Science Department
Grade 4 Curriculum

Developed By: Kelly Cestaro

Supported by: Mrs. Carly Johnson, Coordinator of Science, Nursing Services and Rutgers Allied Health Programming, and Mrs. Janine Hess-Loconsolo, Director of Curriculum, Instruction and Assessment K-5

Effective Date: Fall 2019

Scope and Sequence

Throughout the unit, Mystery Science will direct that some units are "optional" or for "extension purposes". For our curriculum programming and pacing, all activities, even those indicated as "optional" are mandated parts of the curriculum for coverage. In the event of an emergency situation, where a long period of curricular time is lost due to unforeseen circumstances, the activities noted by Mystery Science as "optional" would be the first activities to eliminate from coverage.

Unit 1:Birth of Rocks (4 weeks) October	**Unit 2: Human Machine (4 weeks)** December	**Unit 3: Waves of Sound (about 4 weeks)** February	**Unit 4: Energizing Everything (6-10 weeks)** April & May
Mystery 1: Could a volcano pop up where you live? (***4-ESS1-1 and 4-ESS2-2)***	Mystery 1: Why do your biceps bulge? ***(4-LS1-1)***	Mystery 1: How far can a whisper travel? (***4-PS4-1 and 4-PS4-3)***	Mystery 1: How is your body similar to a car? (***4-PS3-1 and 4-PS3-4)***
Mystery 2: Why do some volcanoes explode? (***4-ESS1-1)***	Mystery 2: What do people who are blind see? ***(4-LS1-1, 4-LS1-2 and 4-PS4-2)***	Mystery 2: What would happen if you screamed in outer space? (***4-PS4-1)***	Mystery 2: What makes roller coasters go so fast? (***4-PS3-1 and 4-PS3-3)***
Mystery 3: Will a mountain last forever? (***4-ESS1-1 and 4-ESS2-1)***	Mystery 3: How can some animals see in the dark? ***(4-LS1-1, 4-LS1-2 and 4-PS4-2)***	Mystery 3: Why are some sounds high and some sounds low? (***4-PS4-1)***	Mystery 3: Why is the first hill of a roller coaster always the highest?***(4-PS3-3)***
Mystery 4: How could you survive a landslide? ***(4-ESS2-1 and 4-ESS3-2)***	Mystery 4: How does your brain control your body? (***4-LS1-1 and 4-LS1-2)***		Mystery 4: Could you knock down a building using only dominoes? (***4-PS3-4 and 3-5-ETS1-1)***
			Mystery 5: Can you build a chain reaction machine? (***4-PS3-4, 3-5-ETS1-1, 3-5-ETS1-2 and 3-5-ETS1-3)***

			Mystery 6: What if there were no electricity? (***4-PS3-2 and 4-PS3-4)***
			Mystery 7: How long did it take to travel across the country before cars and planes? (***4-PS3-2 and 4-PS3-4)***
			Mystery 8: Where does energy come from? (***4-ESS3-1)***

Birth of Rocks:

Grade 4 Earth Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 Could a volcano pop up where you live?	4-ESS1-1 4-ESS2-2	Volcanoes, Rock Cycle & Earth's Surface	Rocks begin as lava--volcanic rocks are lava that has been frozen in time. Volcanoes don't just exist--they *form*, or 'pop up'. There is a pattern to where most volcanoes exist today on the earth. And yet dead volcanoes--and volcanic rock they erupted--can be found in *lots* of places. (So the pattern today isn't necessarily what it used to be.) You can look for volcanic rocks near you. **DCIs: ESS1.C, ESS2.B**	Students **analyze and interpret data** from recent volcanic eruptions. They use their findings as **evidence for an argument** that volcanoes are (or are not) likely to erupt in their backyard. .	Students identify **patterns** about the location of the world's volcanoes and use these patterns as evidence to support an argument about why a volcano may or may not erupt in their backyard.
Mystery 2 Why do volcanoes explode?	4-ESS1-1	Volcanoes, Lava & Rock Cycle	Volcanic rocks are lava frozen in time. There are two primary types of lava, each of whose thickness explains two major differences in a volcano's shape & style of eruption. These two lavas also account for two commonly observed volcanic rocks that you might find. **DCIs: *Foundational for* ESS2.B; *Extends* ESS2.B**	Student **conduct an investigation** to **construct an explanation** for why some volcanoes explode and why some do not. Students **model** thick and thin lava to conduct their investigations.	Students reason about the **cause and effect** of the type of lava (cause) and the nature of the eruption (effect) as well as the shape of the volcano (effect).
Mystery 3 Will a mountain last forever?	4-ESS1-1 4-ESS2-1	Weathering & Destructive Forces	Rock does not stay as massive monoliths of volcanoes--it tends to get broken into smaller pieces ("sediments") over time due to natural forces ("weathering"), and tumble downhill. You can look for evidence of this where you live. **DCIs: ESS2.A**	Students **conduct an investigation** by **modeling** how rocks erode over time. Students **construct an explanation** for why rocks erode.	Students consider the **cause and effect** of ice and root wedging on rock as it is broken down into small pieces.
Mystery 4 How could you survive a landslide?	4-ESS2-1 4-ESS3-2	Erosion, Natural Hazards & Engineering	The weathering process is not benign; it creates some of the worst natural hazards, including rock falls, landslides, and debris flows. If we are to be safe from these hazards, we have to design solutions to protect us. **DCIs: ESS3.B**	Students **design solutions** to protect their "homes" from rock slides. Students **argue** for the merits of their design.	**Engineering** a solution to landslide hazards **depends on scientific knowledge** about the causes of landslides.

Human Machine:

Grade 4 Life Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 Why do your biceps bulge?	4-LS1-1	Muscles & Skeleton	Like a machine or robot, the body has parts, or structures, for moving around (e.g. the limbs). In order to move (one of the body's functions), the body needs at least two things: muscles and bones. The contraction of your muscles pulls on tendons, which in turn pull on the bones, causing you to move. Your external parts (such as appendages) are controlled by your brain like a marionette puppet (a topic we explore in Mystery 4). **DCIs: LS1.A**	Students **build a model** of a finger that they then use to **construct an explanation** for how fingers move.	Students consider how human motion is made possible by a **system** of muscles, tendons and bones. Students consider the **cause and effect** relationship between tendons and the muscles and bones that they move.
Mystery 2 What do people who are blind see?	4-LS1-1 4-LS1-2 4-PS4-2	Eyes & Vision	Continuing the analogy of the body as a machine or robot, we now consider its "sensors"--the sensory organs, in this lesson focusing specifically on the eyes. Students discover the basics of how their eyes work, and figure out some of the causes of vision problems. **DCIs: LS1.A; *Foundational for* LS1.D, PS4.B**	Students **build a model** of a eyeball that they then use to **construct an explanation** of why some people have blurry vision.	Students think about how the eye works as a **system** of different parts that interact to facilitate vision. Students consider how light interacts with the system to determine what images we see (**cause and effect**.)
Mystery 3 How can some animals see in the dark?	4-LS1-1 4-LS1-2 4-PS4-2	How Eyes Work	Students delve further into the workings of the eye, exploring the function of their iris and pupil. **DCIs: LS1.A; *Extends* LS1.D, PS4.B**	Students **conduct an investigation** to see how pupils change in response to light. Students **build a model** of an eye (extending the model they built in Mystery 3) to **explain** how changes in pupil size changes the image that appears on the retina.	Students continue to think about how the eye works as a **system** and how changes to each part impact the system as a whole. Students also reason about the effect of changes in pupil size (**cause and effect).**
Mystery 4 How does your brain control your body?	4-LS1-1 4-LS1-2	Brain & Nerves	Continuing the analogy of the body as a machine or robot, we finally consider the body's 'build-in computer' or central processor: the brain, and its accompanying nerves. Students explore the brain's role in receiving information from the senses, processing that information, and controlling the muscles to enable movement. **DCIs: LS1.A, LS1.D**	Students **conduct investigations** to explore how the brain processes information and responds to that information. Students **analyze and interpret data** from the investigations to determine how fast their reflexes are.	Students identify **patterns** based on how their brains process information.

Waves of Sound:

Grade 4 Physical Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 How far can a	4-PS4-1 4-PS4-3	Sound & Vibrations	Sounds aren't something we can see or touch, and so it's easy to dismiss them as not fully real. But if you've experienced an echo before, then clearly there is something interesting and very real about	Students document their understanding of how vibrations travel using a **model** of their paper cup telephones. Students then	Students identify **patterns** about the relationship between the tension of the string

whisper travel?			sound--we can even feel and see that sound has something to do with vibrations. Students observe a relationship between sound and vibration, and through the activity, discover evidence that sound isn't merely related to vibrations, but perhaps, *is* a vibration. **DCIs: *Foundational for* PS4.A**	**design their own series of investigations** to figure out how to make their telephone work better in different circumstances. Students **construct an explanation** of how the telephone works. Students extend the lesson by developing a way to send a message using a pattern of sounds.	and the quality of the sound it produces. Students also investigate **patterns** in the how different materials affect the quality of the sound that is transmitted.
Mystery 2 What would happen if you screamed in outer space?	4-PS4-1	Sound & Vibrations	Sound can travel through lots of different materials: through water, through string… it's possible to even *feel* the vibrations in the string, pinch the string, and stop the vibrations from reaching the other side. It would seem that sound is a vibration that must travel from one place to another. So does that mean sound is vibrating the air? (It is.) And what happens if there is no air? (There is no sound!) **DCIs: PS4.A**	Students **conduct investigations** with balloons to experience the vibrations caused by sound of their voices. Students **construct an explanation** that sound is a vibration. Students then **develop a model** to explain how sound travels through a medium and how it can cause distant objects to move.	Students consider the **effect** of vibrations on the movement of distant objects.
Mystery 3 Why are some sounds high and some sounds low?	4-PS4-1	Sound, Vibrations & Waves	Some sounds are very high-pitched, while others are low-pitched. For example, young people can even hear certain high-pitched sounds that adults can no longer hear. What makes one sound high and another low? By examining some musical instruments played in slow motion, we can begin to detect some differences in the vibrations. Special instruments enable us to visualize the resulting air vibrations, and reveal that sound vibrations travel as waves in the air. Students discover that the difference between high and low-pitched sounds has to do with the length of these waves ("wavelength"). **DCIs: PS4.A**	Students **analyze and interpret data** from oscilloscopes to determine how wavelengths differ between high and low pitch sounds. Students make claims and **argue from evidence** about which wavelength patterns were generated from different pitches. Students then use a rope to **model** waves created by different pitches and begin to explore the relationship between wavelength and frequency.	Students identify and analyze the oscilloscope **patterns** made by sounds with low and high pitches.

Energizing Everything:

Grade 4 Physical Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Mystery 1 How is your body similar to a car?	4-PS3-1 4-PS3-4	Speed & Energy	When something is moving, it has energy. Moving things get their energy from stored energy, and energy can be *stored* in different ways (gasoline, batteries, food, springs, and rubber bands). Students discover that the faster an object is moving, the more energy it has. They compare models that use thin rubber bands and thick rubber bands to determine how differences in stored energy impact the speed of the ride they are building. **DCIs: PS3.B, Foundational for PS3.A**	Students **build a model** of an amusement park ride called the Twist-o-matic. They use the model to **carry out an investigation** to examine the relationship between energy and speed. Students **analyze and interpret data** from their models, comparing the speed of the ride using a thin versus thick rubber band.	Students explore how **energy** can be stored and released using a rubber band. The amount of **energy** that is put into the **system** is related to the speed that the model spins around.
Mystery 2 What makes roller	4-PS3-1 4-PS3-3	Stored Energy, Speed, Collisions	Giving something "height" (putting it up high) is another way to store energy in something. When the object falls or drops, that stored energy is released: this explains why roller coasters work, but also bicycling downhill, skiing, skydiving, even	Students **build a model** of a roller coaster and carry out an investigation using marbles. Students **analyze and interpret data** from the model to **explain** the connection between height, energy and motion.	Students consider how **energy** is stored and released in a system as they experiment with their marble roller

coasters go so fast?			meteors. The higher up you place an object, the more energy you store in it, and the faster it goes when released or dropped. **DCIs: PS3.A**		coasters.
Mystery 3 Why is the first hill of a roller coaster always the highest?	4-PS3-3	Energy & Collisions	Something that's falling only has as much energy as was stored in it in the first place. This is why the first hill of a rollercoaster is always the highest. When an object collides with another object, some of its energy is transferred. **DCIs: PS3.B**	Students **conduct an investigation** using a model roller coaster to determine how energy can be stored in the hills of the coaster and how that energy is released to make the marbles go different distances. Students **analyze and interpret data** from the model to explain how the heights of different hills give marbles the energy to roll.	Students consider how **energy** is stored and released in a system as they experiment with their marble roller coasters.
Mystery 4 Could you knock down a building using only dominoes?	4-PS3-4 3-5-ETS 1-1	Energy & Engineering	We can invent devices that convert stored energy into movement, and transfer that energy to various other objects along a pathway. **DCIs: PS3.A, PS3.C, ETS1.A**	Students begin to **design** a chain reaction machine. They start by figuring out how to connect two components of the chain reaction: the lever and the slide. This is the basis of the machine they will further develop in Mystery 5.	Students consider the ways in which energy can be stored and released as they trace the path of energy through a chain reaction.

Grade 4 Physical Science	**Performance Expectations**	**Topics**	**Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)**	**Scientific & Engineering Practices (SEPs)**	**Crosscutting Concepts (CCC)**
Mystery 5 Can you build a chain reaction machine? (continuation of Mystery 4)	4-PS3-4 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	Energy & Engineering	Engineers are people who design or invent solutions to problems by using knowledge of science. All engineers think about what their goal is, come up with multiple ideas, test those ideas out, and repeatedly fail until they figure out what works. **DCIs: PS3.A, PS3.C, ETS1.A**	Students **design** a chain reaction machine that displays a message at the end. The chain reaction machines use multiple components that transfer energy from one part to the next.	Students consider the ways in which energy can be stored and released as they trace the path of energy through a chain reaction.
Mystery 6 What if there were no electricity?	4-PS3-2 4-PS3-4	Electrical Energy	Electricity--the stuff from our outlets and batteries--is a form of energy that we use to produce *movement*, but also light, heat, and more. Just like the energy in a chain reaction machine, electricity moves along a path and so can be transferred from one place to another. We can use such knowledge about electrical energy to design solutions to problems (such as flashlights for seeing in the dark). **DCIs: PS3.B, ETS1.A**	Students **design** a flashlights using batteries, flights and tin foil. Students experiment with different ways of constructing their flashlights so that they turn on and off.	Electricity is a form of **energy** that can be stored (such as in batteries) and transferred via wires, where it is used to produce not only movement, but also light, heat, and more.
Mystery 7 How long did it take to travel across the country before cars	4-PS3-2 4-PS3-4	Heat, Engines, & Energy Transfer	The invention of the engine was a monumental step forward for human transportation; it used heat energy released from burning fuel to move people and goods over long distances much more safely, cheaply, and quickly. Engines are chain reaction machines--heat is transferred through a device to create movement!	Students build a paper spinner and **conduct an investigation** to explain how heat makes things move.	Heat is a form of **energy** that can be transferred to create movement.

and planes?			**DCIs: PS3.B, PS3.D**		
Mystery 8 Where does energy come from?	4-ESS3-1	Energy Resources & Environmental Impacts	Some natural resources such as wood, coal, and natural gases can be burned to release energy. Unfortunately, burnable sources of energy release smoke and cause air pollution. Many scientists are exploring alternative natural sources of energy such as solar, wind, and water. These natural sources don't require burning to release energy. **DCIs: PS3.D, ESS3.A**	Students evaluate the advantages and disadvantages of alternative energy sources to power a town. They **obtain and evaluate information** about the needs of each source of energy and **analyze and interpret data** about the town's resources.	Natural resources such as coal, the sun, wind, and wood can be used for **energy**. Using these resources (**cause)** can damage the **environment (effect)**.

Unit 1

Birth of Rocks

Summary and Rationale

This unit takes the perspective that every rock has a story. Students will develop an appreciation for the processes that shape the Earth's surface. After considering where volcanoes form and how they erupt, they turn to investigations of rocks breaking apart and creating potential hazards. Through hands-on investigation, students explore the world of rocks and design ways of protecting humans from their dangers.

Recommended Pacing

4 weeks

Standards

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.
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.
4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features.
4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
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-ETS1-2	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.
Interdisciplinary Connections	
RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.9	Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.
RI.4.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
W.4.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.
W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic.
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.
MP.2	Reason abstractly and quantitatively.
MP.4	Model with mathematics.
4.MD.A2	Know 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 single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.
Integration of Technology	
8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems

Instructional Focus

Enduring Understandings:	**Essential Questions:**
Every rock has a story that it tells, if you know how to "read" it (identifying patterns and knowing the causes of how the various rocks are formed). A rock will tell you something extraordinary about what any ordinary place used to be like: it may well have been the site of a volcano. You will soon discover that nowhere on earth has been mundane forever. One of the most seemingly dull things you can imagine--a simple rock--is actually the relic of something astounding.	What do the shapes of landforms and rock formations tell us about the past? Could a volcano pop up where you live? Why do volcanoes explode? Will a mountain last forever? How could you survive a landslide?

Evidence of Learning (Assessments)

Rocks End of Unit Assessment
Lab reports/ notebooks
Mystery Science mini-assessments

Objectives (SLO)

Students will know:	Students will be able to:
Volcanoes don't just exist--they form, or 'pop up'. There is a pattern to where most volcanoes exist today on the earth. Volcanic rocks are lava frozen in time. There are two primary types of lava, each of whose thickness explains two major differences in a volcano's shape & style of eruption. There are two primary types of lava, each of whose thickness explains two major differences in a volcano's shape & style of eruption. Rock does not stay as massive monoliths of volcanoes--it tends to get broken into smaller pieces (sediments) over time due to natural forces (weathering). The weathering process is not benign; it creates some of the worst natural hazards, including rock falls, landslides, and debris flows. Engineering a solution to landslide hazards depends on scientific knowledge about the causes of landslides.	Students identify patterns about the location of the world's volcanoes and use these patterns as evidence to support an argument about why a volcano may or may not erupt in their backyard. Students analyze and interpret data from recent volcanic eruptions. They use their findings as evidence for an argument that volcanoes are (or are not) likely to erupt in their backyard. Students reason about the cause and effect of the type of lava (cause) and the nature of the eruption (effect) as well as the shape of the volcano (effect). Student conduct an investigation to construct an explanation for why some volcanoes explode and why some do not. Students model thick and thin lava to conduct their investigations. Students conduct an investigation by modeling how rocks erode over time. Students construct an explanation for why rocks erode. Students consider the cause and effect of ice and root wedging on rock as it is broken down into small pieces. Students design solutions to protect their "homes" from rock slides. Students argue for the merits of their design.

Suggested Resources/Technology Tools

Additional Book & Video Resources:

- Epic! Books- Geology
- Epic! Books- Earth's Systems
- Epic! Videos
    - SciShow Kids: Where do Mountains Come From?
    - SciShow Kids: Wheels: Let's Get Rolling!
    - Grand Canyon video
- All About Rocks- ReadworksText Set
- Making the Most of Mountains- Readworks Text Set
- World Mountains- Readworks Text Set
- Natural Wonders Around the World- Readworks Text Set
- Water & the Earth Readworks Text Set
- Shasta Dam Reading

- https://newsela.com/
    - Search by subject, topic and grade level

Additional Curriculum Resources:

- NJ Model Curriculum- Weathering and Erosion
    - Look under "Quick Links" → "What is Looks Like in the Classroom" & "Sample Open Education Resources"
- NJ Model Curriculum- Earth's Processes
    - Look under "Quick Links" → "What is Looks Like in the Classroom" & "Sample Open Education Resources"
- Three Little Pigs- Rocks Engineering
- Earthquake Activity
- Additional Resources to teach about erosion and weathering:
    - Bill Nye- Erosion
    - Hands-on Activity: Glaciers, Water and Wind, Oh My!
    - Weathering & Erosion
- Additional Grade 4 Science Lessons/ Activities
- If time allows, you may wish to pull a lesson from the STC Land & Water Books

Modifications

Teachers can choose from any of the suggested modifications that follow based upon teaching style, instructional method and needs of individual students.

General Modifications for students struggling to learn:

- Focus on building relationships in the classroom.
- Control the stressors for the student and manage alternate pathways for completion of assignments.
- Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.
- Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate.

ELL

- Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.
- Simplification of sentence structure and repetition of questions/sentences exactly as stated before trying to rephrase to allow ELL students to hear the sentence and try to comprehend it.
- Rephrase idioms and teach their meanings as when learning a new language, translations are often very literal. IE "Take a stab at it." Ensure students understand what is meant.
- Use directed reading activities. Ensure preview of text before assigned/read, provide pre-reading questions about the main idea and offer help utilizing key words.
- Allow the use of Google Translate where appropriate.
- Utilize bilingual reading texts provided by the STC program.

G/T

Utilize differentiation in the areas of acceleration, enrichment, and grouping. Examples include, but are not limited to:

- interdisciplinary and problem-based assignments with planned scope and sequence
- advance, accelerated, or compacted content
- abstract and advanced higher-level thinking
- allowance for individual student interests
- assignments geared to development in areas of affect, creativity, cognition, and research skills
- complex, in-depth assignments

- diverse enrichment that broadens learning
- variety in types of resources
- internships, mentorships and independent study where applicable

504/IEP

Modifications and accommodations must be aligned to stated plan and uphold expectations of the plan lawfully. Every student requires a different set of accommodations based upon need. Examples specific to science practice include, but are not limited to:

- Note taker or lab assistant
- Group lab assignments
- Use of scribe
- Adjustable tables and lab equipment within reach
- Classrooms, labs and field trips in accessible locations
- Additional time and separate room for test taking
- Additional time for in-class assignments
- Additional time in lab
- Visual and tactile instructional demonstrations
- Computer with voice output, spelling and grammar checker
- Seating in the front of the class
- Tactile drawings and graphs, and three-dimensional models
- Assignments in electronic format
- Large-print handouts, lab signs and equipment labels
- TV monitor connected to microscope to enlarge images
- Computer equipped to enlarge screen characters and images
- Auditory lab warning signals
- Adaptive lab equipment (talking calculators, talking thermometers, light probes, tactile timers)
- Staples on sticks to indicate units of measurement
- Visual warning system for lab emergencies

21ST CENTURY LIFE AND CAREER STANDARDS

Please select all standards that apply to this unit of study:

- ❑ Act as a responsible and contributing citizen and employee.
- ❑ Apply appropriate academic and technical skills.
- ❑ Attend to personal health and financial well being.
- ❑ Communicate clearly and effectively and with reason.
- ❑ Consider the environmental social and economics impacts of decisions.
- ❑ Demonstrate creativity and innovation.
- ❑ Employ valid and reliable research strategies.
- ❑ Utilize critical thinking to make sense of problems and persevere in solving them.
- ❑ Model integrity, ethical leadership, and effective management.
- ❑ Plan education and career paths aligned to personal goals.
- ❑ Use technology to enhance productivity.
- ❑ Work productively in teams while using cultural global competence.

Suggestions on integrating these standards can be found at: http://www.state.nj.us/education/cccs/2014/career/9.pdf

LINKS TO CAREERS:

https://www.stemjobs.com/5-top-stem-geology-careers/

Unit 2

Human Machine

Summary and Rationale

This introductory human body unit takes the perspective that we can think about our bodies as being like a machine. We have parts for moving around, sensors, and a built-in computer. Students explore their senses and consider how the information we process helps us understand and react to our environment. By developing a model, they describe that an object can be seen when light reflected from its surface enters the eye.

Recommended Pacing

4 weeks

Standards

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.
RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.9	Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.
W.4.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
Integration of Technology	
8.1.	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems

Instructional Focus	
Enduring Understandings:	**Essential Questions:**
Your body is like a machine or robot. It has parts for moving around, sensors, a built-in computer (and it all even runs on power--but that's a topic for a later time). Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. A system can be described in terms of its components and their interactions.	Why do your biceps bulge? What do people who are blind see? How can some animals see in the dark? How does your brain control your body?
Evidence of Learning (Assessments)	
Human Machine Assessment Science notebooks/ labs Mystery science mini-assessments	
Objectives (SLO)	
Students will know: Like a machine or robot, the body has parts, or structures, for moving around (e.g. the limbs). In order to move, the body needs at least two things: muscles and bones. The contraction of your muscles pulls on tendons, which in turn pull on the bones, causing you to move. Students discover the basics of how their eyes work, and figure out some of the causes of vision problems. Light enters the eye through the pupil. As the pupil opens and closes, a muscle called the iris can control the amount of light that enters the eye. The brain is the body's 'built-in computer' or central processor along with its accompanying nerves. The brain receives information from the senses, processes that information and controls the muscles to enable movement	Students will be able to: Students consider how human motion is made possible by a system of muscles, tendons and bones. Students build a model of a finger that they then use to construct an explanation for how fingers move Students consider the cause and effect relationship between tendons and the muscles and bones that they move. Students build a model of an eyeball that they then use to construct an explanation of why some people have blurry vision. Students think about how the eye works as a system of different parts that interact to facilitate vision. Students consider how light interacts with the system to determine what images we see (cause and effect.) Students build a model of an eye to explain how changes in pupil size changes the image that appears on the retina. Students conduct investigations to explore how the brain processes information and responds to that information. Students analyze and interpret data from the investigations to determine how fast their reflexes are. Students identify patterns based on how their brains process information. .

Suggested Resources/Technology Tools

Additional Book & Video Resources:

- Epic! Books- Human Body Systems
- Epic! Books- Animal Adaptation
- Epic! Videos
    - The Muscular System
    - The Brain and the Nervous Systems
- Move your Muscles! Passage
- How Our Bodies Work- Readworks Text Set
- https://newsela.com/
    - Search by subject, topic and grade level

Additional Curriculum Resources:

- NJ Model Curriculum- Structure and Function
    - Look under "Quick Links" → "What is Looks Like in the Classroom" & "Sample Open Education Resources"
- NJ Model Curriculum- How Organisms Process Information
    - Look under "Quick Links" → "What is Looks Like in the Classroom" & "Sample Open Education Resources"
- Pinhole Cameras and Eyes
- Animal Mouth Structures
- Animal Research Project
- Create an Animal!
- Additional Grade 4 Science Lessons/ Activities
- If time allows, you may wish to pull a lesson from the STC Animal Studies Books

Modifications

Teachers can choose from any of the suggested modifications that follow based upon teaching style, instructional method and needs of individual students.

General Modifications for students struggling to learn:

- Focus on building relationships in the classroom.
- Control the stressors for the student and manage alternate pathways for completion of assignments.
- Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.
- Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate.

ELL

- Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.
- Simplification of sentence structure and repetition of questions/sentences exactly as stated before trying to rephrase to allow ELL students to hear the sentence and try to comprehend it.
- Rephrase idioms and teach their meanings as when learning a new language, translations are often very literal. IE "Take a stab at it." Ensure students understand what is meant.
- Use directed reading activities. Ensure preview of text before assigned/read, provide pre-reading questions about the main idea and offer help utilizing key words.

- Allow the use of Google Translate where appropriate.
- Utilize bilingual reading texts provided by the STC program.

G/T

Utilize differentiation in the areas of acceleration, enrichment, and grouping. Examples include, but are not limited to:

- interdisciplinary and problem-based assignments with planned scope and sequence
- advance, accelerated, or compacted content
- abstract and advanced higher-level thinking
- allowance for individual student interests
- assignments geared to development in areas of affect, creativity, cognition, and research skills
- complex, in-depth assignments
- diverse enrichment that broadens learning
- variety in types of resources
- internships, mentorships and independent study where applicable

504/IEP

Modifications and accommodations must be aligned to stated plan and uphold expectations of the plan lawfully. Every student requires a different set of accommodations based upon need. Examples specific to science practice include, but are not limited to:

- Note taker or lab assistant
- Group lab assignments
- Use of scribe
- Adjustable tables and lab equipment within reach
- Classrooms, labs and field trips in accessible locations
- Additional time and separate room for test taking
- Additional time for in-class assignments
- Additional time in lab
- Visual and tactile instructional demonstrations
- Computer with voice output, spelling and grammar checker
- Seating in the front of the class
- Tactile drawings and graphs, and three-dimensional models
- Assignments in electronic format
- Large-print handouts, lab signs and equipment labels
- TV monitor connected to microscope to enlarge images
- Computer equipped to enlarge screen characters and images
- Auditory lab warning signals
- Adaptive lab equipment (talking calculators, talking thermometers, light probes, tactile timers)
- Staples on sticks to indicate units of measurement
- Visual warning system for lab emergencies

21ST CENTURY LIFE AND CAREER STANDARDS

Please select all standards that apply to this unit of study:

- ❑ Act as a responsible and contributing citizen and employee.
- ❑ Apply appropriate academic and technical skills.
- ❑ Attend to personal health and financial well being.
- ❑ Communicate clearly and effectively and with reason.
- ❑ Consider the environmental social and economics impacts of decisions.
- ❑ Demonstrate creativity and innovation.
- ❑ Employ valid and reliable research strategies.
- ❑ Utilize critical thinking to make sense of problems and persevere in solving them.
- ❑ Model integrity, ethical leadership, and effective management.
- ❑ Plan education and career paths aligned to personal goals.

- ❏ Use technology to enhance productivity.
- ❏ Work productively in teams while using cultural global competence.

Suggestions on integrating these standards can be found at: http://www.state.nj.us/education/cccs/2014/career/9.pdf

LINKS TO CAREERS:
http://www.americankinesiology.org/SubPages/Pages/Careers%20In%20Kinesiology

Unit 3

Waves of Sound

Summary and Rationale

In this unit of study, students use a model of sound waves to describe patterns of waves in terms of amplitude and wavelength and to show that waves can cause objects to move. They also develop an understanding that energy can be transferred from place to place by sound. This unit helps students develop the idea that sound is an actual thing, a wave of vibrations traveling through the air. Equipped with this understanding, students can begin to make sense of how sound and music work. Students demonstrate grade-appropriate proficiency in developing and *using models*, *planning and carrying out investigations*, and *constructing explanations*, *and designing solutions*.

Recommended Pacing

3-4 weeks

Standards

4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
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-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
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.
4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.
3-5ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
RI.4.9	Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.
W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic.
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.
MP.2	Reason abstractly and quantitatively.
MP.4	Model with mathematics.
Integration of Technology	
8.1.5.A.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems

Instructional Focus

Enduring Understandings:	**Essential Questions:**
Even though "sound" might seem like a short-lived phenomenon without any real form, it is very much a physical thing, a wave of vibrations traveling through the air. Sound has properties: it takes time to travel, it can be transmitted over a string, manipulated to become high or low, turned into music, even captured and frozen in time. Special instruments enable us to visualize the resulting air vibrations of sound, and reveal that sound vibrations travel as waves in the air.	How far can a whisper travel? What would happen if you screamed in outer space? Why are some sounds high and some sounds low?

Evidence of Learning (Assessments)

Waves of Sound Assessment
Labs and notebook recording
Mystery mini-assessments

Objectives (SLO)	
Students will know: Sound isn't merely related to vibrations, but perhaps, is a vibration. Sound can travel through lots of different materials through its vibrations. Sound vibrations travel as waves in the air. Sounds can be heard at different pitches (high-pitched and low-pitched). The difference between high and low-pitched sounds has to do with the length of these waves ("wavelength"). By examining some musical instruments played in slow motion, we can begin to detect some differences in the vibrations. Special instruments enable us to visualize the resulting air vibrations, and reveal that sound vibrations travel as waves in the air.	Students will be able to: Students identify patterns about the relationship between the tension of the string and the quality of the sound it produces. Students investigate patterns in how different materials affect the quality of the sound that is transmitted. Students document their understanding of how vibrations travel using a model of their paper cup telephones and then design their own series of investigations to figure out ways to make their telephone work better. Students construct an explanation of how the telephone works and then develop a way to send a message using a pattern of sound. Students conduct investigations with balloons to experience the vibrations caused by the sound of their voices and then construct an explanation that sound is a vibration. Students develop a model to explain how sound travels through a medium and how it can cause distant objects to move. Students analyze and interpret data from oscilloscopes to determine how wavelengths differ between high and low pitch sounds. Students make claims and argue from evidence about which wavelength patterns were generated from different pitches. Students use a rope to model waves created by different pitches and begin to explore the relationship between wavelength and frequency. .

Suggested Resources/Technology Tools

Additional Book & Video Resources:

- Epic! Books- Waves
- Sound- Readworks Text Set
- Outer Space- Readworks Text Set
- https://newsela.com/
    - Search by subject, topic and grade level

Additional Curriculum Resources:

- NJ Model Curriculum: Waves & Information
    - Look under "Quick Links" → "What is Looks Like in the Classroom" & "Sample Open Education Resources"
- Possible Extension for Waves of Sound
- Additional Grade 4 Science Lessons/ Activities

Modifications

Teachers can choose from any of the suggested modifications that follow based upon teaching style, instructional method and needs of individual students.

General Modifications for students struggling to learn:

- Focus on building relationships in the classroom.
- Control the stressors for the student and manage alternate pathways for completion of assignments.
- Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.
- Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate.

ELL

- Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.
- Simplification of sentence structure and repetition of questions/sentences exactly as stated before trying to rephrase to allow ELL students to hear the sentence and try to comprehend it.
- Rephrase idioms and teach their meanings as when learning a new language, translations are often very literal. IE "Take a stab at it." Ensure students understand what is meant.
- Use directed reading activities. Ensure preview of text before assigned/read, provide pre-reading questions about the main idea and offer help utilizing key words.
- Allow the use of Google Translate where appropriate.
- Utilize bilingual reading texts provided by the STC program.

G/T

Utilize differentiation in the areas of acceleration, enrichment, and grouping. Examples include, but are not limited to:

- interdisciplinary and problem-based assignments with planned scope and sequence
- advance, accelerated, or compacted content
- abstract and advanced higher-level thinking
- allowance for individual student interests
- assignments geared to development in areas of affect, creativity, cognition, and research skills
- complex, in-depth assignments
- diverse enrichment that broadens learning
- variety in types of resources
- internships, mentorships and independent study where applicable

504/IEP

Modifications and accommodations must be aligned to stated plan and uphold expectations of the plan lawfully. Every student requires a different set of accommodations based upon need. Examples specific to science practice include, but are not limited to:

- Note taker or lab assistant
- Group lab assignments
- Use of scribe
- Adjustable tables and lab equipment within reach
- Classrooms, labs and field trips in accessible locations
- Additional time and separate room for test taking
- Additional time for in-class assignments
- Additional time in lab
- Visual and tactile instructional demonstrations
- Computer with voice output, spelling and grammar checker
- Seating in the front of the class
- Tactile drawings and graphs, and three-dimensional models
- Assignments in electronic format
- Large-print handouts, lab signs and equipment labels

- TV monitor connected to microscope to enlarge images
- Computer equipped to enlarge screen characters and images
- Auditory lab warning signals
- Adaptive lab equipment (talking calculators, talking thermometers, light probes, tactile timers)
- Staples on sticks to indicate units of measurement
- Visual warning system for lab emergencies

21ST CENTURY LIFE AND CAREER STANDARDS

Please select all standards that apply to this unit of study:

- ❑ Act as a responsible and contributing citizen and employee.
- ❑ Apply appropriate academic and technical skills.
- ❑ Attend to personal health and financial well being.
- ❑ Communicate clearly and effectively and with reason.
- ❑ Consider the environmental social and economics impacts of decisions.
- ❑ Demonstrate creativity and innovation.
- ❑ Employ valid and reliable research strategies.
- ❑ Utilize critical thinking to make sense of problems and persevere in solving them.
- ❑ Model integrity, ethical leadership, and effective management.
- ❑ Plan education and career paths aligned to personal goals.
- ❑ Use technology to enhance productivity.
- ❑ Work productively in teams while using cultural global competence.

Suggestions on integrating these standards can be found at: http://www.state.nj.us/education/cccs/2014/career/9.pdf

LINKS TO CAREERS:

https://www.thebalancecareers.com/what-is-a-sound-engineer-2460937

https://www.asha.org/public/Who-Are-Audiologists/

Unit 4

Energizing Everything

Summary and Rationale

In this unit of study, students will begin to think about the energy that things need to move. Students will explore how energy makes things go, from powering vehicles to moving one's body. Students will experiment with rubber band racers to discover the relationship between how much energy is stored in a material and how much is released. They will investigate the role that hills play in making roller coasters move and the energy transfer that happens when two objects collide. Students will realize that thinking about the world in terms of energy helps them make sense of how and why things speed up and slow down. Students can use the evidence to construct an explanation of the relationship between the speed of an object and the energy of that object. Students also develop an understanding that energy can be transferred from place to place by sound, light, heat, and electrical currents or from objects through collisions. Hands on activities focus on engineering, testing hypotheses and using results to develop their ideas.

Recommended Pacing	
6-10 weeks	
Standards	
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
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-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
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.
4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.*
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-ETS1-2	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.
Interdisciplinary Connections	
RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-PS3-1)
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. (4-PS3-1)
RI.4.9	Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS3-1)
W.4.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-PS3-1)
W.4.7	Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-4)

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-PS3-4)
4.OA.A.3	Solve multistep word problems posed with whole numbers and having whole number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4-PS3-4)
Integration of Technology	
8.1	Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems

Instructional Focus

Enduring Understandings:	**Essential Questions:**
"Energy" is a real thing--not just some vague term--almost like a power or substance that causes objects to move, speed up, or slow down. Energy can be transferred between objects when they collide. Thinking about the world in terms of energy helps us to make sense of how and why things speed up and slow down.	How is your body similar to a car? What makes roller coasters go so fast? Why is the first hill of a roller coaster always the highest? Could you knock down a building using only dominoes? Can you build a chain reaction machine? What if there were no electricity? How long did it take to travel across the country before cars and planes? Where does energy come from?

Evidence of Learning (Assessments)

Energizing Everything Assessment
Labs and notebook recording
Mystery mini-assessments

Objectives (SLO)	
Students will know: Moving things get their energy from stored energy, and energy can be stored in different ways Students discover that the faster an object is moving, the more energy it has. When an object falls or drops, its stored energy is released. The higher up you place an object, the more energy you store in it, and the faster it goes when released or dropped. When an object collides with another object, some of its energy is transferred.	Students will be able to: Students build and use a model to carry out an investigation and examine the relationship between energy and speed. Students analyze and interpret data from their models, comparing the speed of the ride using a thin versus thick rubber band. Students analyze and interpret data from the model to explain the connection between height, energy and motion. Students consider how energy is stored and released in a system as they experiment with their marble roller coasters. Students consider the ways in which energy can be stored and released as they trace the path of energy through a chain reaction.

We can invent devices that convert stored energy into movement, and transfer that energy to various other objects along a pathway. All engineers think about what their goal is, come up with multiple ideas, test those ideas out, and repeatedly fail until they figure out what works. Electricity is a form of energy that can be stored and transferred via wires, where it is used to produce not only movement, but also light, heat, and more. Engines are chain reaction machines--heat is transferred through a device to create movement. Heat is a form of energy that can be transferred to create movement. Natural resources such as coal, the sun, wind, and wood can be used for energy. Using these resources (cause) can damage the environment (effect). Many scientists are exploring alternative natural sources of energy such as solar, wind, and water. These natural sources don't require burning to release energy. .	Students design a chain reaction machine that displays a message at the end. Students design a flashlights using batteries, flights and tin foil. Students experiment with different ways of constructing their flashlights so that they turn on and off. Students build a paper spinner and conduct an investigation to explain how heat makes things move. Students evaluate the advantages and disadvantages of alternative energy sources to power a town. Students obtain and evaluate information about the needs of each source of energy and analyze and interpret data about the town's resources. .

Suggested Resources/Technology Tools

Additional Book & Video Resources:

- Epic! Books: Energy
- Epic! Books: Electricity
- The Simple Physics of Soccer
- Up to Speed article on rollercoasters
- Energy for Life article
- https://newsela.com/
    - Search by subject, topic and grade level

Additional Curriculum Resources:

- NJ Model Curriculum: Transfer of Energy
    - Look under "Quick Links" → "What is Looks Like in the Classroom" & "Sample Open Education Resources"
- NJ Model Curriculum: Force & Motion
    - Look under "Quick Links" → "What is Looks Like in the Classroom" & "Sample Open Education Resources"
- NJ Model Curriculum: Using Engineering Design with Force & Motion Systems
- Wind Generator
- Thermal Energy
- If time allows, you may wish to pull a lesson from the STC Electric Circuits Books

Modifications

Teachers can choose from any of the suggested modifications that follow based upon teaching style, instructional method and needs of individual students.

General Modifications for students struggling to learn:

- Focus on building relationships in the classroom.
- Control the stressors for the student and manage alternate pathways for completion of assignments.
- Provide feedback utilizing a growth mindset and praise what is done correctly based upon effort, attitude and strategy.
- Boost engagement with material by providing opportunities of differentiation, group work and alternative assignments/assessments where appropriate.

ELL

- Provide additional wait time for student responses to questions to allow students the ability to undergo the process of translation between languages, composition of response and attempted response.
- Simplification of sentence structure and repetition of questions/sentences exactly as stated before trying to rephrase to allow ELL students to hear the sentence and try to comprehend it.
- Rephrase idioms and teach their meanings as when learning a new language, translations are often very literal. IE "Take a stab at it." Ensure students understand what is meant.
- Use directed reading activities. Ensure preview of text before assigned/read, provide pre-reading questions about the main idea and offer help utilizing key words.
- Allow the use of Google Translate where appropriate.
- Utilize bilingual reading texts provided by the STC program.

G/T

Utilize differentiation in the areas of acceleration, enrichment, and grouping. Examples include, but are not limited to:

- interdisciplinary and problem-based assignments with planned scope and sequence
- advance, accelerated, or compacted content
- abstract and advanced higher-level thinking
- allowance for individual student interests
- assignments geared to development in areas of affect, creativity, cognition, and research skills
- complex, in-depth assignments
- diverse enrichment that broadens learning
- variety in types of resources
- internships, mentorships and independent study where applicable

504/IEP

Modifications and accommodations must be aligned to stated plan and uphold expectations of the plan lawfully. Every student requires a different set of accommodations based upon need. Examples specific to science practice include, but are not limited to:

- Note taker or lab assistant
- Group lab assignments
- Use of scribe
- Adjustable tables and lab equipment within reach
- Classrooms, labs and field trips in accessible locations
- Additional time and separate room for test taking
- Additional time for in-class assignments
- Additional time in lab
- Visual and tactile instructional demonstrations
- Computer with voice output, spelling and grammar checker
- Seating in the front of the class
- Tactile drawings and graphs, and three-dimensional models
- Assignments in electronic format

- Large-print handouts, lab signs and equipment labels
- TV monitor connected to microscope to enlarge images
- Computer equipped to enlarge screen characters and images
- Auditory lab warning signals
- Adaptive lab equipment (talking calculators, talking thermometers, light probes, tactile timers)
- Staples on sticks to indicate units of measurement
- Visual warning system for lab emergencies

21ST CENTURY LIFE AND CAREER STANDARDS

Please select all standards that apply to this unit of study:

- ❑ Act as a responsible and contributing citizen and employee.
- ❑ Apply appropriate academic and technical skills.
- ❑ Attend to personal health and financial well being.
- ❑ Communicate clearly and effectively and with reason.
- ❑ Consider the environmental social and economics impacts of decisions.
- ❑ Demonstrate creativity and innovation.
- ❑ Employ valid and reliable research strategies.
- ❑ Utilize critical thinking to make sense of problems and persevere in solving them.
- ❑ Model integrity, ethical leadership, and effective management.
- ❑ Plan education and career paths aligned to personal goals.
- ❑ Use technology to enhance productivity.
- ❑ Work productively in teams while using cultural global competence.

Suggestions on integrating these standards can be found at: http://www.state.nj.us/education/cccs/2014/career/9.pdf

LINKS TO CAREERS:

https://careerwise.minnstate.edu/guide/energy/energy-career-clusters.html