objects, events, and phenomena.
6. Recognize change in natural and physical systems.
7. Identify and use the nature of scientific and technological knowledge.
8. Describe objects in the world using the five senses.
9. Recognize and use the elements of scientific inquiry to solve problems.
10. Recognize and use the technological design process to solve problems.

.

Unit 1: Physical and Chemical Changes - 18 days / 6 weeks (1 lesson per week)

Goals:

1. Develop a model to describe that matter is made of particles too small to be seen.
2. Make and communicate observations and measurements to identify materials based on their properties.
3. Interpret and analyze data to make decisions about how to utilize materials based on their properties.
4. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
5. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

Marking Period Two: **Time Range - 8 ½ weeks / 45 days**

Unit 2: Energy in Ecosystems - 24 days / 8 weeks (1 lesson per week)

Goals:

1. Support an argument that plants get the materials they need for growth chiefly from air and water.
2. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
3. Use models to describe that energy in animal's food used for body repair, growth, motion, and to maintain body warmth was once energy from the sun.
4. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Marking Period Three: **Time Range - 8 ½ weeks / 45 days**

Unit 3: Earth's Major Systems / Earth's Features and Processes - 6 weeks / 18 days (1 lesson per week)

Goals:

1. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.
2. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
3. Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
4. Generate and design possible solutions to a current environmental issue, threat, or concern.

Begin: **Units 4 and 5: Stars and the Solar System -**

Unit 4: Earth and Space Patterns - 6 weeks / 18 days (1 lesson per week)

Goals:

1. Support an argument that the gravitational force exerted by Earth on objects is directed down.

Marking Period Four: **Time Range - 8 ½ weeks / 45 days**

Continue: **Units 4 and 5: Stars and the Solar System -**

Unit 4: Earth and Space Patterns - 6 weeks / 18 days (1 lesson per week)

Unit 5: Stars and Planets - 4 weeks / 12 days (1 lesson per week)

Goals:

1. Support an argument that the gravitational force exerted by Earth on objects is directed downward.
2. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.

PSSA Prep (approximately 2 weeks)

PSSA Testing (2 weeks - ELA, Math, & Science)

Unit 6: (approximately 4 weeks)
Getting Ready for 6th Grade: Introduction to Open SciEd

Curriculum Plan

Unit 0: Nature of Science Curriculum Map

Unit Overview
The science year begins with a brief overview of how science incorporates reasoning, analysis, tools, processes, procedures, systems, models, and patterns in observing the natural world around us. Beginning of year set-up: 1. Develop a shared set of classroom norms: Classroom Agreement Lesson, Agreement doc 2. Establish routines for set up and break down. 3. Build a science notebook that includes numbered pages and a table of contents (8 ½ x 11 recommended).

PA STEELS Standards	**Big Idea**	**Essential Questions**
3.1.5.A Support an argument that plants get the materials they need for growth chiefly from air and water. (5-LS1-1) 3.4.3-5.A Analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them. 3.4.3-5.C Examine ways you influence your local environment and community by collecting and displaying data.	Ecosystems are complex systems that include both living (biotic) and non-living (abiotic) components that interact with each other. Asking questions and defining problems are essential to developing scientific habits of mind. Scientists construct mental and conceptual models of phenomena to represent current understandings, aid in developing questions and	What kinds of questions do scientists and engineers ask? How do scientists and engineers develop and use models? What do scientists and engineers do to find out more about our world and how it functions? In what ways are data analyzed, interpreted, and communicated?

3.4.3-5.D Develop a model to demonstrate how local environmental issues are connected to the larger local environment and human systems. 3.4.3-5.E Construct an argument to support whether action is needed on a selected environmental issue and propose possible solutions.	experiments, and to communicate ideas to others. Scientists and engineers plan, investigate and observe the world to systematically describe it and to develop and test theories and explanations about how the world works. Data must be presented in a form that can reveal any patterns and relationships and that allows results to be communicated to others.	

Textbook and Supplemental Resources

Mystery Science
IXL
YouTube, New York Botanical Garden, *Kids Observe Like Scientists*
Beetlesproject.org, *I notice, I wonder, It reminds me of…*
Can You Save Fred? pdf
Saving Fred (you tube video)

Unit 0: Nature of Science Curriculum Map

Learning Objectives/DOK Levels

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Connections to Nature of Science: Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena • Science explanations describe the mechanisms for natural events. Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.)	Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Use models to describe phenomena. Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	Connections to Nature of Science: Patterns: • Science assumes consistent patterns in natural systems. • Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. •Different materials have different substructures, which can sometimes be observed. Systems and System Models: • A system can be described in terms of its components and their interactions. Connections to Nature of Science Science Addresses Questions About the Natural and Material World. • Science findings are limited to questions that can be answered with empirical evidence.	DOK Level 1 (Recall and Reproduction) Recall or recognize a fact, term, structure, or property. Represent in words or diagrams a scientific concept or relationship. Provide or recognize a standard scientific representation for a simple phenomenon. Perform a grade level-appropriate routine procedure, such as measuring. DOK Level 2 (Skills/Concepts): Specify and explain the relationship between facts, terms, properties, or variables. Describe and explain examples and non-examples of science concepts. Select a procedure according to specified criteria and

			perform it. Formulate a routine problem, given data and conditions. Organize, represent, and interpret data. Interpret or explain phenomena in terms of science concepts. Make basic predictions for cause-and-effect relationships.

Core Activities and Corresponding Instructional Methods

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
This is a suggested unit for the first week of school.					
Unit 0: **What is Science?** 3 Mini-Lessons: **L1**. Observing and Asking questions *How do scientists know so much?* **L2**. Experiments and Variables: What does a scientist do? **L3.** How do Scientists Learn About Wild Animals?	* After each lesson, revise See, Think, Wonder, DQB, and model. **Mystery Science Mini-Lesson:** **L1.** Observing and Asking questions How do scientists know so much? In this mini-lesson, students deepen their understanding of two foundational scientific practices: making observations and asking questions. In the activity,	**Lesson 0:** -Intro Phenomenon -Connect ● See, Think, Wonder -Question ● Driving Question Board (DQB) ● Questioning Circle - Create Models (Individual and/or Group) -Discussion ● Claims-Evidence-Reasoning (CER) -Connect to Anchor	First Week of school: Teacher-selected activity incorporating scientific process *example*: Can You Save Fred**?** pdf Saving Fred (you tube video)	**IXL:** Scientific Inquiry-Code: VYB	**Day 1:** **Engage** 10 mins **Explore/Hands-On** 20 mins

	Curiosity Challenge, students “train their brains” by observing an everyday object and asking questions like a scientist would. **Engage:** (10 min) Lesson Video **Explore:** Activity (20 min) Materials: Wonder Journal Students work in pairs. **Explain:** Discussion Describe how scientists know so much. **Elaborate:** Wrap-Up: What did this lesson make you curious about? What other questions do you have about scientists?	• Summary Table (to be completed at the end of each lesson)			

	Mystery Science Mini-Lesson: **L2**. Experiments and Variables: What does a scientist do? In the mini-lesson, students explore some things they do every day that scientists ALSO do: observe, ask questions, do experiments, and share their questions and learning. In the activity, Termite Tester, students virtually observe termite behavior and then do a series of virtual experiments to figure out the answers to their questions. **Engage:** Lesson Video (8 min)	Observe and ask questions Develop and use models to describe phenomena Plan and carry out investigations to answer questions or test solutions to problems that controls variables and provides evidence to support explanations or design solutions Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	Extension Activity Science starts when you notice something interesting. With practice, you can get better at noticing interesting things. Try this—decide on one kind of thing you want to notice. You could decide to notice things that are red, for example. Or you could listen for things that hum. Or you could search for things that feel slippery. Then spend five minutes searching for things that match what you decided to notice. When the time is up, write about or draw a picture of the most exciting or surprising thing		**Day 2:** **Engage** Lesson Video (8 min) **Explore** Activity (30 min) Students work in pairs

	Explore: Activity (20 min) Students work in pairs Materials: Termite Tracker Craysons: a black, blue, and red for each student **Explain:** Discussion - What does a scientist do? *Observe* *Question* *Experiment* *Share* **Elaborate:** Wrap-Up: What did this lesson make you curious about? What other questions do you have about scientists?		you found. If you have questions, write those down too. You'll soon be an expert at noticing!		

	Mystery Science Mini-Lesson: **L3**.How do Scientists Learn About Wild Animals? **Engage:** Lesson Video (8 min) *Jane Goodall* Discussion How do you think scientists learn about wild animals? **Explore:** ***Kids Observe Like Scientists*** Kids Observe Like ScientistsActivity (45 min) You Tube Video: (3 min) NY Botanical Garden *from Lawrence Hall of Science* Student Activity Guide: I Notice, I Wonder, It Reminds Me of **Materials:**	Observe and ask questions Develop and use models to describe phenomena Plan and carry out investigations to answer questions or test solutions to problems that controls variables and provides evidence to support explanations or design solutions Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.	**Video: 6 min** How Do We Use Science Tools? **IXL** Identify Control and Experimental Groups Code WKB Identify independent and dependent variables Code JZJ	**IXL** Identify Lab Tools Code CGZ	**Day 3:** **Engage** 10 min **Explore/Hands-On** 45 min

	hand lens (1 per student) access to plants (inside or outside) pencil Paper to record plant drawing and observations: <u>Observation Prompts:</u> *I notice…* *I wonder…* *It reminds me of…* Students record observations about plants **Explain:** Observe Record Share observations **Elaborate:** Wrap-Up: What did this lesson make you curious about? What other questions do you have about scientists?				

Unit 0 Assessments

Diagnostic	Formative	Summative
Wonder Journal I Notice, I Wonder, It Reminds Me of Directed Question Board (DQB)	Class Discussion, Teacher Observation, IXL Quizzes Termite Tracker	Suggested Performance Task Can You Save Fred?

Unit 1: Physical and Chemical Changes Curriculum Map

Unit Overview
The bundle organizes performance expectations with a focus on helping students begin to understand the conservation of matter and its particulate nature. The idea that matter of any type can be subdivided into particles that are too small to see (PS1.A as in 5-PS1-1) connects to the idea that the amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish (PS1.A as in 5-PS1-2). The total weight of substances also does not change no matter what reaction or change in properties occurs (PS1.B as in 5-PS1-2). Change in properties connects to the idea that when two or more different substances are mixed, a new substance with different properties may be formed (PS1.B as in 5-PS1-4). Measurements of a variety of properties can be used to identify materials (PS1.A as in 5-PS1-3), including the new ones that may be formed when two or more substances are mixed. The engineering design idea that different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints (ETS1.C as in 3-5-ETS1-3) could connect to multiple science concepts, such as that when two or more different substances are mixed, a new substance with different properties may be formed (PS1.B as in 5-PS1-4), and that measurements of a variety of properties can be used to identify materials (PS1.A as in 5-PS1-3). Students can be challenged to create a new substance with particular properties (i.e., given criteria). In order to test the solution, measurements of the properties need to be taken to determine that the new substance with the desired properties has been created.

PA STEELS Standards	Big Idea	Essential Questions
3.2.5.A Develop a model to describe that matter is made of particles too small to be seen. (5-PS1-1) 3.2.5.D Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. (5-PS1-2) 3.2.5.B Make and communicate observations and measurements to identify materials based on their properties. (5-PS1-3) 3.2.5.E Conduct an investigation to determine whether the mixing of two or more substances results in new substances. (5-PS1-4) **Technology & Engineering:** 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. 3.5.3-5.C Follow directions to complete a technological task. 3.5.3-5.M Demonstrate essential skills of the engineering design process. 3.5.3-5.R Apply tools, techniques, and materials in a safe manner as part of the design process. 3.5.3-5.I Design solutions by safely using tools, materials, and skills 3.5.3-5.W Describe the properties of different materials.	All forms of matter exist as a result of the combination or rearrangement of atoms. The atoms of some substances combine or rearrange to form new substances that have different properties.	How do particles combine to form the variety of matter one observes? How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?

Environmental Literacy & Sustainability: 3.4 3-5.A Analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them.		

Textbook and Supplemental Resources

Mystery Science IXL Discovery Education Read Works Science: A Closer Look

Unit 1: Physical and Chemical Changes Curriculum Map

Learning Objectives/DOK Levels

Students will know…. (DCI)	**Students will be able to… (SEP)**	**Students will apply…(CCC)**	**DOK Level(s)**
Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gasses are made from matter particles that are too small to see and that are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) Measurements of a variety of properties can be used to identify materials. (Boundary: At this	Developing and Using Models: Use models to describe phenomena. Using Mathematics and Computational Thinking: Measure and graph quantities such as weight to address scientific and engineering questions and problems. Planning and Carrying Out Investigations: Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. Planning and Carrying Out Investigations: Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.	Scale, Proportion, and Quantity: Natural objects exist from the very small to the immensely large. Scale, Proportion, and Quantity: Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. Cause and Effect: Cause and effect relationships are routinely identified and used to explain change.	DOK Level 3 (Strategic Thinking): Using models to describe phenomena involves applying reasoning to represent scientific concepts or processes, requiring the analysis and interpretation of how the model reflects reality. DOK Level 2 (Skills/Concepts): Measuring and graphing quantities involves applying mathematical skills to represent data, but the task remains focused on understanding and applying concepts rather than deeper analysis. DOK Level 3 (Strategic Thinking): Collecting observations and measurements to form evidence requires strategic thinking, as it involves analyzing data and using it to explain a phenomenon. DOK Level 3 (Strategic Thinking: Conducting an investigation with controlled

grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic scale mechanism of evaporation and condensation.) When two or more different substances are mixed, a new substance with different properties may be formed.			variables and multiple trials requires strategic thinking to design the investigation, control conditions, and produce reliable data for analysis.

Activities and Corresponding Instructional Methods

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Unit 1: **Chemical Reactions & Properties of Matter** **(Chemical Magic)** In this unit, students investigate the properties of matter by dissolving everyday chemicals to make solutions and by exploring simple yet surprising chemical reactions. Through these investigations, students begin to build conceptual models for the particulate nature of matter.	Mystery Science Teacher Guide * After each lesson return to See, Think, Wonder and add to model. **Lesson 0:** Anchoring Phenomenon Disappearing Gargoyles The anchor phenomenon for this unit is stone gargoyles that seem to disappear over time. Students generate observations and questions about the phenomenon and create an initial argument to explain what is happening.	**Suggested Routine** **Lesson 0:** -Intro Phenomenon -Connect ● See, Think, Wonder -Question ● Driving Question Board (DQB) ● Questioning Circle - Create Models (Individual and/or Group) -Discussion ● Claims-Evidence-Reasoning (CER) -Connect to Anchor ● Summary Table (to be completed at the end of each lesson)	**Unit 1 Reading:** The Great Molasses Flood :	**IXL:** Interpret ball and stick models Code R7R Understand conservation of matter using graphs Code S7U Compare properties of objects Code 5TK Compare physical and chemical changes Code HW5 Identify reactants and products Code DV7 Identify mixtures Code FK8	Approximately 1 lesson per week- Wk 1: anchor phenomenon Wk 2-6: lessons Wk 7: assess **Anchor Phenomenon** 13 mins **Guided Inquiry** 20 mins **Hands-On Activity** 25 mins **Wrap-Up** 2 mins

	L1: Conservation of Matter Focus question: Are magic potions real? In this session, students meet the alchemists, a historic group that used "potions" to try to transform materials. **Engage:** L1 Video Discussion Do you think there could really be a potion that does something amazing or valuable? (Do you think there are really liquids or mixtures that can transform things?) Why or why not? **Explore:** In the hands-on activity, "Test Like An Alchemist", students test liquids to see which ones will clean the tarnish off a penny. Then, when one penny changes from dark and dirty to bright and shiny, they'll have a	Develop and use models Use mathematics and computational thinking to measure and graph quantities such as weight to address scientific and engineering questions and problems. Plan and carry out investigations. Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. Conduct an investigation collaboratively to produce data to serve as the basis for evidence.	**Vocabulary:** Printout Slideshow **Extension Activity:** The Disappearing Penny **Mini Lesson**: Where Does Metal Come From?	**IXL:** Interpret ball and stick models Code R7R Understand conservation of matter using graphs Code S7U	**Exploration** 15 mins **Hands-On Activity** 25 mins **Wrap-Up** 15 mins **Anchor Connection** 20 mins

	chance to think about where the tarnish went. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder****: What happens to substances when they seem to change and disappear?* ***Students learn****: Another substance may have caused the gargoyles to disappear over time.* **Evaluate:** L1 assessment **Elaborate:** Extensions include readings, activities, and videos.				

	*** L2**: **Dissolving & Particulate Nature of Matter** *****To align with pacing, view lesson video and omit activity. Focus question: Could you transform something worthless into gold? In this session, students investigate the alchemists' claim of transforming ordinary metals into gold. **Engage:** L2 Video **Explore:** In the hands-on activity, "The King's Sword", students use the vinegar, salt, and penny solution that they created in Lesson 1 to copper plate a steel nail. Students then create a conceptual model of how particles from the pennies are the same ones that eventually	Develop and use models Use mathematics and computational thinking to measure and graph quantities such as weight to address scientific and engineering questions and problems. Plan and carry out investigations. Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon Conduct an investigation collaboratively to produce data to serve as the basis for evidence	**Vocabulary:** Printout Slideshow **Extension Activity:** Can you make a penny turn blue? Read "The Penny Experiment" in list of readings **Mini Lesson:** How is Gold Made?	**IXL:** Interpret ball and stick models Code R7R Understand conservation of matter using graphs Code S7U	**Exploration** 20 mins **Hands-On Activity** 25 mins **Wrap-Up** 10 mins **Anchor Connection** 20 mins

	coat the nail in copper. **Explain:** Wrap-up slides & teacher-led discussion. **Anchor Connection** **Students wonder**: Why was the vinegar so good at changing substances? **Students learn:** The stone from the gargoyles could have been dissolved by another substance. **Evaluate:** L2 Assessment. **Elaborate:** Extensions include readings, activities, and videos.				

	L3: Properties of Matter: Acids Focus question: What would happen if you drank a glass of acid? In this session, students are introduced to acids, a group of substances with a reputation for being reactive. **Engage:** L3 Video **Explore:** In the hands-on activity, Acid Test, students discover two ways to detect acids: they use baking soda, which fizzes when mixed with acids, or a special liquid that changes color when mixed with acids. Then, students use those methods to identify common foods that are acidic. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder****:* *Besides acids, will all*	Develop and use models Use mathematics and computational thinking to measure and graph quantities such as weight to address scientific and engineering questions and problems. Plan and carry out investigations Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon Conduct an investigation collaboratively to produce data to serve as the basis for evidence	**Vocabulary:** Printout Slideshow Extension activities: Color-changing foods Make an egg without a shell Taste the fizz	**IXL:** Compare properties of objects Code 5TK	**Exploration** 20 mins **Hands-On Activity** 25 mins **Wrap-Up** 10 mins **Anchor Connection** 20 mins

	substances react with each other to create new substances? ***Students learn****: Findings from this investigation suggest that an acid (acid rain) could have reacted with the gargoyle stone.* **Evaluate:** Lesson 3 Assessment. **Elaborate:** Extensions include readings and activities.				

	L4: Chemical Reactions Focus question: What do fireworks, rubber, and Silly Putty have in common?, This lesson develops the idea that chemical reactions create new materials that have useful and interesting properties. **Engage:** L4 Video **Explore** The "Great Goo Experiment" is a two-part activity. In Part 1, students experiment by combining different substances and watching for reactions. In Part 2, students mix glue and borax solution in clear plastic bags to observe the reaction, which creates "Mystery Goo." **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *How can we tell if the*	Develop and use models Use mathematics and computational thinking to measure and graph quantities such as weight to address scientific and engineering questions and problems. Plan and carry out investigations Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon Conduct an investigation collaboratively to produce data to serve as the basis for evidence	**Vocabulary:** Printout Slideshow **Mini Lesson:** How do things glow in the dark? **Extension Activity**: Mystery Science Goo Challenge	**IXL:** Compare physical and chemical changes Code HW5 Identify reactants and products Code DV7 Identify mixtures Code FK8	**Exploration** 12 mins **Hands-On Activity** 45 mins **Anchor Connection** 20 mins

	new substance created by a chemical reaction is a gas? ***Students learn:*** *Evidence suggests that the acid rain and stone (calcium carbonate) can react to create new substances.* **Evaluate:** L4 assessment. **Elaborate:** Extensions include readings, activities, and background information.				

	L5: Gases and Particle Models Focus question: Why do some things explode? In this session, students investigate and model how gases cause explosions. **Engage:** L5 Video **Explore:** In the hands-on activity, "Bag of Bubbles," students experiment by combining baking soda and vinegar inside a sealed bag and observe how the gas bubbles produced cause the bag to inflate–and sometimes pop! **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students learn:*** *This experiment suggests that one of the substances created in the reaction between acid rain and stone (calcium*	Develop and use models Use mathematics and computational thinking to measure and graph quantities such as weight to address scientific and engineering questions and problems. Plan and carry out investigations Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon Conduct an investigation collaboratively to produce data to serve as the basis for evidence	**Vocabulary:** Printout Slideshow **Extension Activity:** Blow up a balloon with baking soda and vinegar	**IXL:** Interpret ball and stick models Code R7R	**Exploration** 15 mins **Hands-On Activity** 35 mins **Wrap-Up** 5 mins **Anchor Connection** 30 mins

	carbonate) was a gas that expanded into the atmosphere. **Evaluate:** L5 Assessment. **Elaborate:** Extensions include readings, activities, and discussions.				

	Unit Assessment **or** **Performance Task** **Argument from Evidence** Focus question: "What happened to the stone gargoyles over time?" In this performance task, students use their evidence chart to revise their final argument about what happens to the stone gargoyles over time. They create a particle model to show what is happening in the reaction between acid rain and the stone gargoyles to support their argument. If you have time to extend the performance task, there is a hands-on investigation in the Extensions. **Step 1:** Plan ahead: Students will need their completed The Alchemist	Develop and use models Use mathematics and computational thinking to measure and graph quantities such as weight to address scientific and engineering questions and problems. Plan and carry out investigations Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon Conduct an investigation collaboratively to produce data to serve as the basis for evidence		**IXL:** Interpret ball and stick models Code R7R Understand conservation of matter using graphs Code S7U Compare properties of objects Code 5TK Compare physical and chemical changes Code HW5 Identify reactants and products Code DV7 Identify mixtures Code FK8	**Unit Review:** 15 min **Hands-On:** 40 min **Wrap-Up:** 5 min

	Argument Evidence Chart that they have been adding to after each Mystery. Students will also need their first The Alchemist Argument worksheet that they completed during the introduction to the anchor phenomenon. **Step 2:** Print out worksheets: Each student will need: One Final Alchemist Argument worksheet. https://mysteryscience.com/docs/497 One Final Alchemist Argument Rubric worksheet (there are 3 versions, select the best fit for your class). https://mysteryscience.com/docs/499 **Teacher Resource:** The Final Alchemist Argument Sample Model and Response will give you a sense of what your				

	students should be aiming to produce. https://mysteryscience.com/docs/630 Actual student work can and should vary.				

Unit 1 Assessments

Diagnostic	Formative	Summative
See, Think, and Wonder Charts Directed Question Board (DQB)	Mystery Science Lesson Assessments Class Discussion, Teacher Observation, IXL Quizzes	Claims-Evidence- Reasoning (CER) Unit Assessment Performance Task: Particle Model and Argumentation: What happened to the gargoyles over time?

Unit 2: Matter and Energy in Ecosystems Curriculum Map

Unit Overview
The bundle organizes performance expectations with a focus on helping students build an understanding of the flow and cycles of matter and energy. The idea that matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die (LS2.B as in 5-LS2-1) connects to the idea that matter of any type can be subdivided into particles that are too small to see (PS1.A as in 5-PS1-1) because matter is subdivided into particles as it flows between organisms and the air and soil. The idea that matter flows also connects to the ideas that plants acquire their material for growth chiefly from air and water (LS1.C as in 5-LS1-1) and that food provides animals with the materials they need for body repair and growth (LS1.C in 5-PS3-1). Just as matter flows, energy can flow as well. As such, the idea that matter can flow connects to the concept that the energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (PS3.D as in 5-PS3-1). The engineering design concept that communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs (ETS1.B as in 3-5-ETS1-2) could connect to multiple science concepts, such as that a healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life (LS2.A as in 5-LS2-1) and that gasses are made from matter particles that are too small to see and are moving freely around in space (PS1.A as in 5-PS1-1). The first connection could be made through having students share designs for solutions to improve the health of a given ecosystem. The second connection could be made by having students share design for a device that uses the understanding that gasses are made from matter particles too small to see. In either case, students should have an opportunity to communicate with their peers throughout the design process and reflect on how sharing their ideas affected their designs.

PA STEELS Standards	Big Idea	Essential Questions
3.2.5.A Develop a model to describe that matter is made of particles too small to be seen. (Partially accessible in this unit) (5-PS1-1) 3.2.5.G Use models to describe that energy in animals' food (used for body repair, growth,	To produce energy typically means to convert some stored energy into a desired form. All forms of matter exist as a result of the combination or rearrangement of atoms.	How do particles combine to form the variety of matter one observes? How do food and fuel provide energy?

motion, and to maintain body warmth) was once energy from the sun. (5-PS3-1) 3.1.5.A Support an argument that plants get the materials they need for growth chiefly from air and water. (5-LS1-1) 3.1.5.B Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (5-LS2-1) **Technology & Engineering:** 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. 3.5.3-5.A Use appropriate symbols, numbers and words to communicate key ideas about technological products and systems. 3.5.3-5.B Examine information to assess the trade-offs of using a product or system. 3.5.3-5.N Identify why a product or system is not working properly. 3.5.3-5.S Illustrate that there are multiple approaches to design. 3.5.3-5.U Evaluate designs based on criteria, constraints, and standards. 3.5.3-5.DD Demonstrate how simple technologies are often combined to form more complex systems. 3.5.3-5.FF Compare how things found in nature differ from things that are human-made, noting differences and	Animals have external and internal sensory receptors that detect different kinds of information that then gets processed by the brain. Ecosystems are complex systems that include both living (biotic) and non-living (abiotic) components that interact with each other.	If energy is conserved, why do people say it is produced or used? How do organisms detect, process, and use information about the environment? How do organisms interact with the living and nonliving environments to obtain matter and energy?

similarities in how they are produced and used. 3.5.3-5.BB Illustrate how, when parts of a system are missing, it may not work as planned. 3.5.3-5.CC Describe how a subsystem is a system that operates as a part of another larger system. 3.5.3-5.L Demonstrate how tools and machines extend human capabilities, such as holding, lifting, carrying, fastening, separating, and computing. 3.5.3-5.O Describe requirements of designing or making a product or system. **Environmental Literacy & Sustainability:** 3.4 3-5.A Analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them. 3.4.3-5.C Examine ways you influence your local environment and community by collecting and displaying data.		

Textbook and Supplemental Resources

Mystery Science Science: A Closer Look IXL Discovery Ed

Unit 2: Matter and Energy in Ecosystems Curriculum Map

Learning Objectives/DOK Levels

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gasses are made from matter particles that are too small to see and that are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). Food provides animals with the materials they need for body repair and growth and the energy	Developing and Using Models Use models to describe phenomena. Engaging in Argument from Evidence Support an argument with evidence, data, or a model.	Scale, Proportion, and Quantity Natural objects exist from the very small to the immensely large. Energy and Matter Energy can be transferred in various ways and between objects. Energy and Matter Matter is transported into, out of, and within systems. Systems and System Models A system can be described in terms of its components and their interactions.	DOK Level 3 (Strategic Thinking): Developing a model to describe the concept of matter being made of particles too small to be seen involves creating a representation that helps explain a fundamental scientific concept. This requires strategic thinking and understanding of abstract concepts. DOK Level 2 (Skills and Concepts): This statement involves applying a model to explain how energy transfers and transforms, which involves understanding and using concepts but does not require extensive reasoning beyond applying the model. DOK Level 3 (Strategic Thinking): Supporting an

they need to maintain body warmth and for motion. (secondary). Plants acquire their material for growth chiefly from air and water. The food of almost any kind of animal can be traced back to plants.			argument with evidence that plants obtain materials mainly from air and water requires analyzing and synthesizing information to make a reasoned argument, which involves higher-order thinking. DOK Level 3 (Strategic Thinking): Developing a model to describe the movement of matter in an ecosystem involves integrating complex interactions and relationships among various components. This requires strategic planning

Activities and Corresponding Instructional Methods

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days

Unit 2: Ecosystems & The Food Web Unit (Web of Life) In this unit, students explore how organisms depend on one another and form an interconnected ecosystem. Students investigate food chains, food webs, and the importance of producers, consumers, and decomposers.	Mystery Science Teacher Guide: * After each lesson return to See, Think, Wonder and add to model. **Lesson 0:** Life Inside a Dome **Anchoring Phenomenon:** The anchor phenomenon for this unit focuses on attempts to grow food in an enclosed ecosystem. Students generate observations and questions about the phenomenon and create an initial design solution to growing food inside a dome for two years. **Video**: Inside Biosphere 2 Earth's Largest Earth Science Experiment:	**Suggested Routine** **Lesson 0:** -Intro Phenomenon -Connect ● See, Think, Wonder -Question ● Driving Question Board (DQB) ● Questioning Circle - Create Models (Individual and/or Group) -Discussion ● Claims-Evidence-Reasoning (CER) -Connect to Anchor ● Summary Table (to be completed at the end	**Unit Reading:** What can young people do to protect the environment? **Mystery Science Extension:** NOVA Photosynthesis Science Video PBS **Discovery Ed:** Resources for Standard 3.1.5 Resources for Standard 3.2.5	Biosphere Bites examples of menus, etc: Biosphere Bites examples of ingredients needed: **IXL:** How Do Plants Make Food? Code BZ5 Identify Roles in Food Chains Code CTQ How Does Matter Move in Food Chains? Code FDN Interpret Food Webs I Code 5JX Interpret Food Webs II Code LV5 Read and Construct Animal Life Cycle Diagrams Code YFE Compare Animal Life Cycles Code TRB Identify the photosynthetic organism Code ZAW	Approximately 1 lesson per week- Wk 1: anchor phenomenon Wk 2-7: lessons Wk 8: assess **Anchor Phenomenon** 13 mins **Guided Inquiry** 30 mins **Hands-On Activity** 60 mins **Wrap-Up** 2 mins

		of each lesson)		How do plants use and change energy? Code PFE How does matter move in food chains? Code FDN	

	L1: Food Chains, Producers, and Consumers Focus Question: "Why would a hawk move to New York City?" In this session, students develop their thinking about the predator/prey relationships among living things. **Engage:** L1 Video **Explore:** In the hands-on activity, "Eat or Be Eaten," students play a card game in which they make food chains with predators and prey, and producers and consumers. The students who make the longest food chains win the game! **Explain:** Teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *What do the plants need to*	Develop a model to describe phenomena Engage in argument from evidence and support with evidence, data, or a model	**Vocabulary:** Printout Slideshow **Mini-lessons:** How does composting work? Can trees talk to each other? **Extension Activity:** Extension for Eat or be Eaten	**IXL:** How does matter move in food chains? Code 78M	**Exploration** 15 mins **Hands-On Activity** 30 mins **Anchor Connection** 20 mins

	eat? How do they help people? ***Students learn:*** *All living things need a food source in order to grow, and are all part of a food chain.* **Evaluate:** L1 Assessment. **Elaborate:** Extensions include readings, activities, and videos.				

	*** L2: Matter and Plant Growth** *****To align with pacing, view lesson video and omit activity. Focus question: "What do plants eat?" In this session, students discover the surprising nutrient which accounts for most of a plant's food. **Engage:** L2 Video **Explore:** In the hands-on activity, "Weighing Air," students blow up balloons and place them on both sides of a large balance scale constructed from a yardstick. Then, students let the air out of all the balloons on one side of the balance to directly observe that air has weight.		**Vocabulary:** Printout Slideshow	**IXL:** Identify the photosynthetic organism Code ZAW How do plants use and change energy? Code PFE How does matter move in food chains? Code FDN	**Exploration** 21 mins **Hands-On Activity** 30 mins **Wrap-Up** 4 mins **Anchor Connection** 20 mins

	Explain: Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *What happens to plants when they die?* ***Students learn:*** *All living things in a food chain can trace their energy source backwards to plants.* **Evaluate:** L2 Assessment. **Elaborate:** Extensions include readings, videos, and activities.				

	L3: Decomposers and Matter Cycle Focus question: "Where do fallen leaves go?" In this session, students discover the role fungi play in decomposing dead materials and in creating soil. **Engage:** L3 Video **Explore:** In the hands-on activity, "Mold Terrarium," students plan and conduct an investigation to discover the factors affecting decomposition. Students fill Ziploc bags with different types of foods and change environmental conditions to study how different variables affect mold growth. They then observe mold growth over a period of two weeks.		**Vocabulary:** Printout Slideshow **Mini-Lesson:** How Does Composting Work? Can Trees Talk to Eachother? How Can You Tell If a Mushroom is Poisonous?	**IXL:** How do plants use and change energy? Code PFE How does matter move in food chains? Code FDN	**Exploration** 20 mins **Hands-On Activity** 30 mins **Anchor Connection** 20 mins

	Explain: Teacher led discussion. ***Anchor Connection*** ***Students wonder****: Is mold the only decomposer? What other kinds of decomposers are there?* ***Students learn:*** *Decomposers play an important role in the ecosystem and can always be found in a healthy ecosystem.* **Evaluate:** L3 Assessment. **Elaborate:** Extensions include readings, activities, videos, FAQs, and discussions.				
	L4: Decomposers, Nutrients, & Matter Cycle Focus question: "Do worms really eat dirt?"		**Vocabulary:** Printout Slideshow	**IXL:** How do plants use and change energy? Code PFE How does matter move in food chains? Code FDN, 78M	**Exploration** 16 mins **Hands-On Activity** 45 mins **Wrap-Up** 4 mins

	In this lesson, students discover the critical role earthworms play in decomposing dead material and releasing nutrients into the soil. **Engage:** L4 Video **Explore:** During a two-part activity, "Ask a Worm," students observe earthworms and then design their own "fair test" investigations of earthworm behavior. Students first make close observations of worms. Then, students conduct a simple experiment with multiple trials to figure out if worms prefer dry or wet areas. They consider what a "fair test" is and design an experiment to answer other questions about worms.				**Anchor Connection** 20 mins

	Explain: Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students Wonder:*** *Is it possible to have too many nutrients in an ecosystem?* ***Students learn:*** *Worms help an ecosystem by recycling nutrients back into the soil.* **Evaluate:** L4 Assessment. **Elaborate:** Extensions include readings, activities, and videos.				
	L5: Ecosystems and Matter Cycle Focus question: "Why do you have to clean a fish tank but not a pond?" In this session, students combine what they have learned about plants, animals, and decomposers to see		**Vocabulary:** Printout Slideshow **Mini-Lesson:** Why Does it Matter if an Animal is Endangered?	**IXL:** How do plants use and change energy? Code PFE How does matter move in food chains? Code FDN, 78M	**Exploration** 22 mins **Hands-On Activity** 45 mins **Wrap-Up** 3 mins **Anchor Connection** 20 mins

	how they interact in an ecosystem. **Engage:** L5 Video **Explore:** In **part 1** of the activity, "Pond Ecosystem Game," students first build a pond ecosystem that will support a sunfish. To succeed, they must make sure that carbon dioxide levels are healthy for both plants and animals. In **part 2** of the activity, students play a game called Big Fish where they compete to make a healthy ecosystem for a sunfish. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *What happens if one of the living things in an ecosystem becomes overgrown?*				

	Students learn: *Ecosystems can become toxic if there is too much carbon dioxide and not enough plants or decomposers to recycle it.* **Evaluate:** L5 Assessment **Elaborate:** Extensions include readings and resources.				

	L6: Protecting Environments Focus question: "How can we protect Earth's environments?" In this session, students discover what happens in unbalanced ecosystems and how that can lead to an overabundance of algae and harmful algal blooms. **Engage: 20 min** L6 Video **Explore: 35 min** In the hands-on activity, "Bloom Busters," students play a game in which they obtain and combine science ideas in order to help a community respond to and prevent harmful algal blooms. **Explain: 7 min** Wrap-up slides & teacher-led discussion.		**Vocabulary:** Printout Slideshow **Mini-Lesson:** Why are Coral Reefs so Colorful?	**IXL:** Evaluate claims about natural resource use: groundwater Code N6M Evaluate claims about natural resource use: fossil fuels Code GK5 Coral reef biodiversity and human uses: explore a problem Code N2U	**Exploration** 20 mins **Hands-On Activity** 35 mins **Wrap-Up** 7 mins **Anchor Connection** 20 mins

	Anchor Connection 20min ***Students wonder:*** *What would happen if we removed one piece of an ecosystem?* ***Students learn:*** *All living things require water. Maintaining a clean water supply in a biosphere is very important.* **Evaluate:** L6 Assessment **Elaborate:** Extensions include readings and activities.				

	L7: Food Webs and Flow of Energy Focus question: "Why did the dinosaurs go extinct?" In this session, students investigate the hypothesis that an asteroid impact caused the extinction of the dinosaurs. **Engage:** L7 Video **Explore:** In the hands-on activity, "Create a Dinosaur Food Web," students use cards and construction paper connectors to create a food web from the time of the dinosaurs. Using this model, they follow the flow of energy through the food web and figure out why dinosaurs went extinct but some other animals survived.		**Vocabulary:** Printout Slideshow	**IXL:** How do plants use and change energy? Code PFE	**Exploration** 15 mins **Hands-On Activity** 30 mins **Wrap-Up** 5 mins **Anchor Connection** 20 mins

	Explain: Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students learn:*** *Energy from the sun is the original energy source for entire ecosystems*. **Evaluate:** L7 Assessment. **Elaborate:** Extensions include readings and activities.				

	Unit Assessment **or** **Performance Task: Ecosystem Argument** Focus question: "How could we grow food on Mars?"			**IXL:** Identify the photosynthetic organism Code ZAW How do plants use and change energy? Code PFE How does matter move in food chains? Code FDN, 78M	**Unit Review:** 30 min **Hands-On:** 60 min

Unit 2 Assessments

Diagnostic	Formative	Summative
See, Think, and Wonder Charts Directed Question Board (DQB)	Class Discussion, Teacher Observation, IXL Quizzes	Claims-Evidence- Reasoning (CER) Unit 2 Assessment Performance Task: How could we grow food on Mars?

Curriculum Plan

Unit 3: Earth's Features and Processes Curriculum Map

Unit Overview
The unit organizes standards with a focus on helping students build understanding of Earth's major systems and how they interact. The disciplinary core ideas in this bundle are linked through the concept of Earth's major systems. The idea that matter of any type can be subdivided into particles that are too small to see (PS1.A as in 5-PS1-1) can connect to the concept that Earth's major systems interact in multiple ways to affect Earth's surface materials and processes (ESS2.A as in 5-ESS2-1), since matter sometimes moves through the systems as particles that are too small to see. Earth's major systems also connect to the concept that nearly all of Earth's available water is in the ocean, and most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere (ESS2.C as in 5-ESS2-2) as this concept is about the hydrosphere. The Earth's major systems are affected by gravity as the gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center (PS2.B as in 5-PS2-1). Finally, the idea that human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, and air also connects to our understanding of Earth's major systems. The engineering design concept that different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success (ETS1.A as in 3-5-ETS1-1) could connect to multiple science concepts, such as that the ocean supports a variety of ecosystems and organisms (ESS2.A as in 5- ESS2-1) and that nearly all of Earth's available water is in the ocean, and most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere (ESS2.C as in 5-ESS2-2). The first connection could be made by having students propose solutions regarding threatened ecosystems that are supported by the ocean. The second connection could be made by having students design processes to locate and identify drinkable water. In either case, students should have an opportunity to compare different proposals on the basis of how well they meet given criteria.

PA STEELS Standards	Big Idea	Essential Questions
3.2.5.A Develop a model to describe that matter is made of particles too small to be seen. (5-PS1-1)	All forms of matter exist as a result of the combination or rearrangement of atoms.	How do particles combine to form the variety of matter one observes? What underlying forces explain the variety of interactions observed?

3.2.5.F Support an argument that the gravitational force exerted by Earth on objects is directed down. (5-PS2-1) 3.3.5.C Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (5-ESS2-1) 3.3.5.D Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. (5-ESS2-2) 3.3.5.E Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. (5-ESS3-1) **Technology & Engineering:** 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 3.5.3-5.A Use appropriate symbols, numbers and words to communicate key ideas about technological products and systems. 3.5.3-5.B Examine information to assess the trade-offs of using a product or system. 3.5.3-5.D Predict how certain aspects of their daily lives would be different without given technologies. 3.5.3-5.E Explain why responsible use of technology requires sustainable management of resources	All forces between objects, regardless of size or direction, arise from only a few types of interactions. Plate tectonics explains the past and current movements and features of the rocks at Earth's surface. Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. Human activities in agriculture, industry, and everyday life have had major impacts on the land, rivers, ocean, and air.	Why do the continents move, and what causes earthquakes and volcanoes? What regulates weather and climate? How do humans change the planet?

3.5.3-5. F Classify resources used to create technologies as either renewable or nonrenewable 3.5.3-5.G Describe the helpful and harmful effects of technology 3.5.3-5.K Judge technologies to determine the best one to use to complete a given task or meet a need. 3.5.3-5.H Determine factors that influence changes in a society's technological systems or infrastructure. 3.5.3-5.J Explain how technologies are developed or adapted when individual or societal needs and wants change. 3.5.3-5.N Identify why a product or system is not working properly. 3.5.3-5.T Apply universal principles and elements of design. 3.5.3-5.V Interpret how good design improves the human condition. 3.5.3-5.EE Explain how solutions to problems are shaped by economic, political, and cultural forces. 3.5.3-5.Y Identify the resources needed to get a technical job done, such as people, materials, capital, tools, machines, knowledge, energy, and time. 3.5.3-5.Z Create a new product that improves someone's life. **Environmental Literacy & Sustainability:** 3.4.3-5.B Make a claim about the		

environmental and social impacts of design solutions and civic actions, including their own actions. 3.4 3-5.A Analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them. 3.4.3-5.C Examine ways you influence your local environment and community by collecting and displaying data. 3.4.3-5.D Develop a model to demonstrate how local environmental issues are connected to larger local environment and human systems. 3.4.3-5.F Critique ways that people depend on and change the environment. 3.4.3-5.G 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.		

Textbook and Supplemental Resources

Mystery Science Science: A Closer Look IXL

Unit 3: Earth's Features and Processes Curriculum Plan

Learning Objectives/DOK Levels

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gasses are made from matter particles that are too small to see and that are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.	Developing and Using Models: Use models to describe phenomena. Engaging in Argument from Evidence: Support an argument with evidence, data, or a model. Developing and Using Models: Develop a model using an example to describe a scientific principle. Using Mathematics and Computational Thinking: Describe and graph quantities such as area and volume to address scientific questions. Obtaining, Evaluating, and Communicating Information: Obtain and combine information from books and/or other reliable	Scale, Proportion, and Quantity: Natural objects exist from the very small to the immensely large. Cause and Effect: Cause and effect relationships are routinely identified and used to explain change. Scale, Proportion, and Quantity: Standard units are used to measure and describe physical quantities such as weight and volume. Systems and System Models: A system can be described in terms of its components and their interactions.	Here's how each statement aligns with the Depth of Knowledge (DOK) levels: DOK Level 2 (Skills and Concepts): Using models to describe phenomena involves applying models to explain or interpret specific situations. This requires understanding and using existing concepts but does not necessarily involve extensive reasoning or complex problem-solving. DOK Level 3 (Strategic Thinking): Supporting an argument with evidence, data, or a model involves constructing a reasoned argument and integrating evidence to support it. This requires strategic thinking and the ability to analyze and synthesize information.

	media to explain phenomena or solutions to a design problem.		DOK Level 3 (Strategic Thinking): Developing a model using an example to describe a scientific principle involves creating and applying a model to explain a principle, which requires understanding and integrating complex ideas. This goes beyond simply using a model and involves creating one to illustrate a concept. DOK Level 2 (Skills and Concepts): Describing and graphing quantities such as area and volume involves applying mathematical and computational skills to address scientific questions. This requires using concepts and procedures but does not necessarily involve high-level reasoning or problem-solving. DOK Level 3 (Strategic Thinking): Obtaining, evaluating, and combining information from various sources to explain phenomena or solve a design problem involves

			integrating and analyzing information from multiple sources. This requires strategic thinking and higher-order cognitive skills to synthesize and communicate findings effectively.

Core Activities and Corresponding Instructional Methods

Mystery Science Unit	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Unit 3: Water Cycle & Earth's Systems Unit (Watery Planet) In this unit, students consider the profound importance of water as a natural resource. Students investigate the distribution of water, how it cycles through Earth's systems, and explore how it affects human societies.	Mystery Science Teacher Guide * After each lesson return to See, Think, Wonder and add to model. **Lesson 0:** Anchor Phenomenon: The Dust Bowl Disaster-The anchor phenomenon for this unit is the Dust Bowl. Students generate observations and questions about the phenomenon and create an initial model to explain how Earth's four spheres interact to cause the Dust Bowl.	**Suggested Routine** **Lesson 0:** -Intro Phenomenon -Connect ● See, Think, Wonder -Question ● Driving Question Board (DQB) ● Questioning Circle - Create Models (Individual and/or Group) -Discussion ● Claims-Evidence-Reasoning (CER) -Connect to Anchor ● Summary Table (to be completed at the end of each lesson)	**Unit Reading:** All About Drought	**IXL:** Describe the geosphere, biosphere, hydrosphere, and atmosphere Code ZLL Water on Earth Code LVZ Describe and graph water on Earth Code A2S Evaluate claims about natural resource use: ground water Code N6M Evaluate claims about natural resource use: fossil fuels Code GK5 Science literacy: How can a community protect sea turtles? Code 2VE	Approximately 1 lesson per week- Wk 1: anchor phenomenon Wk 2-6: lessons Wk 7: assess **Anchor Phenomenon:** 10 mins **Guided Inquiry** 20 mins **Hands-On Activity** 30 mins

				Evaluate natural energy sources Code BNC Label parts of the water cycle Code FG2 Select parts of water cycle Code BND	

	L1: Hydrosphere and Water Distribution Focus question: "How much water is in the world?" In this session, students use estimation and graphing to discover the surprising difference in the amounts of fresh and saltwater on Earth. **Engage:** L1 video **Explore:** In the hands-on activity, "Map the World's Water", students count squares on maps and record the amount of fresh, frozen, and salt water found in their assigned area of the world. Then students calculate and graph how much of each	Develop and use models to describe a phenomena and a scientific principle Engage and support an argument with evidence, data, or a model Use math and computational thinking to describe and graph quantities such as area and volume to address scientific questions Obtain, evaluate, and communicate information from books and/or other reliable media to explain phenomena or solutions to a design problem	**Vocabulary:** Printout Slideshow **Mini-lesson:** How deep does the ocean go?	**IXL:** Water on Earth Code LVZ Describe and graph water on Earth Code A2S	**Exploration** 25 mins **Hands-On Activity** 25 mins **Wrap-Up** 5 mins **Anchor Connection** 30 mins

	type of water is present on the planet. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *If there aren't bodies of freshwater nearby, where does the water come from to support life & human activity (farming, bathing, etc.)?* ***Students learn:*** *The region where the Dust Bowl happened did not have large bodies of freshwater nor did it have significant rainfall.* **Evaluate:** Lesson 1 Assessment **Elaborate:** Extensions include readings, activities, and videos.				

	***L2 Mixtures and Solution:** *To align with pacing, view lesson video and omit activity. Focus question: How much salt is in the ocean? In this session, students explore how incredibly salty the ocean is, even though we can't see the salt! **Engage:** L2 video **Explore:** In **part 1** of the activity, "Tiny Ocean", students create a model ocean to observe how salt seems to completely vanish when dissolved in water. Students then measure and graph quantities of the water and salt to provide evidence that, even though we	Develop and use models to describe a phenomena and a scientific principle Engage and support an argument with evidence, data, or a model Use math and computational thinking to describe and graph quantities such as area and volume to address scientific questions Obtain, evaluate, and communicate information from books and/or other reliable media to explain phenomena or solutions to a design problem	**Vocabulary:** Printout Slideshow **Mini-lessons:** Why is the ocean salty? Where does salt come from? **Activity:** How much salt is in the ocean?	**IXL:** Understand conservation of matter using graphs Code 9WD	**Exploration** 10 mins **Hands-On Activity** 35 mins **Wrap-Up** 20 mins **Anchor Connection** 15 mins

	cannot see it, the salt still weighs the same amount. * In **part 2** of the activity, (May omit if needed for pacing.) students also create a model salt flat, allowing the water to evaporate, leaving the salt behind. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *Where does the water come from to fill/refill aquifers?* ***Students learn:*** *With a lack of freshwater and rain, much of the water in the area simply dried up. This left dry ground behind.* **Evaluate:** Lesson 2 Assessment **Elaborate:** Extensions include readings, activities,				

	mini-lessons, and an online simulation.				

	L3 Groundwater as a Natural Resource Focus question: "When you turn on the faucet, where does the water come from?" In this session, students construct an explanation about a surprising phenomenon: the existence of underground water. **Engage:** "L3 Video" **Explore:** In the hands-on activity, "Wanted: A Well", students play a game in which they must obtain and combine information about groundwater in order to select the best site to build a town. They evaluate the features of the landscape, plants in the area, and clues from the soil	Develop and use models to describe a phenomena and a scientific principle Engage and support an argument with evidence, data, or a model Use math and computational thinking to describe and graph quantities such as area and volume to address scientific questions Obtain, evaluate, and communicate information from books and/or other reliable media to explain phenomena or solutions to a design problem	**Vocabulary:** Printout Slideshow **Mini Lesson:** What's the deepest hole anyone has ever dug? - Mystery Science **Activity:** Aquifer Station **Video:** Groundwater, Beneath the Surface | KQED	**IXL:** Water on Earth Code LVZ Describe and graph water on Earth Code A2S Evaluate claims about natural resource use: groundwater Code N6M	**Exploration** 20 mins **Hands-On Activity** 25 mins **Wrap-Up** 10 mins **Anchor Connection** 30 mins

	and then decide where to dig a well. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *Where does the water come from to fill/refill aquifers?* ***Students learn:*** *In the Dust Bowl region, native grasses were the only plants with deep roots that could access groundwater*. **Evaluate:** Lesson 3 Assessment. **Elaborate:** Extensions include readings, discussions, videos, and activities.				

	L4 Water Cycle Focus question: "Can we make it rain?" In this session, students develop a model to explain how water cycles from the Earth's surface to the atmosphere and back again. **Engage:** L4 Video **Explore:** In the hands-on activity, "Make It Rain", students create simple models of the ocean and sky to see how these two systems interact. Students compare how the temperature of the ocean and the temperature of the sky affect evaporation and condensation. **Explain:** Wrap-up slides & teacher-led discussion.	Develop and use models to describe a phenomena and a scientific principle Engage and support an argument with evidence, data, or a model Use math and computational thinking to describe and graph quantities such as area and volume to address scientific questions Obtain, evaluate, and communicate information from books and/or other reliable media to explain phenomena or solutions to a design problem	**Vocabulary:** Printout Slideshow **ELA Extension:** My Life as a Drip **Videos:** The Great Aquifer Adventure (4:28) reviews the basics of evaporation, condensation, and precipitation. Crash Course Kids - YouTube **Discussion:** Are you drinking the same water the dinosaurs drank? Water is always evaporating, making clouds, then raining down to fill lakes and oceans. That means the earth's water gets used over and over again. Think about what that	**IXL:** Describe the geosphere, biosphere, hydrosphere, and atmosphere Code ZLL Label parts of the water cycle Code FG2 Select parts of water cycle Code BND	**Exploration** 23 mins **Hands-On Activity** 25 mins **Wrap-Up** 7 mins **Anchor Connection** 30 mins

	Anchor Connection ***Students wonder:*** *How do ocean temperatures affect the amount of rainfall in an area?* ***Students learn:*** *Students reason that a severe drought led to dry soil and dying plants. Without the plants' roots, there was nothing to hold the soil in place*. **Evaluate:** Lesson 4 Assessment **Elaborate:** Extensions include readings, videos, online resources, discussions, and an ELA extension.		means for the water you drink. What does that mean for people today? Are we using the same water that dinosaurs used? What does that mean for people in the future? Will they use the same water you're using? Are there things we should all do to save and protect water for the future?		

	L5 Natural Disasters and Engineering Focus question How can you save a town from a hurricane? In this session, students examine the causes of flooding using the real-world example of Hurricane Katrina. **Engage:** L5 Video **Explore:** In the hands-on activity, Save Beachtown, students propose plans to prevent flooding and save historic buildings in a coastal town–all while staying within budget! **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection Students learn:*** *This*	Develop and use models to describe a phenomena and a scientific principle Engage and support an argument with evidence, data, or a model Use math and computational thinking to describe and graph quantities such as area and volume to address scientific questions Obtain, evaluate, and communicate information from books and/or other reliable media to explain phenomena or solutions to a design problem	**Vocabulary:** Printout Slideshow **Mini Lesson:** What makes hurricanes so dangerous? **Activity:** Tell your students that the people of Beachtown had a meeting to discuss the proposals your class came up with. Ask your students how they would answer these questions or address these issues. Remember: There are no right answers and it may be difficult to make everyone happy. **Discussion:** The 2012 Atlantic Hurricane Season video (4:05) *see* **L5** *for discussion questions.*	**IXL:** Evaluate multiple design solutions to prevent flooding Code G5K Identify the best design solution to prevent hurricane damage Code R9W Identify parts of the engineering process Code HVS Evaluate tests of engineering design solutions Code V6M Use data from tests to compare engineering design solutions Code 8Z4 Explore the engineering design process - Going to the Moon! Code ZFL Identify control and experimental groups Code WKB	**Exploration** 15 mins **Hands-On Activity** 35 mins **Wrap-Up** 5 mins **Anchor Connection** 30 mins

	investigation suggests that changes in ocean temperatures impact rainfall patterns. When the ocean temperatures cool, rainfall can decrease, causing droughts **Evaluate:** Lesson 5 Assessment **Elaborate:** Extensions include readings, activities, discussions, and background information.			Identify independent and dependent variables Code JZJ	

	Unit Assessment **or** **Performance Task: Interactions of Earth's Spheres and Argumentation** Focus question: How can you protect a farm from the next Dust Bowl? **Elaborate:** In the Performance Task, students inherit a farm in the Midwest. They use their Dust Bowl model to evaluate four Drought Protection kits and select which one they think is the best choice. Students write an argument to defend their kit selection, using evidence from the unit.	Develop and use models to describe a phenomena and a scientific principle Engage and support an argument with evidence, data, or a model Use math and computational thinking to describe and graph quantities such as area and volume to address scientific questions Obtain, evaluate, and communicate information from books and/or other reliable media to explain phenomena or solutions to a design problem		**IXL:** Describe the geosphere, biosphere, hydrosphere, and atmosphere Code ZLL Describe and graph water on Earth Code A2S, TZK Evaluate claims about natural resource use: ground water Code N6M	

Unit 3 Assessments

Diagnostic	Formative	Summative
See, Think, and Wonder Charts Directed Question Board (DQB)	Class discussion, teacher observations, IXL quizzes	Claims-Evidence- Reasoning (CER) Unit 3 Assessments Performance Task:How can you protect a farm from the next dust bowl?

Curriculum Plan

Units 4 and 5: Stars and the Solar System Curriculum Map

Unit Overview
The bundle organizes performance expectations with a focus on helping students build understanding of the Earth's position in the solar system and universe. The idea that the sun is a star that appears larger and brighter than other stars because it is closer (ESS1.A as in 5-ESS1-1) connects to the idea that there are observable patterns – such as different positions of the sun at different times of the day, month, and year – caused by the orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis (ESS1.B as in 5-ESS1-2), as both address the appearance of objects in the sky based on our position relative to other objects in the solar system and universe.

PA STEELS Standards	Big Idea	Essential Questions
3.3.5.A Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. (5-ESS1-1) 3.3.5.B Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (5-ESS1-2) **Technology & Engineering:** 3.5.3-5.CC Describe how a subsystem is a system that operates as a part of another larger system. 3.5.3-5.L Demonstrate how tools and machines extend human capabilities, such as	We can infer information about stars based on observations we make from Earth. Observations of the sky can be explained by predictable patterns of the movement of Earth, moon, sun and planets.	What is the universe, and what is Earth's place in it? What are the predictable patterns caused by Earth's movement in the solar system?

holding, lifting, carrying, fastening, separating, and computing. 3.5.3-5.AA Create representations of the tools people made, how they cultivated to provide food, made clothing, and built shelters to protect themselves. 3.5.3-5.N Identify why a product or system is not working properly. 3.5.3-5.K Judge technologies to determine the best one to use to complete a given task or meet a need. 3.5.3-5.P Evaluate the strengths and weaknesses of existing design solutions, including their own solutions. 3.5.3-5.Q Practice successful design skills. **Environmental Literacy & Sustainability:** 3.4.3-5.G 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.		

Textbook and Supplemental Resources

Mystery Science
Science: A Closer Look
IXL
Discovery Education
Read Works

Units 4 and 5: Stars and the Solar System Curriculum Plan

Learning Objectives/DOK Levels

Students will know…. (DCI)	Students will be able to… (SEP)	Students will apply…(CCC)	DOK Level(s)
The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes.	Engaging in Argument from Evidence: Support an argument with evidence, data, or a model. Analyzing and Interpreting Data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.	Scale, Proportion, and Quantity: Natural objects exist from the very small to the immensely large. Patterns: Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena.	DOK Level 3 (Strategic Thinking): Supporting an argument involves reasoning, analyzing evidence, and synthesizing information to explain the relationship between brightness and distance, which requires critical thinking and deeper analysis. DOK Level 2 (Skills/Concepts): Representing data in graphical displays requires organizing information and identifying patterns, which involves understanding and applying concepts, but does not require extended or strategic thinking.

Core Activities and Corresponding Instructional Methods

Mystery Science Unit(s)	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Unit 4: Earth & Space Patterns Unit (Spaceship Earth) In this unit, students explore our solar system! They investigate how bright the Sun appears from each planet in our solar system in addition to stars of other solar systems in galaxies far away. They also investigate	Mystery Science Teacher Guide * After each lesson return to See, Think, Wonder and add to model. **Lesson 0: Anchoring Phenomenon:** Star Trails The anchor for this unit is star trails that appear in long-exposure photographs. Students generate observations and questions about the phenomenon and create an initial model to explain what causes these patterns to form.	**Suggested Routine** **Lesson 0:** -Intro Phenomenon -Connect ● See, Think, Wonder -Question ● Driving Question Board (DQB) ● Questioning Circle - Create Models (Individual and/or Group) -Discussion ● Claims-Evidence-Reasoning (CER)	**Unit Reading:** What do A.M and P.M. mean? How does a leaf know when to change its color? The many names for a full Moon	**IXL:** Constellations and the changing night sky-Code 4S8 Shadows- Code: 9PB Day and night- Code S9N Brightness of the Sun and other stars-Code E2R Identify direction of forces-Code UQD What causes seasons on Earth?-Code 7XR Phases of the Moon-Code 4T6	Approximately 1 lesson per week- Wk 1: anchor phenomenon Wk 2-6: lessons Wk 7: assess **Anchor Phenomenon** 13 mins **Guided Inquiry** 30 mins **Hands-On Activity** 30 mins **Wrap-Up** 2 mins

gravity on Earth and gravity on other planets to discover patterns of this incredible force.		-Connect to Anchor ● Summary Table (to be completed at the end of each lesson)			

	L1: Day, Night, and Earth's Rotation Focus question: How fast does the Earth spin? In this session, students come to understand that the setting Sun isn't moving, the Earth is spinning. **Engage:** L1 video **Explore:** In the hands-on activity, "Spinning Earth," students use their bodies as a kinesthetic model of the Earth to understand how the speed of the Earth's spin affects the length of a day. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection-Students wonder:*** *Can the Sun's position in the sky help us tell the time of day?*	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships	**Vocabulary:** Printout Slideshow **Mini-lessons:** Why do places have different times? Is there a pole at the North Pole? **Activities:** *See* **L1** *for details.* Earth in the Sun On the Move Sky Dome	**IXL:** Day and night- Code S9N Shadows- Code: 9PB Constellations and the changing night sky- Code 4S8 Brightness of the Sun and other stars-Code E2R	**Exploration** 15 mins **Hands-On Activity** 30 mins **Wrap-Up** 5 mins **Anchor Connection** 30 mins

	Students learn: *The Earth is rotating, and that rotation is what causes the Sun to appear to move in the sky. The Sun doesn't move—we do!* **Evaluate:** L1 Assessment. **Elaborate:** Extensions include readings, activities, and videos.				

	L2: Earth's Rotation and Daily Shadow Patterns Focus question: Who set the first clock? In this session, students will learn why our ancestors divided the day into hours and how clocks measure the Sun's apparent movement. **Engage:** L2 video **Explore:** In the hands-on activity, "Make a Shadow Clock," students make their own sundials. First, students use flashlights indoors to understand how the position of the light affects the time shown on the clock. Then, students take their shadow clocks outside to see how the position of the Sun can tell them the time of day.	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships	**Vocabulary:** Printout Slideshow **Videos:** Explore the movement of shadows with three time-lapse videos. Ask the question before playing the video. Can your students figure out the answer? Why are these shadows moving so fast? Which direction are you facing when you sit in this chair? How is the movement of the clock's hands like the movement of the shadow? **Activities:** *See* **L2** *for details.*	**IXL:** Shadows- Code 9PB Day and night- Code S9N Brightness of the Sun and other stars-Code E2R	**Exploration** 20 mins **Hands-On Activity** 25 mins **Anchor Connection** 30 mins

	Explain: Wrap-up slides & teacher-led discussion. ***Anchor Connection-Students wonder:*** *Is the Sun always overhead at noon?* ***Students learn:*** *Just like the Sun, the stars appear to rise in the east and set in the west due to the Earth's rotation. The stars don't move—we do!* **Evaluate:** L2 Assessment. **Elaborate:** Extensions include readings, activities, and videos.		Match the sun's position to clock time Moving Shadow Game		
	L3: Seasonal Changes and Shadow Length Focus question: How can the Sun tell you the season? In this session, students discover how the Sun's path changes with the seasons. **Engage:** L3 video	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or	**Vocabulary:** Printout Slideshow **Activities:** *See* **L3** *for details.* Show how the Sun's position changes over weeks by marking a shadow.	**IXL:** What causes seasons on Earth?-Code 7XR Shadows- Code 9PB Brightness of the Sun and other stars-Code E2R	**Exploration** 20 mins **Hands-On Activity** 25 mins **Anchor Connection** 30 mins

	Explore: In the visual activity, “Guess the Season,” students figure out the season of the year by studying a photo. Students come to realize that they can use the time of day and length of shadows to figure out the season in each photo. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection-Students wonder:*** *Does anything else in the sky change with the seasons?* ***Students learn:*** *During the Summer, the length of time that the Sun is visible each day is longer and the length of time the stars are visible each night is shorter. The opposite is true in the winter.* **Evaluate:** L3 Assessment.	pie charts) to reveal patterns that indicate relationships	Add the Sun's summer and winter paths to the Sky Dome that you made in the "How fast does the Earth spin?" .		

	Elaborate: Extensions include readings, activities, and a demonstration.				
	***L4: Seasonal Patterns and Earth's Orbit** *To align with pacing, view lesson video and omit activity. Focus question: Why do the stars change with the seasons? In this session, students will be introduced to the Earth's orbital movement around the Sun, as a means of seeing why the constellations change. **Engage:** L4 video **Explore:** In the hands-on activity, Universe-in-a-Box, students make a paper model that helps them	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships	**Vocabulary:** Printout Slideshow **Online Resource:** Astronomy Picture of the Day **Activities:** *See* **L4** *for details.* Sky Heroes Finding Your Way to Mars, Pennsylvania	**IXL:** Constellations and the changing night sky-Code: 4S8 What causes seasons on Earth?-Code: 7XR Brightness of the Sun and other stars-Code: E2R	**Exploration** 20 mins **Hands-On Activity** 25 mins **Anchor Connection** 30 mins

	visualize the Earth's yearly orbit around the Sun. They use this model to understand why some constellations are only visible during part of the year. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection-*** ***Students wonder:*** *The Moon looks different on different nights. Is there a pattern to the Moon's changes?* ***Students learn:*** *While many stars do change from season to season, the stars near the North Star don't. This is because the North Pole is aimed very close to the North Star, and this part of the night sky is visible throughout the year.* **Evaluate:** L4 Assessment.				

	Elaborate: Extensions include readings, activities, an online resource, and an ELA + geography extension.				
	L5: Moon Phases, Lunar Cycle Focus question: Why does the Moon change shape? This lesson explores why the Moon seems to change shape (phases) over the course of a month. **Engage:** L5 video **Explore:** In the hands-on activity, "Model the Moon's Phases", students use a styrofoam ball as a model of the Moon and a flashlight as a model of the Sun to gain a better understanding of how the interactions between the Sun and	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships	**Vocabulary:** Printout Slideshow **Mini-Lesson:** How do we know the Earth is round? **Activities:** *See* **L5** for details. Moon Journal The Moon's Face	**IXL:** Phases of the Moon- Code 4T6 Constellations and the changing night sky- Code 4S8 Day and night- Code S9N	**Exploration** 13 mins **Hands-On Activity** 25 mins **Wrap-Up** 7 mins **Anchor Connection** 30 mins

	Moon are responsible for the Moon's phases. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection-Students wonder:*** *What other patterns can I see in the night sky? Students learn: The full Moon rises at sunset and sets at sunrise. Just as the Sun is always highest in the sky in the middle of the day, the Moon is always highest in the sky in the middle of the night.* **Evaluate:** L5 Assessment. **Elaborate:** Extensions include: Readings and activities.				

	Unit Assessment **or** **Performance Task: Night Sky** Focus question: How can you tell time at night? **Elaborate:** In the Performance Task, students use engineering design principles to invent a clock that uses patterns in the night sky. They evaluate possible patterns, suggest multiple ways to measure time with those patterns, and describe their final design and how it works.	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships		**IXL:** Phases of the Moon- Code 4T6 Constellations and the changing night sky- Code 4S8 What causes seasons on Earth?-Code 7XR Brightness of the Sun and other stars-Code E2R Shadows- Code 9PB Day and night- Code S9N	**Unit Review** 20 mins **Hands-On Activity** 40 mins

Unit 5: **Stars & Planets** **(Wandering Stars)** In this unit, students explore our solar system! They investigate how bright the Sun appears from each planet in our solar system in addition to stars of other solar systems in galaxies far away. They also investigate gravity on Earth and gravity on other planets to discover patterns of this	Mystery Science Teacher's Guide * After each lesson return to See, Think, Wonder and add to model. **Anchor Phenomenon: Solar System** Wandering Stars The anchor phenomenon for this unit is the wandering stars: a small number of objects in the night sky that appear to move completely separately from all of the other stars. Students generate observations and questions about the phenomenon and document their initial thinking about the characteristics of the wandering stars.	**Suggested Routine** **Lesson 0:** -Intro Phenomenon -Connect ● See, Think, Wonder -Question ● Driving Question Board (DQB) ● Questioning Circle - Create Models (Individual and/or Group) -Discussion ● Claims-Evidence-Reasoning (CER) -Connect to Anchor ● Summary Table (to be completed at the end of each lesson)	**Unit Reading:** A Simple Invention that Changed the World	**IXL:** Brightness of the Sun and other stars-Code E2R Identify direction of forces-Code UQD Identify the planets in the solar system-Code SFA	Approximately 1 lesson per week- Wk 1: anchor phenomenon Wk 2-4: lessons Wk 5: assess **Anchor Phenomenon** 15 mins **Guided Inquiry** 20 mins **Hands-On Activity** 20 mins

incredible force.					

	L1: Solar System and Sun Brightness Focus question: How can the Sun help us explore other planets? In this session, students gather evidence to support an argument that the apparent brightness of the Sun is dependent upon an observer's distance from the Sun. **Engage:** L1 video **Explore:** In the hands-on activity, Solar Energy Explorer, students construct a model solar system and gather observations of the Sun's apparent brightness from each planet within their model. Students then use those observations as evidence to support a claim about which planet is best suited to	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships	**Vocabulary:** Printout Slideshow **Mini Lessons:** Why is Mars red? Is Pluto a planet? Why isn't Pluto a (major) planet anymore? **Activity:** *See* **L1** *for details.* Create a Solar System Scale Model	**IXL:** Brightness of the Sun and other stars-Code E2R Models of the Earth, Sun, Moon system-Code 8FB	**Exploration** 15 mins **Hands-On Activity** 35 mins **Wrap-Up** 12 mins **Anchor Connection** 15 mins

	explore with a solar-powered planetary rover. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *What else is different on each planet?* ***Students learn:*** *The brightness of the light from the Sun varies significantly between the planets. This is due to their varying distance from the Sun. As one moves farther and farther away from the Sun, the light becomes dimmer and dimmer.* **Evaluate:** L1 Assessment. **Elaborate:** Extensions include mini-lessons and activities.				

	L2: Gravity Focus question: Why is gravity different on other planets? In this lesson, students discover that gravity exists on all planets and moons, but the amount of gravity is different because it depends on how massive the object is. In the activity, Gravity Jump, students measure how high they can jump on Earth and then calculate how high they would be able to jump on other planets and moons within our Solar System. **Engage:** L2 video **Explore:** In this session, students discover that gravity exists on all planets and moons, but the amount of gravity is different because it depends on	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships	**Vocabulary:** Printout Slideshow **Mini Lesson:** What is a black hole? **Activities:** *See* **L2** *for details.* Asteroid Jump Defying Gravity Your Weight on Other Worlds | Exploratorium	**IXL:** Identify direction of forces-Code UQD	**Exploration** 5 mins **Hands-On Activity** 45 mins **Wrap-Up** 10 mins **Anchor Connection** 15 mins

	how massive the object is. **Explain:** Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *Could you ever live on or visit another planet?* ***Students learn:*** *The force of gravity on each planet can vary significantly.* **Evaluate:** L2 Assessment. **Elaborate:** Extensions include readings, activities, andEngage in argument and support with evidence, data, or a model				

	L3: Star Brightness and Habitable Planets Focus question: Could there be life on other planets? In this lesson, students discover that the Earth is in the "Goldilocks Zone" — a distance from the Sun with the right amount of light and heat for life to exist. **Engage:** L3 video **Explore:** In the hands-on activity, "Star Explorer", students plan a space mission to another planet outside our Solar System based on the amount of heat and light that reaches the planet's surface. Once students plan their space mission, they will reflect on what our Sun would look like from this far-away planet.	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships	**Vocabulary:** Printout Slideshow **Mini Lessons:** Is Earth the only planet with life? How close could an astronaut get to the Sun? Are aliens real? **Activities:** *See* **L3** *for details.* NASA's Eyes (on exoplanets) NASA's Exoplanet Travel Bureau.	**IXL:** Brightness of the Sun and other stars-Code E2R	**Exploration** 16 mins **Hands-On Activity** 35 mins **Wrap-Up** 4 mins **Anchor Connection** 15 mins

	Explain: Wrap-up slides & teacher-led discussion. ***Anchor Connection*** ***Students wonder:*** *Which planet would be best to visit? Students learn: Ultimately, all other planets that scientists have discovered would be very hostile places for humans to live.* **Evaluate:** L3 Assessment **Elaborate:** Extensions include: Readings, activities, and mini-lessons.				
	Unit Assessment **or** **Performance Task: Solar System** Focus question: What's the best place to visit in the Solar System? **Elaborate:** In the Performance	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs,		**IXL:** Brightness of the Sun and other stars-Code E2R Identify direction of forces-Code UQD	**Unit Review** 20 mins **Hands-On Activity** 40 mins

	Task, students engage in evidence-based argumentation to explain why one of the planets in our solar system would be best to visit for themselves, a friend, or a family member. They apply what they have learned throughout the unit about the physical characteristics of the planets to complete this task. At the end of the slides, you can choose what you would like for your students to do next. They can use their Solar System Trip Planner to create a fully written letter as a writing task, or create a presentation, or create a poster. In addition to the information contained within the lessons in this unit, you can provide your students with books, websites, or other	pictographs and/or pie charts) to reveal patterns that indicate relationships			

	resources that they can use to gather information about the various planets and moons within our solar system. While not necessary, it is a great opportunity for students to extend the depth and breadth of their knowledge.				

Units 4 & 5 Assessments

Diagnostic	Formative	Summative
See, Think, and Wonder Charts Directed Question Board (DQB)	Class discussion, teacher observations, IXL quizzes, lesson quizzes	Claims-Evidence- Reasoning (CER) Unit 4 Assessments Unit 4 Performance Task Unit 5 Assessments Unit 5 Performance Task

Curriculum Plan

Unit 6: Matter Properties (OpenSciEd) Curriculum Map

Unit Overview
Water is essential for all living things, leading many cultures to proclaim, “Water Is Life.” In this unit, students investigate natural water systems to determine whether they are healthy or unhealthy, considering different species' needs and exploring ways to improve water quality. Students begin by analyzing four water samples (Lake, Pool, Metallic, and Rain Water) and creating models to explain what might make them healthy or unhealthy. They observe properties to identify materials in the water and design a filter to remove visible contaminants. However, they realize that some unhealthy particles remain.

PA STEELS Standards	Big Idea	Essential Questions
5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen. 5-PS1-2: Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. 5-PS1-3: Make observations and measurements to identify materials based on their properties. 5-PS1-4: Conduct an investigation to determine whether the mixing of two or more substances results in new substances. **Technology & Engineering:** ETS1- 1: Define a simple design problem	We can change the chemical and physical properties of different materials to support access to healthy water for living things.	How can we make water healthy for all living things? How can we identify properties of matter? How can we design an engineered solution that changes the properties of our water samples to be more healthy by removing materials from the mixture?

reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. ETS1-3: Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or 3.5.3-5.A prototype that can be improved. Use appropriate symbols, numbers and words to communicate key ideas about technological products and systems. 3.5.3-5.C Follow directions to complete a technological task. 3.5.3-5.N Identify why a product or system is not working properly. 3.5.3-5.H Determine factors that influence changes in a society's technological systems or infrastructure. 3.5.3-5.P Evaluate the strengths and weaknesses of existing design solutions, including their own solutions. 3.5.3-5.Q Practice successful design skills. 3.5.3-5.R Apply tools, techniques, and materials in a safe manner as part of the design process. 3.5.3-5.S Illustrate that there are multiple approaches to design. 3.5.3-5.U Evaluate designs based on criteria, constraints, and standards. 3.5.3-5.V Interpret how good design improves the human condition. 3.5.3-5.I Design solutions by safely using tools, materials, and skills		

3.5.3-5.EE Explain how solutions to problems are shaped by economic, political, and cultural forces. 3.5.3-5.O Describe requirements of designing or making a product or system. 3.5.3-5.ZCreate a new product that improves someone's life. **Environmental Literacy & Sustainability:** 3.4.3-5.C Examine ways you influence your local environment and community by collecting and displaying data. 3.4.3-5.F Critique ways that people depend on and change the environment.		

Textbook and Supplemental Resources

OpenSciEd Unit 5.2 Matter Properties Text, Filtering Water (Lesson 3) IXL

Unit 6: Matter Properties (OpenSciEd) Curriculum Plan

Learning Objectives/DOK Levels

Students will know…. (DCI)	**Students will be able to… (SEP)**	**Students will apply…(CCC)**	**DOK Level(s)**
PS1.A: Structure and Properties of Matter. Develop a model to describe that matter exists of particles too small to be seen. Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (Boundary: Mass and weight are not distinguished at this grade level.) Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define	Developing and Using Models: Use models to describe phenomena. Using Mathematics and Computational Thinking: Measure and graph quantities such as weight to address scientific and engineering questions and problems. Planning and Carrying Out Investigations: Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. Planning and Carrying Out Investigations: Conduct an investigation collaboratively to produce data to serve as the	Cause and effect relationships are routinely identified, tested, and used to explain change. (CE-E1) Scale, Proportion, and Quantity Natural objects and/or observable phenomena exist from the very small to the immensely large or from very short to very long time periods. (SPQ-E1) Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. Energy and Matter Matter is made of particles. (EM-E1) Matter flows and cycles can be tracked in terms of the weight of the substances before and after a process occurs. The total weight	DOK Level 3 (Strategic Thinking): Supporting an argument involves reasoning, analyzing evidence, and synthesizing information to explain the relationship between brightness and distance, which requires critical thinking and deeper analysis. DOK Level 2 (Skills/Concepts): Representing data in graphical displays requires organizing information and identifying patterns, which involves understanding and applying concepts, but does not require extended or strategic thinking.

the unseen particles or explain the atomic scale mechanism of evaporation and condensation.) When two or more different substances are mixed, a new substance with different properties may be formed.	basis for evidence, using fair tests in which variables are controlled and the number of trials considered.	of the substances does not change. This is what is meant by conservation of matter. Matter is transported into, out of, and within systems. (EM-E2) Energy can be transferred in various ways and between objects. (EM-E3)	

Core Activities and Corresponding Instructional Methods

OpenSciEd Unit	Core Activities	Corresponding Instructional Methods	Extensions	Correctives	Time/Days
Unit 6: Openscied.org Matter Properties Openscied Matter Properties Teacher Guide Unit 6 Storyline Elementary Teacher Handbook Tools Student Handouts	**Anchoring Phenomenon** **Driving Question:** How can we tell if water is healthy or unhealthy? lesson slides **Refer to Teacher Guide** for details (download unit). **Focus Question:** How can we identify properties of matter? Lesson 1 Slides **Session 1- :45** In this Anchoring Phenomenon Lesson, we work in small groups to sort pictures of water into categories. We observe water	Intro Phenomenon Connect ● See, Think, Wonder Create Models ● (Individual and/or Group) Question ● Driving Question Board (DQB) ● Questioning Circle Investigate Discussion ● Discussion supports Summary Table end of each lesson Claims-Evidence-	**Unit Vocabulary:** material, mixture, property, constraints, criteria, matter, particles, substance, water treatment To learn more: Water health as a justice-focused phenomenon Water quality & methods of treating water	**IXL:** Identify mixtures FK8 Compare solutionsY8Q Evaluate claims about natural resource use: groundwater	Approximately 1 lesson per week **L1:** **Session 1- :45** **Session 2- :30** **Session 3- :45** Lesson 1 L1 Teacher Prep Video Preparation and Materials. Water Sample Prep & Materials **Safety Information**

	samples and create a model of the sample we think is the least healthy. We also think about how to make the sample healthy again. **Connect** to our experiences with water. Slides A-B **Explore** Make observations. In small groups, we observe and sort photos of bodies of water, share our ideas about how to sort them, and observe water samples to gather additional evidence. Healthy/Unhealthy Water?, cards from Bodies of Water Card Sort, water samples created from Water Samples **Synthesize** individually develop models explaining why the water is unhealthy	Reasoning (CER) summative response at end of unit L1: Handouts Healthy/Unhealthy Water? Initial Model Related Phenomena Investigation Ideas			

	Preparation--Lesson 1, "Health of the water" chart paper Slides C-E **Session 2- :30** **Synthesize-** discuss the health of the water samples **Connect-** consider water -related phenomena in our community **Session 3- :45** **Synthesize**- create class DQB and investigation ideas Summary Table end of each lesson				
	L2: Water Samples Focus question: **What else can we figure out about our water samples?** **Refer to Teacher Guide** for details.	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in	**Vocabulary:** material, mixture, property, constraints, criteria, matter, particles, substance, water treatment	**IXL:** Identify mixtures FK8 Compare solutionsY8Q Evaluate claims about natural resource use: groundwater	**1 lesson per week** **L2:** **Session 1- :45** **Session 2- :45** **Session 3- :45** *modify times as needed

	Lesson 2 Slides **Session 1- :45** **Navigate:** Introduce our purpose As a class, we connect the work of our current unit to the need to return to and revise the first classroom agreement of "We can do science in many different ways." **Explore:** Make observations. As a class, we observe and reflect on artifacts of students doing science in different ways. **Connect:** share what we observed about water in our own lives **Synthesize:** chart the properties we observed **Session 2- :45** **Navigate-** recall where we left off **Connect-** share what we observed about	graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships **L2 Handouts:** **Water Observations** **Properties and Materials** **Properties and Materials Key** **My Growing Ideas Chart**			Prep water samples: Make a class set of the four water samples that students will observe, test, filter, and try to make healthier. Make a subset of the water samples for students to observe in small groups.

	water in our own lives **Explore**- observe water samples **Synthesize-** chart the properties we observed **Session 3- :45** **Explore-** make sense of properties data **Synthesize-** identify materials based on their properties and create the My Growing Ideas chart Summary Table end of each lesson **Navigate-** decide where to go next				
	L3: Filtering Water Investigation Focus question: How can we design filters to separate these materials out of the water? **Refer to Teacher Guide** for details.	**L3 Handouts:** Engineers Solve Problems Filter Design & Testing Conduct an Initial Test	**Vocabulary:** material, mixture, property, constraints, criteria, matter, particles, substance, water treatment **Reading:**	**IXL:** Identify mixtures FK8 Compare solutionsY8Q Evaluate claims about natural resource use: groundwater	**1 week** **L3:** **Session 1- :35** **Session 2- :25** **Session 3- :30** Prepare supplies for designing & testing with water filter

	Lesson 3 Slides In this session, students design and test a filter to separate out materials that can be seen in the water samples. **Session 1- :35** **Navigate-** recall where we left off **Connect-** read a book **Explore-** define a problem **Session 2- :25** **Explore-** plan a filter design and investigation **Session 3- :30** **Explore-** test filter designs **Synthesize-** reflect on our designs Summary Table end of each lesson **Navigate-** consider where to go next	Record Observations Revisit Design Decide to start improving the health of our water samples by removing the visible materials. Brainstorm and read about ideas to build filters. Identify success criteria and limiting constraints for designing filters. Design a filter and investigation plan for one of the water samples. Test the water filters. We need to account for criteria and constraints	Introduce the *Who Else Filters Water?* book. Display slide D. Tell students that before we filter our own water samples, we will get a chance to see some other examples of water being filtered by reading a book. Tell students to keep the sample they will be filtering in mind as they listen to the book. **Read:** Display slide F Distribute the *Engineers Solve Problems and Design Solutions* handout and have students read the article in pairs to review the key aspects of defining problems and designing solutions.		Be prepared to store groups' filtered water samples in bottles with lids. Students will use them in the next lesson when they work on optimizing their filter designs.

		when designing solutions for engineering problems. During design testing, we collect data to decide if a design meets the criteria. Since the materials in the water are matter, we can weigh our samples to see how much matter is removed by filtering.			
	L4: Investigation Focus Question: How can we develop and optimize our filters to separate unhealthy materials out of the water? **Lesson 4 Slides**	L4 Handouts: Optimize, Test, & Reflect Properties of Water Samples Optimize and test the filter we designed in Lesson 3. Use our	**Vocabulary:** optimize, material, mixture, property, constraints, criteria, matter, particles, substance, water treatment **Materials:** cheesecloth, coffee filters, gravel, sand,	**IXL:** Identify mixtures FK8 Compare solutionsY8Q Evaluate claims about natural resource use: groundwater	**1 lesson per week** **L4:** **Session 1- :40** **Session 2- :40** **Prepare filtering supplies and have groups' filtered samples**

	Refer to Teacher Guide for details. **Session 1- :40** **Navigate**- recall where we left off **Explore-** optimize our filter designs **Session 2- :40** **Explore**- reflect on our optimization **Synthesize-** connect our work to the engineering process and update My growing Ideas chart Make sense of what we have learned. Summary Table end of each lesson **Navigate-** questions we still have	investigation data to decide how to redesign our filter. Compare our redesigned and original filters to decide which one worked best to remove materials from our water sample. Identify how our filter design and investigation activities fit with the Engineering Design Process. Our water samples weigh less after filtering, so we know that we got at least some of the materials out of the water. We identify how our filter design and investigation activities fit with the Engineering Design Process. Our redesigned	strainer, funnel, tall plastic cups goggles, gloves, paper towels		**from Lesson 3 accessible.** **Lesson 4 Materials & Prep**

		filters were able to remove a lot of the materials that we could see in our water samples			

	Unit 6 Assessment: Students respond to Unit Driving Question: How can we make water healthy for all living things? by creating a Claims-Evidence- Reasoning (CER) summative response at end of unit	Engage in argument and support with evidence, data, or a model Analyze and interpret data: Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships	**Vocabulary:** material, mixture, property, constraints, criteria, matter, particles, substance, water treatment	**IXL:** Identify mixtures FK8 Compare solutionsY8Q Evaluate claims about natural resource use: groundwater	**Unit Assessment** 30-40 mins

Units 6 Assessments

Diagnostic	Formative	Summative
Initial Model handout (Lesson 1)	• Drawings • Spoken Descriptions • Movement and/or Gestures • Discussion prompts provided in the lesson. • Make observations of properties in water samples • Self and Peer Assessment	• Develop a model to describe the causes of what is making the water healthy and unhealthy and how to make the water healthy again. (Lesson 1) • On the Water Observations handout (Lesson 2) • Filter Design and Testing handout. (Lesson 3) • Optimize, Test, & Reflect handout (Lesson 4) • Claims-Evidence- Reasoning (CER) • Summary Table

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_____

Please Go to Human Resources page on the Delaware Valley School District website for updated Payment form to be submitted.

https://pa01001022.schoolwires.net/site/handlers/filedownload.ashx?moduleinstanceid=7055&dataid=16708&FileName=AUTHORIZATION%20FOR%20PAYMENT%20-%20SECURED.pdf