

Essex Fells Public School

CURRICULUM & INSTRUCTION

Science

Grade: 4

ABSTRACT

Students are expected to demonstrate grade appropriate proficiency in asking questions, developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding in the disciplines of physical, life and Earth and space sciences. Student performance will be evaluated using a variety of assessments, including teacher-generated tests and quizzes, laboratory activities, homework, research projects, class participation and small group exploration activities.

BOE Approved: 8/12/26

ESSEX FELLS PUBLIC SCHOOLS

Grade 4 Science

Unit of Study: <i>(Pacing Guide - Specify time frame by days or weeks)</i>	Earth's Place in the Universe September/October <i>(8 weeks)</i>	Energy November-January <i>(12 weeks)</i>	Waves and their Applications February-March <i>(8 weeks)</i>
STAGE 1: Desired Results			
Established Goals: Write out complete NJSLS: <i>(Content Specific Standards Only. Only use standards that are applicable to the unit.)</i>	Science Standards Earth's Place in the Universe 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. Earth's Systems 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. Earth and Human Activity 4- ESS3-1 Obtain and combine information to describe that energy and fuels are derived from natural	Science Standards Energy 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. Disciplinary Core Ideas PS3.A: Definitions of Energy	Science Standards Waves and Their Applications in Technologies for Information Transfer 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. Disciplinary Core Ideas 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

	resources and that their uses affect the environment.  4-ESS3-2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change on humans.  Disciplinary Core Ideas ESS1.C: The History of Planet 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)	- The faster a given object is moving, the more energy it possesses. (4-PS3-1) - Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2), (4-PS3-3) PS3.B: Conservation of Energy and Energy Transfer - 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), (4- PS3-3) ETS1.A: Defining and Delimiting Engineering Problems - Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (secondary to 4-PS3- 4) - PS3.A: Definitions of Energy	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 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.B: Electromagnetic Radiation - An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2) 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)
--	---	--	--

		• The faster a given object is moving, the more energy it possesses. (4-PS3-1) • Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2), (4-PS3-3) PS3.B: Conservation of Energy and Energy Transfer • 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), (4-PS3-4) ETS1.A: Defining and Delimiting Engineering Problems • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (secondary to 4-PS3- 4)	
--	--	---	--

Interdisciplinary Connections: Write out complete NJSLS: <i>(Must have at least one standard from one of these areas but may have more):</i> • <i>ELA companion standards;</i> • <i>Standards for Mathematical Practice</i> • <i>Science;</i> • <i>Visual/Performing Arts) - Standard 1;</i> • <i>Comprehensive Health & PE - Standard 2;</i> • <i>Social Studies - Standard 6;</i> • <i>World Languages - Standard 7;</i>	English Language Arts • 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.4.3 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.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. • W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. • 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. • W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. Mathematics • MP.2 Reason abstractly and quantitatively. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically • 4.MD.A.1 Know relative sizes of	English Language Arts • 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.4.3 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.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. • W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. • 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. • W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. Mathematics • MP.2 Reason abstractly and quantitatively. • MP.4 Model with mathematics. • MP.5 Use appropriate tools strategically • 4.MD.A.1 Know relative sizes of	English Language Arts • 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.4.3 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.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. • W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. • 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. • W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. Mathematics • MP.2 Reason abstractly and quantitatively. • MP.4 Model with mathematics.
--	--	--	---

	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. ● 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale	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. ● 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. ● 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	● MP.5 Use appropriate tools strategically ● 4.MD.A.1 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 Career Readiness, Life Literacies & Key Skills: Write out complete NJSLS: <i>(Must have at least one standard from:</i> • 9.1 Personal Financial Literacy; or • 9.2 Career Awareness, Exploration, Preparation & Training; or • 9.4 Life Literacies & Key Skills)	● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). ● 9.4.5.CI.2: Investigate a persistent local or global issue, such as climate change, and collaborate with individuals with diverse perspectives to improve upon current actions designed to address the issue (e.g., 6.3.5.CivicsPD.3, W.5.7). ● 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). ● 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).	● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). ● 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). ● 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).	● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). ● 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). ● 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).
Integration of Computer Science and Design Thinking: Write out complete NJSLS: <i>(Must have at least one standard from:</i> • 8.1 Computer Science; or • 8.2 Design Thinking)	Computer Science ● 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. ● 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. Design Thinking ● 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with	Computer Science ● 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. ● 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. Design Thinking ● 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with	Computer Science ● 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. ● 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. Design Thinking ● 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting

	supporting sketches or models. ● 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. ● 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.	supporting sketches or models. ● 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. ● 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.	sketches or models. ● 8.2.5.ED.5: Describe how specifications and limitations impact the engineering design process. ● 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.
21st Century Life and Careers: Career Education: Write out complete NJSLS: <i>(Only include if a CTE curriculum</i> ● 9.3 Career and Technical Education)	N/A	N/A	N/A
Enduring Understandings: <i>(Follow UbD: What big ideas will students know?)</i>	● All living organisms interact with the living and nonliving parts of their surroundings to meet their needs for survival. These interactions lead to a constant exchange of matter ● Rock formations reveal the past	● Energy can be transmitted from a source as waves. ● Energy is present in many forms and is used to make things happen. ● Energy can be transferred from one object to another. ● Energy can be observed in everyday life through light, sound, heat, electricity, and motion. ● Energy can be transformed from one form to another.	● Waves carry energy from one place to another. ● Waves transfer energy and can be described by recognizable patterns and properties. ● Waves have identifiable parts and characteristics that help explain how they behave. ● Waves can cause objects to move by transferring energy. ● Light allows objects to be seen, and changes in light affect visibility. ● Reflection and refraction change the path of light and influence how we see

			objects.
Essential Questions: <i>(Follow UbD best practices in the creation of questions)</i>	- What can fossils tell us about history? - How do wind, water, and ice shape the land? - What is the difference between weathering and erosion? - How do fossils form? - What evidence of erosion can you see around you? - How can maps be used to describe patterns in our landforms? - What is a natural resource? - How are renewable resources different from non-renewable resources? - What resources do humans use from the earth? What impact does using these resources have on our environment? - How do humans survive Earth's natural events?	- What is energy? - How is energy transferred between objects? - What are some examples of energy around you? - How can energy be converted from one form to another?	- What are waves? - How can you describe the patterns in waves? - What are the parts of a wave? - How can waves affect the motion of an object? - How does light (and changing light) impact the ability of objects to be seen? - What is reflection/refraction? How do they affect how we see things? - How do our eyes see objects?
STAGE 2: Evidence			
Assessment & Evidence: <i>(By what criteria will performances of understanding be judged? Include:</i> 1. Formative, 2. Summative, 3. Alternative - Performance/Project) 4. Benchmark)	Formative Assessments - Class Discussions - Classroom Polls - using various apps; responses only seen by teacher - Cooperative Learning Activities that students complete in class where the teacher can assess an individual or group - Exit Tickets - In-class Assignments - Inquiry Evaluations - Labs - Page Keeley Science Probes	Formative Assessments - Class Discussions - Classroom Polls - using various apps; responses only seen by teacher - Cooperative Learning Activities that students complete in class where the teacher can assess an individual or group - Exit Tickets - In-class Assignments - Inquiry Evaluations - Labs - Page Keeley Science Probes	Formative Assessments - Class Discussions - Classroom Polls - using various apps; responses only seen by teacher - Cooperative Learning Activities that students complete in class where the teacher can assess an individual or group - Exit Tickets - In-class Assignments - Inquiry Evaluations - Labs - Page Keeley Science Probes

	• Quizzes • Strategic Questioning -higher order questions require more in-depth thinking by students. This can help the teacher discern the level and extent of student understanding • Teacher Observations • Think - Pair -Share - students write down answers to a teacher posed question. Students discuss their answers with a peer/peers. The teacher moves around the classroom to listen to various discussions, gaining valuable insight into levels of understanding • Write It Down - students write down an explanation of what they understand about a topic • 3-2-1 Countdown - 3 things you didn't know before; 2 things that surprised you about this topic, 1 thing you want to start doing with what you learned Summative Assessments • Culminating experiment • End of Chapter or Unit Tests • Research Papers • Written/Essay Assessments Benchmark Assessments • Short Answer/Multiple Choice/Fill in the Blank Assessment administered at the end of the 1st and 3rd marking periods Summative Assessments • Culminating experiment • End of Chapter or Unit Tests • Research Papers	• Quizzes • Strategic Questioning -higher order questions require more in-depth thinking by students. This can help the teacher discern the level and extent of student understanding • Teacher Observations • Think - Pair -Share - students write down answers to a teacher posed question. Students discuss their answers with a peer/peers. The teacher moves around the classroom to listen to various discussions, gaining valuable insight into levels of understanding • Write It Down - students write down an explanation of what they understand about a topic • 3-2-1 Countdown - 3 things you didn't know before; 2 things that surprised you about this topic, 1 thing you want to start doing with what you learned Summative Assessments • Culminating experiment • End of Chapter or Unit Tests • Research Papers • Written/Essay Assessments Benchmark Assessments • Short Answer/Multiple Choice/Fill in the Blank Assessment administered at the end of the 1st and 3rd marking periods Summative Assessments • Culminating experiment • End of Chapter or Unit Tests • Research Papers	• Quizzes • Strategic Questioning -higher order questions require more in-depth thinking by students. This can help the teacher discern the level and extent of student understanding • Teacher Observations • Think - Pair -Share - students write down answers to a teacher posed question. Students discuss their answers with a peer/peers. The teacher moves around the classroom to listen to various discussions, gaining valuable insight into levels of understanding • Write It Down - students write down an explanation of what they understand about a topic • 3-2-1 Countdown - 3 things you didn't know before; 2 things that surprised you about this topic, 1 thing you want to start doing with what you learned Summative Assessments • Culminating experiment • End of Chapter or Unit Tests • Research Papers • Written/Essay Assessments Benchmark Assessments • Short Answer/Multiple Choice/Fill in the Blank Assessment administered at the end of the 1st and 3rd marking periods Summative Assessments • Culminating experiment • End of Chapter or Unit Tests • Research Papers
--	---	---	---

	- Written/Essay Assessments Benchmark Assessments - Short Answer/Multiple Choice/Fill in the Blank Assessment administered at the end of the 1st and 3rd marking periods Alternative Assessments - Create Something - have students build/create something that requires that they apply what they have learned - Oral Presentations - Research Based Writing - Questions for Comprehension - Peer Assessment - PresentationsScientific Notebooks - Self-Assessment - WebQuests	- Written/Essay Assessments Benchmark Assessments - Short Answer/Multiple Choice/Fill in the Blank Assessment administered at the end of the 1st and 3rd marking periods Alternative Assessments - Create Something - have students build/create something that requires that they apply what they have learned - Oral Presentations - Research Based Writing - Questions for Comprehension - Peer Assessment - PresentationsScientific Notebooks - Self-Assessment - WebQuests	- Written/Essay Assessments Benchmark Assessments - Short Answer/Multiple Choice/Fill in the Blank Assessment administered at the end of the 1st and 3rd marking periods Alternative Assessments - Create Something - have students build/create something that requires that they apply what they have learned - Oral Presentations - Research Based Writing - Questions for Comprehension - Peer Assessment - PresentationsScientific Notebooks - Self-Assessment - WebQuests
STAGE 3: Learning Plan			
Learning Activities/Content: <i>(What is the core content of this unit? What performance tasks/ activities will students do? What skills will students know? Include content that adheres to NJ Administrative Code and Statutes:</i> - Amistad Law - Holocaust Law - LGBTQ/Disabilities Law)	N.J.S.A. 18A:35-4.36a Students will conduct investigations, analyze and interpret data, and construct explanations for changes in Earth's surface. Potential Activities: - Moving Earth Inquiry Activity - Landforms from Another Planet. - Shake, Rattle, and Roll. - Weathered by Vegetation - Rates of Erosion - Landslide Experiment - Making an Impression	N.J.S.A. 18A:35-4.36a Students will make a prediction about what will happen with kinetic and potential energy. Allow students to investigate their predictions and explain what happened. Potential activities: - Simulation - The Moving Marble - Test Toy Cars - Protect an Egg - Collision Variables - Design a Roller Coaster - Energy Science Experiments at:	N.J.S.A. 18A:35-4.36a Students will create models that could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves. 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. Potential Activities: - What makes Sound? - Rubber Band Investigation

	• Fossil Model • Fossil Types • Model of a Canyon • Textbook: Amplify • www.NSTA.org • www.nextgenscience.org • Achieve3000 • Newsela • Readworks • www.betterlesson.com • http://www.earthsciweek.org/classroom-activities/ngss (general resource) • Examine samples of fossils, as well as photographs of rock layers, and write a story about how the landforms have changed over time, and what the landscapes may have been like many years ago. • Create fossils using plastic insects and clay - molding the clay with various amounts of weight. Determine the minimum amount of weight needed to create the ideal fossil impression. Discuss the relationship between the weight applied and the layers of sedimentary rock in the earth. • Create models of landforms and simulate the effect of different forms of erosion, changing variables for each simulation. Wind, water, and ice will be used on the model landforms to determine the features and effects created. (use stream	http://www.energyquest.ca.gov/projects/index.html#hydro • Making a Pizza Box Solar Oven • Design an experiment to test the energy in a moving object by measuring and evaluating the impact the moving object has on a second, stationary object. • Build spool racers that will transfer stored energy in a rubber band to kinetic energy in the moving spool racer. Students will write a reflection relating the speed of the racer (measured) to the amount of energy in the rubber band. https://www.teachengineering.org/activities/view/ucd_energy_lesson01_activity1 (spool racer design challenge) • Build model circuits converting energy in a battery into light. • Convert solar energy to produce workable oven https://www.homesciencetools.com/build-a-solar-oven-project/ • Explore the amount of energy needed to bounce various types of balls at different heights(golf ball and ping pong ball activity, see attached 5e model lesson plan • Demonstrate the transfer of energy from colored paper to an ice cube. See attached 5e model lesson plan • Explore principles of energy related	• Sound Carriers Inquiry • Foldable • Seismic Waves Research • Making Waves Performance Task • Model of Waves • Using Waves to Transmit Information • Echolocation in Animals Digital Interactive • Morse Code Inquiry • What's That Say? Investigation & Research • Pixel Message Task • Design a Solution • Let's Communicate Performance Project DEI: Create assignments that capitalize on students' cultural and linguistic resources from their backgrounds (e.g., home and community) that can serve as intellectual resources in the science classroom. • Demonstrate how force changes a wave's amplitude and its ability to move an object. • Apply their knowledge of waves (sound, light) to communicate through non verbal means • Build/examine a model of the human eye and describe how light is responsible for seeing objects. • Waves unit: https://learning-in-action.williams.edu/opportunities/elementary-outrreach/science-lessons/4th-grad
--	---	--	---

	tables) • Measure the effects of different forms of erosion from the models and draw conclusions based on the data. • Watch a video comparing satellite views of the Earth over time and write an analysis. • Examine maps of the Earth and its features. Look for patterns and identify features and where they occur. • Analyze articles about natural events and the impacts on communities. (focus on areas near bodies of water for most impact) • Create an emergency preparedness kit for handling the impact of natural events/disasters • Save our City - https://www.teachengineering.org/activities/view/cub_natdis_lesson01_activity1 natural disaster prevention • Create/build building models that can withstand an earthquake https://www.teachengineering.org/activities/view/cub_natdis_lesson03_activity1 (Earthquake proof building) • Build “house of cards” that will remain sturdy when placed under pressure for period of time. (engineering challenge) • Build sand castles with combinations of types of sand and glue and design an experiment to determine how well they hold up to weathering. https://www.teachengineering.org/activities/view/cub_earth_lesson1_activity1 (three little pigs sand houses) • Research the Grand Canyon and	to electricity. https://educators.brainpop.com/lesson-plan/electricity-lesson-plan-exploring-currents-circuits-electromagnetism/ • -How does height affect the distance a car travels • Examine the differences between sound energy in solids, liquids, and gases https://www.teachengineering.org/activities/view/cub_energy2_lesson05_activity2 • Design and test gliders to obtain the maximum amount of distance. Students will modify and redesign to gain 10% distance over original design. (see Pearson, Interactive Science) • Investigate the Penny experiment.	e-waves-unit/ • Unit lessons: http://ngss.nsta.org/DisplayStandard.aspx?view=topic&id=16 • Model waves in 2 liter bottles with a cork inside and examine what happens to the cork
--	--	---	---

	discuss impacts over time http://www.discoveryeducation.com/teachers/free-lesson-plans/the-grand-canyon.cfm (examining the grand canyon) - Identify natural hazards in a fictional country and make decisions on where to place scientific devices to help prevent disaster https://www.teachengineering.org/activities/view/cub_natdis_lesson01_activity1 - Research the birth of rocks 4 week unit of study https://mysteryscience.com/rocks/rock-cycle-erosion-natural-hazards - Oil spill activity - human impact of natural resources https://www.calacademy.org/educators/lesson-plans/slippery-shores-oil-spill-clean-up - Carving out the landscape, http://teachers.egfi-k12.org/road-warriors/ - Rocks and minerals http://www.livebinders.com/play/play?id=759827		
Resources: <i>(Include names of texts and all online resources)</i>	- Textbook: Amplify www.NSTA.org www.nextgenscience.org - Achieve3000 - Newsela - Readworks www.betterlesson.com http://www.earthsciweek.org/classroom-activities/ngss (general resource)	- Textbook: Amplify www.NSTA.org www.nextgenscience.org - Achieve3000 - Newsela - Readworks www.betterlesson.com http://www.earthsciweek.org/classroom-activities/ngss (general resource)	- Textbook: Amplify www.NSTA.org www.nextgenscience.org - Achieve3000 - Newsela - Readworks www.betterlesson.com http://www.earthsciweek.org/classroom-activities/ngss (general resource)

Differentiation: <i>(What type of differentiated instruction will be used for each of the following subgroups:</i> 1. <i>Special Education</i> 2. <i>English Language Learners (ELLs)</i> 3. <i>At Risk/BSI</i> 4. <i>Gifted & Talented/Advanced</i> 5. 504)	Special Education ● Individualized Education Plans (IEPs) ● Exemplars of varied performance levels ● Multi-media presentations ● Sheltered Instruction ● Consultation with CST ● Manipulatives ● Scaffolded Lessons ● Guided note-taking ● Study Guides ● Modified homework ● Differentiated pre-typed class notes and example problems ● Use of the inclusion teacher to re-instruct in flexible small groups for the struggling learner ● Use of alternate assessments English Language Learners (ELLs) ● Total Physical Response (TPR) ● Dictionaries ● Mnemonic devices ● Visual aids ● Modeling ● Provide notes to students as needed in native language ● Cultural responsiveness ● Present information in a variety of ways (notes, guided notes, video clips, images, diagrams, graphic organizers, stations) ● Group students with others of different learning levels and abilities.	Special Education ● Individualized Education Plans (IEPs) ● Exemplars of varied performance levels ● Multi-media presentations ● Sheltered Instruction ● Consultation with CST ● Manipulatives ● Scaffolded Lessons ● Guided note-taking ● Study Guides ● Modified homework ● Differentiated pre-typed class notes and example problems ● Use of the inclusion teacher to re-instruct in flexible small groups for the struggling learner ● Use of alternate assessments English Language Learners (ELLs) ● Total Physical Response (TPR) ● Dictionaries ● Mnemonic devices ● Visual aids ● Modeling ● Provide notes to students as needed in native language ● Cultural responsiveness ● Present information in a variety of ways (notes, guided notes, video clips, images, diagrams, graphic organizers, stations) ● Group students with others of different learning levels and abilities.	Special Education ● Individualized Education Plans (IEPs) ● Exemplars of varied performance levels ● Multi-media presentations ● Sheltered Instruction ● Consultation with CST ● Manipulatives ● Scaffolded Lessons ● Guided note-taking ● Study Guides ● Modified homework ● Differentiated pre-typed class notes and example problems ● Use of the inclusion teacher to re-instruct in flexible small groups for the struggling learner ● Use of alternate assessments English Language Learners (ELLs) ● Total Physical Response (TPR) ● Dictionaries ● Mnemonic devices ● Visual aids ● Modeling ● Provide notes to students as needed in native language ● Cultural responsiveness ● Present information in a variety of ways (notes, guided notes, video clips, images, diagrams, graphic organizers, stations) ● Group students with others of different learning levels and abilities.
---	--	--	--

	● Non-verbal assessments Students At-Risk (BSI) ● Read, Encode, Annotate, Ponder (iREAP) ● Interactive maps ● Jigsaw groups ● Vocabulary Self-Collection Strategy (VSS) ● Graphic organizers ● Use of technology for class assignments and homework ● Provide opportunities for students to discuss material verbally and also periods of quiet reflection. Gifted and Talented (Advanced) Students: ● Project Based Learning ● Multimedia presentations ● Open-ended and informative writing ● VoiceThreads/Prezi/PWP ● Internet based research ● Open-ended responses ● Curriculum Compacting ● Advanced problems to extend the critical thinking skills of advanced learner ● Supplemental reading material for independent study ● Flexible grouping ● Tiered assignments ● Topic selection by interest ● Elevated questioning techniques using Webb's Depth of Knowledge matrix 504 Plans	● Non-verbal assessments Students At-Risk (BSI) ● Read, Encode, Annotate, Ponder (iREAP) ● Interactive maps ● Jigsaw groups ● Vocabulary Self-Collection Strategy (VSS) ● Graphic organizers ● Use of technology for class assignments and homework ● Provide opportunities for students to discuss material verbally and also periods of quiet reflection. Gifted and Talented (Advanced) Students: ● Project Based Learning ● Multimedia presentations ● Open-ended and informative writing ● VoiceThreads/Prezi/PWP ● Internet based research ● Open-ended responses ● Curriculum Compacting ● Advanced problems to extend the critical thinking skills of advanced learner ● Supplemental reading material for independent study ● Flexible grouping ● Tiered assignments ● Topic selection by interest ● Elevated questioning techniques using Webb's Depth of Knowledge matrix 504 Plans	● Non-verbal assessments Students At-Risk (BSI) ● Read, Encode, Annotate, Ponder (iREAP) ● Interactive maps ● Jigsaw groups ● Vocabulary Self-Collection Strategy (VSS) ● Graphic organizers ● Use of technology for class assignments and homework ● Provide opportunities for students to discuss material verbally and also periods of quiet reflection. Gifted and Talented (Advanced) Students: ● Project Based Learning ● Multimedia presentations ● Open-ended and informative writing ● VoiceThreads/Prezi/PWP ● Internet based research ● Open-ended responses ● Curriculum Compacting ● Advanced problems to extend the critical thinking skills of advanced learner ● Supplemental reading material for independent study ● Flexible grouping ● Tiered assignments ● Topic selection by interest ● Elevated questioning techniques using Webb's Depth of Knowledge matrix 504 Plans
--	--	--	--

	• Preferential seating. • Extended time on tests and assignments. • Reduced homework or classwork. • Verbal, visual, or technology aids. • Modified textbooks or audio-video materials. • Oral assessments	• Preferential seating. • Extended time on tests and assignments. • Reduced homework or classwork. • Verbal, visual, or technology aids. • Modified textbooks or audio-video materials. • Oral assessments	• Preferential seating. • Extended time on tests and assignments. • Reduced homework or classwork. • Verbal, visual, or technology aids. • Modified textbooks or audio-video materials. • Oral assessments
--	---	---	---

Unit of Study: <i>(Pacing Guide - Specify time frame by days or weeks)</i>	Topic: From Molecules to Organisms: Structures and Processes April-June <i>(12 weeks)</i>		
STAGE 1: Desired Results			
Established Goals: Write out complete NJSLs: <i>(Content Specific Standards Only. Only use standards that are applicable to the unit.)</i>	Science Standards LS1: From Molecules to Organisms: Structures and Processes 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.		

Interdisciplinary Connections: Write out complete NJSLS: <i>(Must have at least one standard from one of these areas but may have more):</i> • <i>ELA companion standards;</i> • <i>Standards for Mathematical Practice</i> • <i>Science;</i> • <i>Visual/Performing Arts) - Standard 1;</i> • <i>Comprehensive Health & PE - Standard 2;</i> • <i>Social Studies - Standard 6;</i> • <i>World Languages - Standard 7;</i>	English Language Arts • 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.4.3 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.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. • W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. • 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. • W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.		
--	--	--	--

Integration of Career Readiness, Life Literacies & Key Skills: Write out complete NJSLS: <i>(Must have at least one standard from:</i> ● 9.1 Personal Financial Literacy; or ● 9.2 Career Awareness, Exploration, Preparation & Training; or ● 9.4 Life Literacies & Key Skills)	Life Literacies & Key Skills ● 9.4.5.CT.1: Identify and gather relevant data that will aid in the problem-solving process (e.g., 2.1.5.EH.4, 4-ESS3-1, 6.3.5.CivicsPD.2). ● 9.4.5.IML.2: Create a visual representation to organize information about a problem or issue (e.g., 4.MD.B.4, 8.1.5.DA.3). ● 9.4.5.IML.6: Use appropriate sources of information from diverse sources, contexts, disciplines, and cultures to answer questions (e.g., RI.5.7, 6.1.5.HistoryCC.7, 7.1.NM. IPRET.5).		
Integration of Computer Science and Design Thinking: Write out complete NJSLS: <i>(Must have at least one standard from:</i> ● 8.1 Computer Science; or ● 8.2 Design Thinking)	Computer Science ● 8.1.5.DA.3: Organize and present collected data visually to communicate insights gained from different views of the data. ● 8.1.5.DA.5: Propose cause and effect relationships, predict outcomes, or communicate ideas using data. Design Thinking ● 8.2.5.ED.2: Collaborate with peers to collect information, brainstorm to solve a problem, and evaluate all possible solutions to provide the best results with supporting sketches or models. ● 8.2.5.ED.5: Describe how		

	specifications and limitations impact the engineering design process. ● 8.2.5.ED.6: Evaluate and test alternative solutions to a problem using the constraints and tradeoffs identified in the design process.		
21st Century Life and Careers: Career Education: Write out complete NJSLS: <i>(Only include if a CTE curriculum</i> ● 9.3 Career and Technical Education)	N/A		
Enduring Understandings: <i>(Follow UbD: What big ideas will students know?)</i>	● Plants and animals have basic needs that must be met to survive. ● Internal and external structures help living things survive, grow, and reproduce. ● Systems are groups of parts that work together to perform a specific function. ● Body structures and systems work together to keep living things alive and functioning. ● Living things use their senses to gather information about their environment. ● Living things sense changes in their surroundings, such as light, sound, temperature, touch, and smells. ● Sensory information helps living		

	things respond to their environment and meet their needs. ● Sense receptors detect changes in the environment and send information that helps living things react appropriately.		
Essential Questions: (Follow UbD best practices in the creation of questions)	1. What do plants and animals need to survive? 2. How do internal and external structures support life? 3. What is a system? 4. How do these structures/systems work together? 5. Why do living things need to sense? 6. What do living things sense? 7. How does sensory information guide actions of a living thing? 8. What are sense receptors?		
STAGE 2: Evidence			
Assessment & Evidence: (By what criteria will performances of understanding be judged? Include: 1. Formative, 2. Summative, 3. Alternative - Performance/Project) 4. Benchmark)	Formative Assessments ● Label plant and animal parts; complete a Venn diagram comparing structures; draw and explain how a structure helps an organism survive; sort pictures by function (protection, movement, obtaining food). ● Exit ticket explaining how one internal and one external structure support survival; Think-Pair-Share about structure and function; complete a graphic organizer matching structures to functions. ● Class Discussions ● Classroom Polls - using various apps; responses only seen by teacher ● Cooperative Learning Activities that		

	students complete in class where the teacher can assess an individual or group ● In-class Assignments ● Inquiry Evaluations ● Labs ● Quizzes ● Strategic Questioning -higher order questions require more in-depth thinking by students. This can help the teacher discern the level and extent of student understanding ● Teacher Observations ● Write It Down - students write down an explanation of what they understand about a topic ● 3-2-1 Countdown - 3 things you didn't know before; 2 things that surprised you about this topic, 1 thing you want to start doing with what you learned Summative Assessments ● Culminating experiment ● End of Chapter or Unit Tests ● Research Papers ● Written/Essay Assessments ● Benchmark Assessments ● Short Answer/Multiple Choice/Fill in the Blank Assessment administered at the end of the 1st and 3rd marking periods Summative Assessments ● Respond to a prompt using the Claim-Evidence-Reasoning format, citing evidence from investigations or informational texts. ● Create a slideshow, poster, or digital presentation explaining how structures		
--	---	--	--

	and sense receptors help living things survive. ● Research a plant or animal, describing its internal and external structures and how they help it survive and respond to its environment. ● Design a model organism with structures that help it survive in a specific habitat and explain how each structure functions. ● Culminating experiment ● End of Chapter or Unit Tests ● Research Papers Assessments Benchmark Assessments ● End-of-unit benchmark assessment with multiple-choice, short-answer, and constructed-response questions aligned to 4-LS1-1 and 4-LS1-2. ● Science notebook benchmark review in which students demonstrate understanding through diagrams, labeled illustrations, written explanations, and evidence from investigations. ● Benchmark CER (Claim-Evidence-Reasoning) writing task explaining how internal and external structures help organisms survive and how sense receptors guide responses to the environment. Alternative Assessments ● Create a 3D model of a plant or animal that labels and explains how its internal and external structures help it survive. ● Design a new organism adapted to a		
--	--	--	--

	specific habitat and explain how each structure supports survival and responds to environmental conditions. ● Develop a multimedia presentation (Google Slides, PowerPoint, or video) explaining how plant or animal structures function. ● Create an illustrated field guide describing the structures and adaptations of several plants or animals. ● Complete a science investigation and present findings using the Claim-Evidence-Reasoning (CER) framework. ● Design a poster or infographic showing how sense receptors gather information and how organisms respond to stimuli. ● Write and illustrate a children's book that teaches younger students about plant and animal structures and their functions. ● Participate in a science museum walk by creating a display board and presenting research to classmates. ● Develop a digital or physical concept map connecting structures, functions, sense receptors, stimuli, and responses. ● Produce a short podcast or video explaining how internal and external structures help organisms survive. ● Complete a portfolio that includes science notebook entries, diagrams, investigations, reflections, and written explanations collected throughout the unit.		
--	--	--	--

STAGE 3: Learning Plan

Learning Activities/Content: <i>(What is the core content of this unit? What performance tasks/ activities will students do? What skills will students know? Include content that adheres to NJ Administrative Code and Statutes:</i> • <i>Amistad Law</i> • <i>Holocaust Law</i> • <i>LGBTQ/Disabilities Law</i>	● Identify structures useful to animals and describe their functions in survival ● Create diagram of plant structures ● Identify structures useful to plants and describe their functions in survival ● Watch brain pop videos on various human body systems and play guts and bolts to connect the systems so that they function in a working order. ● Construct a model lung and describe its function in the body and how it assists in a larger system needed for survival ● Examine camouflage through an activity designed to hide worm from a “bird” based on their color ● Analyze information they know and have learned about bones to apply to an unknown creature by assembling the bone structure and making inferences ● Use their sense of touch only, to describe unknown objects ● “Dissect a Lima Bean” activity: http://buggyandbuddy.com/dissect-a-bean-seed-science-invitation-saturday/ ● Use this bird beak adaptation activity to have students examine how easily different shaped beaks pick up food for birds. This is a 7th grade activity, adapt to 4th grade http://www.vrml.k12.la.us/7th/7SC_By_Unit/unit5/act1/7SC_Un5Act1.htm		
Resources: <i>(Include names of texts and all online</i>	● Textbook ● www.NSTA.org		

resources)	• www.nextgenscience.org • Achieve3000 • Newsela • Readworks • www.betterlesson.com		
Differentiation: <i>(What type of differentiated instruction will be used for each of the following subgroups:</i> 1. Special Education 2. English Language Learners (ELLs) 3. At Risk/BSI 4. Gifted & Talented/Advanced 5. 504)	Special Education • Individualized Education Plans (IEPs) • Exemplars of varied performance levels • Multi-media presentations • Sheltered Instruction • Consultation with CST • Manipulatives • Scaffolded Lessons • Guided note-taking • Study Guides • Modified homework • Differentiated pre-typed class notes and example problems • Use of the inclusion teacher to re-instruct in flexible small groups for the struggling learner • Use of alternate assessments English Language Learners (ELLs) • Total Physical Response (TPR) • Dictionaries • Mnemonic devices • Visual aids • Modeling • Provide notes to students as needed in native language • Cultural responsiveness • Present information in a variety of ways (notes, guided notes, video clips, images, diagrams, graphic organizers, stations)		

	● Group students with others of different learning levels and abilities. ● Non-verbal assessments Students At-Risk (BSI) ● Interactive maps ● Jigsaw groups ● Vocabulary Self-Collection Strategy (VSS) ● Graphic organizers ● Use of technology for class assignments and homework ● Provide opportunities for students to discuss material verbally and also periods of quiet reflection. Gifted and Talented (Advanced) Students: ● Project Based Learning ● Multimedia presentations ● Open-ended and informative writing ● VoiceThreads/Prezi/PWP ● Internet based research ● Open-ended responses ● Curriculum Compacting ● Advanced problems to extend the critical thinking skills of advanced learner ● Supplemental reading material for independent study ● Flexible grouping ● Tiered assignments ● Topic selection by interest ● Elevated questioning techniques using Webb's Depth of Knowledge matrix ● 504 Plans ● Preferential seating.		
--	--	--	--

	• Extended time on tests and assignments. • Reduced homework or classwork. • Verbal, visual, or technology aids. • Modified textbooks or audio-video materials. • Oral assessments		
--	--	--	--