UNIT 1: Weathering and Erosion

Unit Summary: In this unit, students will make observations detailing the effects of weathering and erosion through water ice, wind, or vegetation. Students will test erosion based on distinct environmental factors. Students will then identify patterns in rock formations and fossils to support environmental changes to our landscape.

Concepts & Vocabulary:
Energy, furels, renewable, resources, derived, natural processes,hazards, impacts, regional, affect, organisms, global, rock formation, sediments, gravity, articles, physical characteristics, ocean floor, rock layers, ocean trenches, weathering, vegetation

Stage 1 – Desired Results (Also see Disciplinary Core Ideas below)

Performance Expectations: (PE) (Established Goals / Content Standards)

- **4-ESS2-1: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.**
  - *Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.*
  - *Assessment Boundary: Assessment is limited to a single form of weathering or erosion.*
- **4-ESS1-1: Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.**
  - *Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.*
  - *Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.*

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations ● Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1) **Constructing Explanations and Designing Solutions** ● Identify the evidence that supports particular points in an explanation. (4-ESS1-1)	**ESS2.A: Earth Materials and Systems** ● Rainfall helps to shape the land and affects the types of living things found in a region. ● Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1) **ESS2.E: Biogeology** ● Living things affect the physical characteristics of their regions. (4-ESS2-1) **ESS1.C: The History of Planet**	**Cause and Effect** ● Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1) **Patterns** ● Patterns can be used as evidence to support an explanation. (4-ESS1-1)

	Earth ● Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)	

Enduring Understandings (1-3 max) Students will understand that: (connects with EQ 1) ● Environmental factors and living things shape the land and affects the types of living things found in a region. Students will understand that: (connects with EQ 2) ● Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes, hurricanes, and other weather forces.	**Essential Questions** ***What do the shapes of landforms and rock formations tell us about the past?*** EQ 1: *How can evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation be observed or measured?* EQ 2: *What can rock formations tell us about the past?*

Stage 2 – Model Assessments	
Summative Performance Task(s) Writing connection: Science Journal:	**Formative Evidence for EQ 1:** *How can evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation be observed or measured?* ● Identify, test, and use cause-and-effect relationships in order to explain change. ○

Audience: ● Rubric	● Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. ● Navigating Nonfiction- Use the skills and mini-lessons taught in this unit to read informational texts ● Make observations and/or measurements to produce evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. *(Note: Assessment is limited to a single form of weathering or erosion.)* Examples of variables to test could include ○ Angle of slope in the downhill movement of water ○ Amount of vegetation ○ Relative rate of deposition ○ Volume of water flow **Formative Evidence for EQ 2:** *What can rock formations tell us about the past?* ● Support and identify explanations using patterns as evidence through the use of illustrations, diagrams, and written response. Explain how rock layers change overtime in our landscape provide an example that illustrates your thinking.

Stage 3 – Learning Plan Resources and Activities
Suggested Resources for Planning: Mystery Science, Tower Garden Lessons, NJCTL.org, and other relevant resources.
Learning Activities: **Standard: 4-ESS1-1, 4-ESS2-2** Mystery Science: Mystery 1 Could a volcano pop up where you live? Target: ● I can explain changes of landscape over time. ● I can provide evidence of the effects of weathering erosion over time Mystery 2: Why do some volcanoes explode? Target: ● I can explain changes of landscape over time ● Anchor Chart-highlighting link of cause and effect Mystery 3: Will a mountain last forever? Target: ● I can explain changes of landscape over time. ● I can provide evidence of the effects of weathering erosion over time. Mystery 4: How could you survive a landslide? Target: ● I can explain changes of landscape over time. ● I can provide evidence of the effects of weathering erosion over time. ● I can compare solutions to reduce impacts of natural Earth processes on humans.

Additional Resources:
More Picture-Perfect Science Lessons: “If you Find a Rock “pages 157-167.
Books:
Let’s Go Rock Collecting

Suggested Methods:

- Phenomena:
    - What do the shapes of landforms and rock formations tell us about the past?
    - How can evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation be observed or measured?

UNIT 2: Transfer of Energy

Unit Summary: In this unit, students will provide evidence that energy can be transferred from place to place. Students will design a device that converts energy from one form to another.

It is recommended for students to have a science journal that will allow them to display their thoughts and ideas, to find vocabulary, and respond to discussions and writing prompts.

Concepts and Vocabulary:
Vocabulary

constraints	criteria	electric currents
transforming	conversion	hazardous
delimiting	proposals	proposed
electric circuits		

Stage 1 – Desired Results (Also see Disciplinary Core Ideas below)

Performance Expectations: (PE)

● 4-PS3-2: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

● 4-ESS3-1: Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

Enduring Understandings (1-3 max)
Students will understand that: (connects with EQ 1)

- Energy can be moved from place to place through sound, light, or electric currents
- Energy can be transferred in various ways and between objects.
- Light also transfers energy from place to place.

Students will understand that: (connects with EQ 2)

- Cause-and-effect relationships are routinely identified and used to explain change.

Essential Questions
Guiding Question: Where do we get the energy we need for modern life?

EQ 1:

- *"How does energy make your TV or other things work?"*

EQ 2:

- *"How much does matter where we get our energy from, and why?"*

• Knowledge of relevant scientific concepts and research findings is important in engineering. • Over time, people's needs and wants change, as do their demands for new and improved technologies. • Energy and fuels that humans use are derived from natural sources.	

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts

Obtaining, Evaluating, and Communicating Information ● Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)	● Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2 ● Light also transfers energy from place to place. (4-PS3-2) ● Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2) ● **ESS3.A: Natural Resources** Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)	● Cause and effect relationships are routinely identified and used to explain change. (4-ESS3-1) --- ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ● Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3-1) **Influence of Engineering, Technology, and Science on Society and the Natural World** ● Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1)

Stage 2 – Assessment Evidence	
Summative Performance Task(s) **Writing Connection:** Choose an idea and write a story or essay about it. Use your imagination and your knowledge of energy. ● Black out! One evening, there's a blackout in your neighborhood. All the electric lights go out. The electric stove, the microwave oven, the TV, the computer — none of them are working. What will you do to get through the evening? What will you make for dinner? What will you do for amusement? ● Invent it! You used a rubber-band to make a motor that moved your rubber-band roller. What are some other machines you could make with a motor like that? (You can be serious or silly — your choice.) ● Snack power! If you could make a vehicle that uses food as fuel, what food would you use? What vehicle would you make? Why would you use that food and make that vehicle? ● No gas; no go? Suppose all gasoline-powered engines suddenly stopped working. Cars, trucks, buses, and motorcycles won't run. How would you get to school? Where would the energy come from to get you from one place to the other? ● Pancakes or Petroleum? How is a big breakfast like a tankful of gas? How are they different? ● The power of zap! Suppose you are a superhero named the Energizer. What is your superpower? How will you use it? **Audience:** ● Peers and teacher ● Rubric (Coming Soon)	**Formative Evidence for EQ 1:** *How does energy move?* ***Students who understand the concepts are able to:*** ● Identify cause-and-effect relationships in order to explain change. ● Obtain and combine information from books and other reliable media to explain phenomena. **Formative Evidence for EQ 2: How can energy be stored?** ● Identify cause-and-effect relationships in order to explain change. ● Obtain and combine information from books and other reliable media to explain phenomena. Navigating Nonfiction- Use the skills and mini-lessons taught in this unit to read informational texts presented in this unit. Students can showcase this knowledge in various outlets.

Stage 3 – Learning Plan / Road Map (Design to make as student centered as possible)
Suggested Resources for Planning: Mystery Science, Tower Garden Lessons, NJCTL.org, and other relevant resources.
Learning Activities: Learning Goal: Students will provide evidence that energy can be transferred from place to place.Students will design a device that converts energy from one form to another. **Mystery Science Resources** Mystery 1: How is your body similar to a car? Standard:4-PS3-1, 4-PS3-4 Target: ● I can provide evidence that energy can be transferred from place to place. ● I can design a device that converts energy from one form to another. ● Assessment: can be done in science journal Mystery 2: What makes roller coasters go fast? Standard:4-PS3-1, 4-PS3-3 Target: ● I can provide evidence that energy can be transferred from place to place. ● Assessment Question ● Anchor Chart Mystery 3: Why is the first hill of a roller coaster always the highest? Standard:4-PS3-3 Target: ● I can provide evidence that energy can be transferred from place to place. Mystery 4: Could you knock down a building using only dominoes? Standard:4-PS3-4, 3-5-ETS1-1

Target:

- I can provide evidence that energy can be transferred from place to place.
- I can design a device that converts energy from one form to another.
- Anchor Chart

Mystery 5: Can you build a chain reaction machine?

Standard:4-PS3-4, 3-5ETS1-1, 3-5ETS1-2, and 3-5ETS1-3

Target:

- I can provide evidence that energy can be transferred from place to place.
- I can design a device that converts energy from one form to another.
- Anchor Chart

Mystery 6: What if there was no electricity?

Standard:4-PS3-2, 4-PS3-4

Target:

- I can provide evidence that energy can be transferred from place to place.
- I can design a device that converts energy from one form to another.
- Anchor Chart

Additional Resources:
Science of Roller Coasters Understanding Energy

Suggested Methods: Could be tracked using science journals

Phenomena:

- What is the relationship between the speed of an object and the energy of that object?
- In what ways does energy change when objects collide?
- How can scientific ideas be applied to design, test, and refine a device that converts energy from one form to another?
- How can we use waves to gather and transmit information?
- Where do we get the energy we need for modern life?

UNIT 3: Structures and Functions

Topics at a Glance: Students will identify internal and external structures of plants and animals and use a model to describe information transfer of an animal. Students will develop models to describe waves and reflection of light.

It is recommended for students to have a science journal that will allow them to display their thoughts and ideas, define vocabulary, and respond to discussion and writing prompts.

Unit Vocabulary

internal	external	reproduction
receptors	perceptions	processed

Stage 1 – Desired Results (Also see Disciplinary Core Ideas below)

Performance Expectations: (PE)

4-LS1-1: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

4-LS1-2 Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

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

Enduring Understandings (1-3 max)
Students will understand that: (connects with EQ 1)*Students who understand the concepts are able to*

- Describe a system in terms of its components and their interactions
- Use a model to test interactions concerning the functioning of a natural system
- Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. Emphasis is on systems of information transfer.

Students will understand that: (connects with EQ 2)
Students who understand the concepts are able to

- Identify cause-and-effect relationship
- Develop a model to describe phenomena.

Essential Questions
Guiding Question: How do the internal and external parts of plants and animals support their survival, growth, behavior, and reproduction?

EQ 1:

- How do animals receive and process different types of information from their environment in order to respond appropriately?

EQ 2:

- *What happens when light from an object enters the eye?*

○ An object can be seen when light reflected from its surface enters the eyes. ● Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. *(Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works)*	

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models ● Model to test interactions concerning the functioning of a natural system. (4-LS1-2) ● Develop a model to describe phenomena. (4-PS4-2)	**LS1.D: Information Processing** ● Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2) **PS4.B: Electromagnetic Radiation** ● An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2	**Systems and System Models** ● A system can be described in terms of its components and their interactions. (4-LS1-1),(4-LS1-2) **Cause and Effect** ● Cause and effect relationships are routinely identified. (4-PS4-2)

Stage 2 – Model Assessments	
Summative Performance Task(s) ● Create model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. ○ Different sense receptors are	**Guiding Question: How do the internal and external parts of plants and animals support their survival, growth, behavior, and reproduction?** EQ 1:How do animals receive and process

specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. ● Develop a model to describe that light reflecting from objects and entering the eye allows for objects to be seen. ○ Student Performance: ■ An object can be seen when light reflected from its surface enters the eyes. ■ Components of the model ■ Relationships ■ Connections	different types of information from their environment in order to respond appropriately? ● Writing Connection: Larry states an animals fur helps it survive by protecting it from predators. Do you agree or disagree? Provide evidence to support your claim. EQ 2: *What happens when light from an object enters the eye?* ● Writing connection: Nocturnal animals are able to see in the dark. Explain how their eyes work in order for this to occur. Utilize all vocabulary and concepts taught in this unit to explain your thinking ● Unit 3 Navigating Nonfiction- Use the skills and mini-lessons taught in this unit to read informational texts presented in this Science unit.

Stage 3 – Learning Plan / Road Map (Design to make as student centered as possible)

Suggested Resources for Planning:
Mystery Science, Tower Garden Lessons, NJCTL.org, and other relevant resources.

Learning Activities:
Learning Goal: Students will identify internal and external structures of plants and animals and use a model to describe information transfer of an animal. Students will develop models to describe waves and reflection of light.

Tower Garden lessons

Mystery Science Resources

Mystery 1: Why do your biceps bulge?

Standard:4-LS1-1

Target:

- I can identify internal and external structures of plants and animals.

Mystery 2: What do blind people see?

Standard:4-LS1-1, 4-LS1-2, 4-PS4-2

Target:

- I can identify internal and external structures of plants and animals.
- I can use a model to describe information transfer of an animal.
- I can develop models to describe waves and reflection of light.

Mystery 3: How can some animals see in the dark?

Standard:4-LS1-1, 4-LS1-2, 4-PS4-2

Target:

- I can identify internal and external structures of plants and animals.
- I can use a model to describe information transfer of an animal.
- I can develop models to describe waves and reflection of light.

Mystery 4: How does your brain control your body?

Standard:4-LS1-1, 4-LS1-2

Target:

- I can identify internal and external structures of plants and animals.
- I can use a model to describe information transfer of an animal.

Additional Resources:
Books: Eye to Eye: How Animals The World. Steve Jenkins

Suggested Methods:

Phenomena:

- Why do some plants have thorns and others do not?
- Why are some animals colorful and others camouflaged?
- What happens when light from an object enters the eye?

-

UNIT 4: Waves and Information

Topics at a Glance: Students will develop models to describe wave and reflection of light.

It is recommended for students to have a science journal that will allow them to display their thoughts and ideas, define vocabulary, and respond to discussion and writing prompts.
Unit Vocabulary

disturbing	amplitude	wavelength
degradation	digitized	convert
decode		

Stage 1 – Desired Results (Also see Disciplinary Core Ideas below)

Performance Expectations:

4-PS4-1: Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

- *Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.*

4-PS4-3: Generate and compare multiple solutions that use patterns to transfer information.

- *Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.*

3-5-EST-1-2: Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

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.

Enduring Understandings (1-3 max) Students will understand that: (connects with EQ 1)*Students who understand the concepts are able to*	**Essential Questions** **Guiding Question: *How can we use waves to gather and transmit information?*** EQ 1:*If a beach ball lands in the surf, beyond the breakers, what will happen to it?*
● Waves, which are regular patterns of motion, can be made in water by disturbing the surface. ● When waves move across the surface of deep water, the water goes up and down in	

place; there is no net motion in the direction of the wave except when the water meets a beach. ● Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks) Students will understand that: (connects with EQ 2) *Students who understand the concepts are able to:* ● *Different solutions need to be tested in order to determine which of them best solve the problem, given the criteria and the constraints.* ● *Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.* ● *Tests are often created to embed improvements to improve the design/process*	EQ 2: *Which team can design a way to use patterns to communicate with someone across the room?*

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models ● Develop a model using an analogy, example, or abstract representation to describe a s **Constructing Explanations and Designing Solutions** ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3) ● Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of	**PS4.A: Wave Properties** ● Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. *(Note: This grade band endpoint was moved from*	**Patterns** ● Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena. (4-PS4-1) ● Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3) ----------

the design problem. (3-5-ETS1-2) --- ***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ● Science findings are based on recognizing patterns. (4-PS4-1) **Planning and Carrying Out Investigations** ● Plan and 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. (3-5-ETS1-3)	*K–2.)* (4-PS4-1) ● Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1) **PS4.C: Information Technologies and Instrumentation** ● Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3) **ETS1.C: Optimizing The Design Solution** ● Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. *(secondary to 4-PS4-3)* **ETS1.B: Developing Possible Solutions** ● Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it	***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ● Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3) **Influence of Science, Engineering, and Technology on Society and the Natural World** ● Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)

	performs under a range of likely conditions. (3-5-ETS1-2) ● At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2) ● Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3) ETS1.C: Optimizing the Design Solution ● Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)	

Stage 2 – Model Assessments	
Summative Performance Task(s) Sort and classify natural phenomena using similarities and differences in patterns. ● Develop a model (e.g., diagram, analogy, or physical model) of waves to describe patterns in terms of amplitude and wavelength, and that waves can cause objects to move. *Students who understand the concepts can:* ● Sort and classify designed products using similarities and differences in patterns ● Generate and compare multiple solutions that	**Formative Evidence for EQ 1:** **Guiding Question: *How can we use waves to gather and transmit information?*** EQ 1:*If a beach ball lands in the surf, beyond the breakers, what will happen to it?* ● Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

use patterns to transfer information. Examples of solutions could include: ○ Drums sending coded information through sound waves; ○ Using a grid of ones and zeroes representing black and white to send information about a picture;	EQ 2: *Which team can design a way to use patterns to communicate with someone across the room?* ● Writing Connection: Using your knowledge of sound waves, argue the best material for sending sound through a toy telephone. Display a picture of a toy telephone. ● Unit 4 Navigating Nonfiction- Use the skills and mini-lessons taught in this unit to read informational texts presented in this Science unit.

Stage 3 – Learning Plan / Road Map (Design to make as student centered as possible)
● **Suggested Resources for Planning:** ● Mystery Science, Tower Garden Lessons, NJCTL.org,and other relevant resources.
Learning Activities: Students will develop models to describe wave and reflection of light. **Mystery Science Resources** Mystery 1: How far can a whisper travel? Standard:4-PS4-1, 4-PS4-3 Target: ● I can develop models to describe wave and reflection of light. Mystery 2: What would happen if you scream in outer space? Standard:4-PS4-1

Target:

- I can develop models to describe wave and reflection of light

Mystery 3: Why are some sounds high and some sounds low?

Standard:4-PS4-1

Target:

- I can develop models to describe wave and reflection of light.

Additional Resources

Picture-Perfect Science Lessons: “Sounds of Science” pages 217-226

Books: The Remarkable Farkle McBride

Phenomena:

Fourth Grade Science
Course Compendium

UNITS OF STUDY*

Unit 1- *Weather and Erosion*
Unit 2- *Transfer of Energy*
Unit 3- *Structures and Functions*
Unit 4- *Waves and Information*

INTERDISCIPLINARY CONNECTIONS

ELA Standards:

- W.4.2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly. A. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. B. Develop the topic with facts, definitions, concrete details, text evidence , or other information and examples related to the topic. C. Link ideas within paragraphs and sections of information using words and phrases (e.g., another, for example, also, because). D. Use precise language and domain-specific vocabulary to inform about or explain the topic. E. Provide a conclusion related to the information or explanation presented.
- W.4.7. Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1) W.4.7
- W.4.8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS2-1),(4-ESS1-1)W.4.8
- W.4.9. Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1) W.4.9
- SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-2),(4-LS4-2) SL.4.5
- RI.4.9. Integrate and reflect on (e.g. practical knowledge, historical/cultural context, and background knowledge) information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS4-3) RI.4.9
- RI.4.3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
- RI.4.8. Explain how an author uses reasons and evidence to support particular points in a text.

Math Standards

- MP.2 Reason abstractly and quantitatively.
- MP.4. Model with mathematics.
- MP.5 Use appropriate tools strategically.
- 4.MD.A.1 Know the relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a

**See individual units for Pacing Guide, NJSLS Standards, Transfer Skills, Enduring Understandings, Essential Questions, Learning Objectives, Key Vocabulary, Skills, Resources, & Assessments*

single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two column table.

- 4. G.A.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

21st Century Life and Careers

- CRP2. Apply appropriate academic and technical skills.
- CRP4. Communicate clearly and effectively and with reason.
- CRP6. Demonstrate creativity and innovation.
- CRP7. Employ valid and reliable research strategies
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.
- 9.2.4.A.3 Investigate both traditional and nontraditional careers and relate information to personal likes and dislikes.
- 9.2.4.A.4 Explain why knowledge and skills acquired in the elementary grades lay the foundation for future academic and career success.
-

Technology

- **8.2.2.B.4** Identify how the ways people live and work has changed because of technology.
- **8.2.2.C.1** Brainstorm ideas on how to solve a problem or build a product.

GENERAL CONSIDERATIONS FOR DIVERSE LEARNERS		
English Language Learners	**Students Receiving Special Education Services**	**Advanced Learners**
• WIDA Can Do Descriptors for Kindergarten* • WIDA Essential Actions Handbook • FABRIC Paradigm • Wall Township ESL Grading Protocol *Use WIDA Can Do Descriptors in coordination with Student Language Portraits (SLPs). **Potential Accommodations for ELLs** • Personal glossary • Text-to-speech	• New Jersey Tiered System of Supports • National Center on Universal Design for Learning - About UDL • UDL Checklist • UDL Key Terms Students within this class receiving Special Education/Section 504 programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP)/504 Plans due to an identified disability and/or diagnosis. In addition to exposure to the general education curriculum, instruction is differentiated based upon the student's needs. The IEP/504 Plan acts as a supplemental curriculum guide inclusive of	• Knowledge and Skill Standards in Gifted Education for All Teachers • Pre-K-Grade 12 Gifted Programming Standards • Gifted Programming Glossary of Terms **Potential Accommodations for Advanced Learners** • Use of high level academic vocabulary/texts • Problem-based learning • Pre-assess to condense curriculum • Interest-based research

**See individual units for Pacing Guide, NJSLS Standards, Transfer Skills, Enduring Understandings, Essential Questions, Learning Objectives, Key Vocabulary, Skills, Resources, & Assessments*

● Extended time ● Simplified / verbal instructions ● Frequent breaks ● Small group/One to one ● Additional time ● Review of directions ● Student restates information ● Extra visual and verbal cues and prompts ● Preferential seating ● Verbal and visual cues regarding directions and staying on task ● Checklists ● Immediate feedback	instructional strategies that support each specific learner. **Potential Accommodations for Special Education** **Presentation accommodations**: ● Listen to audio recordings instead of reading text ● Pre-teach unknown vocabulary through pictures or videos, and relate to prior knowledge ● Work with fewer items per page and/or materials in a larger print size ● Use a visual blocker ● Use visual presentations of verbal material, such as word webs and visual organizers ● Be given a written list of instructions/picture cues **Response accommodations**: ● Give responses in a form (oral or written) that's easier for him/her ● Dictate answers to a scribe ● Capture responses on an audio recorder ● Use a spelling dictionary or electronic spell-checker ● Use a word processor to give responses in class ● Use a calculator or table of "math facts" **Setting accommodations**: ● Work or take a test in a different setting, such as a quiet room with few distractions ● Sit where he/she learns best (for example, near the teacher) ● Take a test in small group setting **Timing accommodations**: ● Take more time to complete a task or a test ● Have extra time to process oral information and directions ● Take frequent breaks, such as after completing a task **Assignment modifications**: ● Complete fewer or different homework problems than peers ● Shorten assignment ● Answer fewer or different test questions ● Create alternate projects or assignments	● Authentic problem-solving ● Homogeneous grouping opportunities **Students with 504 Plans** Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.
At Risk Learners / Differentiation Strategies		

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Alternative Assessments	Independent Research & Projects	Jigsaw
Choice Boards	Multiple Intelligence Options	Think-Tac-Toe
Games and Tournaments	Project-Based Learning	Cubing Activities
Group Investigations	Varied Supplemental Activities	Exploration by Interest
Guided Reading	Varied Journal Prompts or RAFT Writing	Flexible Grouping
Learning Contracts	Tiered Activities/Assignments	Goal-Setting with Students
Leveled Rubrics	Tiered Products	Homework Options
Literature Circles	Graphic Organizers	Open-Ended Activities
Multiple Texts	Choice of Books/Activities	Use of Reading Buddies
Personal Agendas	Mini-Workshops to Reteach or Extend	Varied Product Choices
	Think-Pair-Share by readiness or interest	Stations/Centers
	Use of Collaboration of Various Activities	Work Alone/Together

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