

PITTSGROVE TOWNSHIP SCHOOL DISTRICT



Course Name: Science	Grade Level(s): 4
Department: Science	Credits: N/A
BOE Adoption Date: September 17, 2020	Revision Date(s): August 5, 2020

Course Description

Students will explore the scientific method through an inquiry-based environment, developing critical thinking and problem solving skills essential to becoming informed productive contributors to society in the 21st century. Students will engage in engineering and scientific practices and apply concepts to deepen their understanding of questioning, research, hypothesis, experimenting, collecting data, and analysis. Through the application of the scientific method, students will be able to draw conclusions, collaborate, and communicate results regarding systems and processes, energy, and earth sciences.

Mission Statement

The Pittsgrove Township School District believes in growing all learners to thrive. The district offers an intellectually rigorous, dynamic curriculum aligned to state and national standards coupled with research-based practices in classrooms. The Pittsgrove Township School District strives to highlight critical thinking, problem-solving, intercultural literacy, digital literacy, collaboration, innovation, and a growth mindset as part of the instructional core of learning. The district provides high quality resources to provide young people the knowledge they need to approach the future as leaders and learners.

Curriculum & Instruction Goals

1. To ensure students are college and career ready upon graduation
2. To vertically and horizontally align curriculum PreK-12 to ensure successful transition of students at each grade level
3. To identify individual student strengths and weaknesses utilizing various assessment measures (formative, summative, alternative, etc.) so as to differentiate instruction while meeting the rigor of the applicable content standards
4. To improve student achievement as assessed through multiple measures including, but not limited to, state testing, local assessments, and ongoing progress monitoring

How to Read this Document

This curricular document contains both a *pacing guide* and *curriculum units* . The *pacing guide* serves to communicate an estimated timeframe as to *when* critical knowledge and skills will be taught throughout the year. The *pacing* , however, may differ slightly depending upon the unique needs of each learner. The *curriculum units* contain more detailed information as to the content, goals, objectives, instructional strategies, resources, and assessments.

NJ Administrative Code and Statutes Key
<p>^=Amistad Law O=Diversity & Inclusion Law <>=Holocaust +=LGBT and Disabilities Law *=AAPI (Asian American and Pacific Islanders) \$=Financial Literacy Use this key to understand where the NJ mandates are being implemented in the K-12 curriculum units.</p>

Pacing Guide

Course Title: Science

Prerequisite(s): --

Unit Title	Duration/ Month(s)	Related Standards	Learning Goals	Critical Knowledge and Skills
Unit 1: Scientific Method	2-3 weeks 3-4 times a week	3-5-ETS1-1 3-5-ETS1-2	Students will be able to: <ul style="list-style-type: none"> ● Explain and apply the scientific method. ● Investigate the use of scientific tools in the observation process. 	<ul style="list-style-type: none"> ● Understand and explain the scientific process including question, research, hypothesis, test (experiment), collect data, analyze data, and draw conclusions, and communicate results ● Plan and conduct a simple investigation ● Measure, gather, record, display, and interpret data ● Draw conclusions based on data collected ● Communicate with peers about conclusions drawn
Unit 2: Life Science/Structure & Processes (Human Machine)	4-6 weeks 3-4 times a week	4-LS1-1 4-LS1-2 4-PS4-2 (?) 3-5-ETS1-3	Students will be able to: <ul style="list-style-type: none"> ● Explore and explain how organisms use internal and external structures that function to support survival and senses. ● Observe and explain how living things are adapted for survival in their environment. ● Demonstrate grade-level 	<ul style="list-style-type: none"> ● Understand how the brain controls body parts, or structures ● Construct a model to demonstrate how a human finger moves ● Draw a model depicting the eye and its functional parts ● Construct a model of the eye to demonstrate/analyze (1) how it works and (2) what someone with a visual impairment would see

			proficiency in developing and using models.	<ul style="list-style-type: none"> ● Investigate the functions and changes of the eye to better understand how some animals are adapted to see in the dark ● Experiment using reflexes to explore and analyze how the brain processes information and responds
Unit 3: Energy & Energy Transfer (Energizing Everything & Waves of Sound)	12-14 weeks 3-4 times a week	4-PS3-1 4-PS3-2 4-PS3-3 4-PS3-4 4-ESS3-1 4-PS4-1 4-PS4-3 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3	Students will be able to: <ul style="list-style-type: none"> ● Differentiate between potential and kinetic energy. ● Identify energy uses and their sources. ● Explore and explain how energy can transfer and how it changes when objects collide. ● Describe the uses of chemical and mechanical energy and how chemical energy can be changed to other forms of energy. ● Describe the relationship between sound and vibrations. ● Explore and describe how sound makes objects move. ● Determine how wavelengths differ between high and low-pitched sounds. ● Demonstrate grade-level 	<ul style="list-style-type: none"> ● Explore and explain how energy makes things go ● Identify kinetic, potential, and mechanical energy ● Observe the relationship between height, energy and speed using the rubber band model and the roller coaster model ● Explore how energy is stored and transferred using a rubber band model ● Understand energy transfer through observation of collisions ● Engineer, design, and refine a chain reaction machine ● Recognize electricity as a form of energy that has multiple uses ● Investigate how electrical energy travels ● Design flashlights that can turn on and off ● Relate electricity to magnetism ● Analyze circuits and explain how they work

			<p>proficiency in developing and using models.</p>	<ul style="list-style-type: none"> ● Identify elements in a circuit that transform electrical energy into heat, light, sound, and motion ● Understand and explain how sound travels through vibrations and waves ● Model and describe vibrations and how they travel through cup phones ● Explore and understand the relationship between wavelengths and frequency ● Model wavelengths and frequencies using rope
<p>Unit 4: Earth Science (The Birth of Rocks)</p>	<p>4-6 weeks 3-4 times a week</p>	<p>4-ESS1-1 4-ESS2-1 4-ESS2-2 4-ESS3-2 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-3</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> ● Use patterns in rock to identify types of changes in land formations over time. ● Explore and understand the effects of weathering and erosion. ● Analyze and interpret data from maps to describe patterns of Earth’s features. ● Compare and create solutions to reduce the impacts of natural Earth processes and climate change on humans. 	<ul style="list-style-type: none"> ● Analyze recent volcanic eruptions to identify patterns in volcano locations ● Investigate why some volcanoes explode and some do not ● Model thick and thin lava to perform an investigation ● Investigate and model erosion of rocks ● Explain how and why rocks erode and break down over time ● Explore landslide causes and effects ● Engineer and design solutions to protect homes from landslides

Instructional Unit Map

Course Title: Science

Unit Title:	Scientific Method		Start Date:	September
			Length of Unit:	2-3 weeks 3-4 times a week
Content Standards <i>What do we want them to know, understand, & do?</i>	<p>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.</p> <p>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.</p>	Learning Goals	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Explain and apply the scientific method. • Investigate the use of scientific tools in the observation process. 	
Essential Questions	<ol style="list-style-type: none"> 1. What are the characteristics of a problem worth investigating? 2. What are the characteristics of a good, testable question? 3. What are the characteristics of a strong, observable hypothesis? 4. How can we analyze, use, and communicate data after an investigation? 			
Assessments <i>How will we know they have</i>	Formative	Summative		Alternative

<p><i>gained the knowledge & skills?</i></p>	<ul style="list-style-type: none"> ● Vocabulary study ● Group discussion ● Turn and talk ● Teacher Observation ● Graphic organizers ● Experiment findings/notes ● Written responses ● Post-it note shares ● Interactive sites (Kahoot, Quizizz, Plickers, Padlet, Quizlet, etc.) ● Quizzes ● Self-evaluations 	<ul style="list-style-type: none"> ● Independent investigation ● End of unit assessment 	<ul style="list-style-type: none"> ● Google slide presentation ● Seesaw activity/explanation
<p>Unit Pre-Assessment(s) <i>What do they already know?</i></p>	<ul style="list-style-type: none"> ● KWL Chart (individual or whole class) ● Kahoot/Quizizz/Plickers pre-assessment ● Seesaw pre-assessment activity (video, voice recording, drawing, or written explanation of what they already know) ● Post-it note/Padlet share 		
<p>Instructional Strategies/ Student Activities</p>	<ul style="list-style-type: none"> ● Inquiry, student-based instruction ● Turn and talk ● Modeling ● Partner/Group work ● Vocabulary cards ● Graphic organizers ● Note taking ● Investigations/experiments ● Mystery Science materials (videos, experiments, readings, “End of Mystery” questions, extension activities, etc.) 		

Instructional/ Assessment Scaffolds	English Language Learners	Special Education Learners	Struggling Learners	Advanced Learners
<i>(Modifications/ Accommodations) – planned for prior to instruction</i>	<ul style="list-style-type: none"> ● Preferential seating ● Peer buddy/study buddy ● Refer to prior knowledge ● Highlight/pre-teach vocabulary ● Vocabulary cards ● Simplify language/key words ● Provide visual/verbal charts and cues ● Provide concrete examples/models ● Consistent lesson structure ● Frequent checks for understanding ● Give clear directions 	<ul style="list-style-type: none"> ● Preferential seating ● Peer buddy/study buddy ● Refer to prior knowledge ● Highlight key terms ● Vocabulary cards ● Provide concrete examples/models ● Consistent lesson structure ● Frequent checks for understanding ● Give clear directions ● Give directions visually and verbally ● Repeat directions 	<ul style="list-style-type: none"> ● Preferential seating ● Refer to prior knowledge ● Vocabulary cards ● Graphic organizers ● Frequently check for understanding ● Clear directions ● Concrete examples ● Consistent lesson structure ● Vary test formats ● Highlight key directions ● Additional time ● Provide study guides ● Allow retakes 	<ul style="list-style-type: none"> ● Analyze and build on independent prior knowledge ● Higher level questioning with investigations/experiments ● Provide extension centers ● Leveled grouping ● Independent study

	<ul style="list-style-type: none"> ● Give directions visually and verbally ● Repeat directions ● Give directions in native language ● Give single step directions ● Highlight key directions ● Shorten task/assignment ● Study guides provided by teacher in native language ● Vary test formats ● Additional time ● Allow oral responses ● Read test/portions aloud ● Provide glossary with native language ● Allow for retakes 	<ul style="list-style-type: none"> ● Allow for rest breaks ● Highlight key directions ● Shorten task/assignment ● Provide study guides ● Provide modified tests ● Additional time ● Allow oral responses ● Read test/portions aloud ● Allow for retakes 		
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Differentiated Instructional Methods:	Access (Resources and/or Process)	Expression (Products and/or Performance)
<i>(Multiple means for students to access content and multiple modes for student to express understanding)</i>	<ul style="list-style-type: none"> ● Chromebook ● Interactive Whiteboard ● Graphic organizers ● Vocabulary cards ● Turn and talk ● Modeling ● Partner/Group work ● Graphic organizers ● Note taking 	<ul style="list-style-type: none"> ● Presentations (Google Slides, Seesaw) ● Investigations/experiments
Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i>	<p>Tier II - question, research, investigate, experiment, data, analyze, conclusions, communicate, results, variable</p> <p>Tier III - hypothesis, scientific method</p>	
Integration of Technology SAMR	<ul style="list-style-type: none"> ● S - Use Brainpop & Flocabulary videos to introduce lessons/concepts, Record findings in Google Docs/Slides ● A - Google Forms, Quizziz, Kahoot, etc. for review/assessment ● M - Students collaborate to complete graphic organizers/models in Google Docs/Slides ● R - Students collaborate to complete and explain scientific findings in Google Docs/Slides or Seesaw and present to the class 	
Interdisciplinary Connections NJ Student Learning Standards	<p>ELA Standards:</p> <ul style="list-style-type: none"> ● RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. ● RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. ● RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. 	

	<ul style="list-style-type: none"> ● W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. ● W.5.8 Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work and provide a list of sources. ● W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. <p>Mathematics Standards:</p> <ul style="list-style-type: none"> ● MP.2 Reason abstractly and quantitatively. ● MP.4 Model with mathematics. ● MP.5 Use appropriate tools strategically. ● 3-5.OA Operations and Algebraic Thinking <p>Technology Standards:</p> <ul style="list-style-type: none"> ● 8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems. ● 8.1.5.A.3 Use a graphic organizer to organize information about problems or issues. <p>Career Ready Practices:</p> <ul style="list-style-type: none"> ● CRP1 Act as a responsible and contributing citizen and employee. ● CRP2 Apply appropriate academic and technical skills. ● CRP4 Communicate clearly and effectively and with reason. ● CRP6 Demonstrate creativity and innovation. ● CRP8 Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP11 Use technology to enhance productivity. ● CRP12 Work productively in teams while using cultural global competence. 	
21st Century Themes/Skills P21 Framework	Themes	Skills

	<ul style="list-style-type: none"> ● Global Awareness ● Environmental Literacy 	<ul style="list-style-type: none"> ● Creativity and Innovation ● Critical Thinking and Problem Solving ● Communication and Collaboration ● Flexibility and Adaptability ● Initiative and Self-direction ● Social and Cross-cultural skills ● Productivity and Accountability ● Leadership and Responsibility
Resources/Materials	<ul style="list-style-type: none"> ● Chromebooks ● Flocabulary ● Brainpop & Brainpop Jr. ● Interactive websites (Kahoot, Quizziz, Seesaw, etc.) ● Google Classroom ● Science folder ● Teacher generated resources ● Scientific Method flipbook ● Scientific Method graphic organizer ● Mystery Science materials for “Introduce Science” lessons (videos, experiments, readings, “End of Mystery” questions, extension activities, etc.) 	

Instructional Unit Map

Course Title: Science

Unit Title:	Life Science/Structure & Processes (Human Machine)		Start Date:	October-November
			Length of Unit:	4-6 weeks 3-4 times a week
Content Standards <i>What do we want them to know, understand, & do?</i>	<p>4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <p>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.</p> <p>4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p> <p>3-5-ETS1-3</p>	Learning Goals	<p>Students will be able to:</p> <ul style="list-style-type: none"> ● Explore and explain how organisms use internal and external structures that function to support survival and senses. ● Observe and explain how living things are adapted for survival in their environment. ● Demonstrate grade-level proficiency in developing and using models. 	

	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.		
Essential Questions	<ol style="list-style-type: none"> 1. How are structure and function related in living things? 2. How do animals use their senses to process and respond to information? 3. How and why do living things adapt in different environments? 		
Assessments <i>How will we know they have gained the knowledge & skills?</i>	Formative	Summative	Alternative
	<ul style="list-style-type: none"> ● Vocabulary study ● Group discussion ● Turn and talk ● Teacher Observation ● Graphic organizers ● End of Mystery questions ● Experiment findings/notes ● Written responses ● Post-it note shares ● Interactive sites (Kahoot, Quizizz, Plickers, Padlet, Quizlet, etc.) ● Quizzes ● Self-evaluations 	<ul style="list-style-type: none"> ● Independent investigation ● End of unit assessment 	<ul style="list-style-type: none"> ● Google slide presentation ● Seesaw activity/explanation

Unit Pre-Assessment(s) <i>What do they already know?</i>	<ul style="list-style-type: none"> ● KWL Chart (individual or whole class) ● Kahoot/Quizizz/Plickers pre-assessment ● Seesaw pre-assessment activity (video, voice recording, drawing, or written explanation of what they already know) ● Post-it note/Padlet share 			
Instructional Strategies/ Student Activities	<ul style="list-style-type: none"> ● Inquiry, student-based instruction ● Turn and talk ● Modeling ● Partner/Group work ● Vocabulary cards ● Graphic organizers ● Note taking ● Investigations/experiments ● Mystery Science materials (videos, experiments, readings, “End of Mystery” questions, extension activities, etc.) 			
Instructional/ Assessment Scaffolds <i>(Modifications/ Accommodations) – planned for prior to instruction</i>	English Language Learners	Special Education Learners	Struggling Learners	Advanced Learners
	<ul style="list-style-type: none"> ● Preferential seating ● Peer buddy/study buddy ● Refer to prior knowledge ● Highlight/ pre-teach vocabulary ● Vocabulary cards 	<ul style="list-style-type: none"> ● Preferential seating ● Peer buddy/study buddy ● Refer to prior knowledge ● Highlight key terms ● Vocabulary cards 	<ul style="list-style-type: none"> ● Preferential seating ● Refer to prior knowledge ● Vocabulary cards ● Graphic organizers ● Frequently check for understanding ● Clear directions ● Concrete examples ● Consistent lesson structure ● Vary test formats ● Highlight key directions ● Additional time 	<ul style="list-style-type: none"> ● Analyze and build on independent prior knowledge ● Higher level questioning with investigations/ experiments ● Provide extension centers

	<ul style="list-style-type: none"> ● Simplify language/key words ● Provide visual/verbal charts and cues ● Provide concrete examples/models ● Consistent lesson structure ● Frequent checks for understanding ● Give clear directions ● Give directions visually and verbally ● Repeat directions ● Give directions in native language ● Give single step directions ● Highlight key directions ● Shorten task/assignment ● Study guides provided by 	<ul style="list-style-type: none"> ● Provide concrete examples/models ● Consistent lesson structure ● Frequent checks for understanding ● Give clear directions ● Give directions visually and verbally ● Repeat directions ● Allow for rest breaks ● Highlight key directions ● Shorten task/assignment ● Provide study guides ● Provide modified tests ● Additional time ● Allow oral responses 	<ul style="list-style-type: none"> ● Provide study guides ● Allow retakes 	<ul style="list-style-type: none"> ● Leveled grouping ● Independent study
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	<p>teacher in native language</p> <ul style="list-style-type: none"> • Vary test formats • Additional time • Allow oral responses • Read test/portions aloud • Provide glossary with native language • Allow for retakes 	<ul style="list-style-type: none"> • Read test/portions aloud • Allow for retakes 		
<p>Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i></p>	<p>Access (Resources and/or Process)</p>		<p>Expression (Products and/or Performance)</p>	
	<ul style="list-style-type: none"> • Chromebook • Interactive Whiteboard • Graphic organizers • Vocabulary cards • Turn and talk • Modeling • Partner/Group work • Graphic organizers • Note taking 		<ul style="list-style-type: none"> • Presentations (Google Slides, Seesaw) • Investigations/experiments 	
<p>Vocabulary <i>Highlight key vocabulary (both</i></p>	<p>Tier II - question, research, investigate, experiment, data, analyze, conclusions, communicate, results, structure, processes, function, senses, lens, pupil, reflection, nerves</p> <p>Tier III - muscles, tendons, appendages, retina, cornea</p>			

Tier II and Tier III words)	
Integration of Technology SAMR	<ul style="list-style-type: none"> ● S - Use Brainpop & Flocabulary videos to introduce lessons/concepts, Record findings in Google Docs/Slides ● A - Google Forms, Quizziz, Kahoot, etc. for review/assessment ● M - Students collaborate to complete graphic organizers/models in Google Docs/Slides ● R - Students collaborate to complete and explain scientific findings in Google Docs/Slides or Seesaw and present to the class
Interdisciplinary Connections NJ Student Learning Standards	<p>ELA Standards:</p> <ul style="list-style-type: none"> ● W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. ● SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. <p>Mathematics Standards:</p> <ul style="list-style-type: none"> ● 4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. <p>Technology Standards:</p> <ul style="list-style-type: none"> ● 8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems. ● 8.1.5.A.3 Use a graphic organizer to organize information about problems or issues. ● 8.2.5.A.4 Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences. <p>Career Ready Practices:</p> <ul style="list-style-type: none"> ● CRP1 Act as a responsible and contributing citizen and employee. ● CRP2 Apply appropriate academic and technical skills. ● CRP4 Communicate clearly and effectively and with reason. ● CRP 5 Consider the environmental, social, and economic impacts of decisions.

	<ul style="list-style-type: none"> ● CRP6 Demonstrate creativity and innovation. ● CRP8 Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP11 Use technology to enhance productivity. ● CRP12 Work productively in teams while using cultural global competence. 	
21st Century Themes/Skills P21 Framework	Themes	Skills
	<ul style="list-style-type: none"> ● Global Awareness ● Environmental Literacy 	<ul style="list-style-type: none"> ● Creativity and Innovation ● Critical Thinking and Problem Solving ● Communication and Collaboration ● Flexibility and Adaptability ● Initiative and Self-direction ● Social and Cross-cultural skills ● Productivity and Accountability ● Leadership and Responsibility
Resources/Materials	<ul style="list-style-type: none"> ● Mystery Science materials for “Human Machine” lessons 1-4 (videos, experiments, readings, “End of Mystery” questions, extension activities, etc.) ● Chromebooks ● Flocabulary ● Brainpop & Brainpop Jr. ● Interactive websites (Kahoot, Quizziz, Seesaw, etc.) ● Google Classroom ● Science folder ● Teacher generated resources ● Vocabulary cards ● Graphic organizer 	

Instructional Unit Map

Course Title: Science

Unit Title:	Energy & Energy Transfer (Energizing Everything & Waves of Sound)	Start Date:	December-March
		Length of Unit:	12-14 weeks 3-4 times a week
Content Standards <i>What do we want them to know, understand, & do?</i>	<p>4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.</p> <p>4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.</p> <p>4-PS3-3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p> <p>4-PS3-4</p>	Learning Goals	<p>Students will be able to:</p> <ul style="list-style-type: none"> ● Differentiate between potential and kinetic energy. ● Identify energy uses and their sources. ● Explore and explain how energy can transfer and how it changes when objects collide. ● Describe the uses of chemical and mechanical energy and how chemical energy can be changed to other forms of energy. ● Describe the relationship between sound and vibrations. ● Explore and describe how sound makes objects move. ● Determine how wavelengths differ between high and low-pitched sounds. ● Demonstrate grade-level proficiency in developing and using models.

	<p>Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.</p> <p>4-ESS3-1 Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.</p> <p>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.</p> <p>4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information.</p> <p>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.</p> <p>3-5-ETS1-2 Generate and compare multiple possible solutions</p>		
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	<p>to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p> <p>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.</p>			
<p>Essential Questions</p>	<ol style="list-style-type: none"> 1. What is energy? 2. How is energy transferred and stored? 3. How do food and fuel provide energy? 4. How do humans depend on Earth's resources? 5. How are waves used to transfer energy and information? 6. What are the characteristic properties and behaviors of sounds waves? 			
<p>Assessments <i>How will we know they have gained the knowledge & skills?</i></p>	<p style="text-align: center;">Formative</p>	<p style="text-align: center;">Summative</p>		<p style="text-align: center;">Alternative</p>
	<ul style="list-style-type: none"> ● Vocabulary study ● Group discussion ● Turn and talk ● Teacher Observation ● Graphic organizers ● End of Mystery questions ● Experiment findings/notes ● Written responses 	<ul style="list-style-type: none"> ● Independent investigation ● End of unit assessment 		<ul style="list-style-type: none"> ● Google slide presentation ● Seesaw activity/ explanation

	<ul style="list-style-type: none"> ● Post-it note shares ● Interactive sites (Kahoot, Quizizz, Plickers, Padlet, Quizlet, etc.) ● Quizzes ● Self-evaluations 			
Unit Pre-Assessment(s) <i>What do they already know?</i>	<ul style="list-style-type: none"> ● KWL Chart (individual or whole class) ● Kahoot/Quizizz/Plickers pre-assessment ● Seesaw pre-assessment activity (video, voice recording, drawing, or written explanation of what they already know) ● Post-it note/Padlet share 			
Instructional Strategies/ Student Activities	<ul style="list-style-type: none"> ● Inquiry, student-based instruction ● Turn and talk ● Modeling ● Partner/Group work ● Vocabulary cards ● Graphic organizers ● Note taking ● Investigations/experiments ● Mystery Science materials (videos, experiments, readings, “End of Mystery” questions, extension activities, etc.) 			
Instructional/ Assessment Scaffolds <i>(Modifications/ Accommodations) – planned for prior to instruction</i>	English Language Learners	Special Education Learners	Struggling Learners	Advanced Learners
	<ul style="list-style-type: none"> ● Preferential seating ● Peer buddy/study buddy 	<ul style="list-style-type: none"> ● Preferential seating ● Peer buddy/study buddy 	<ul style="list-style-type: none"> ● Preferential seating ● Refer to prior knowledge ● Vocabulary cards ● Graphic organizers 	<ul style="list-style-type: none"> ● Analyze and build on independent prior knowledge

	<ul style="list-style-type: none"> ● Refer to prior knowledge ● Highlight/pre-teach vocabulary ● Vocabulary cards ● Simplify language/key words ● Provide visual/verbal charts and cues ● Provide concrete examples/models ● Consistent lesson structure ● Frequent checks for understanding ● Give clear directions ● Give directions visually and verbally ● Repeat directions ● Give directions in native language ● Give single step directions 	<ul style="list-style-type: none"> ● Refer to prior knowledge ● Highlight key terms ● Vocabulary cards ● Provide concrete examples/models ● Consistent lesson structure ● Frequent checks for understanding ● Give clear directions ● Give directions visually and verbally ● Repeat directions ● Allow for rest breaks ● Highlight key directions ● Shorten task/assignment ● Provide study guides 	<ul style="list-style-type: none"> ● Frequently check for understanding ● Clear directions ● Concrete examples ● Consistent lesson structure ● Vary test formats ● Highlight key directions ● Additional time ● Provide study guides ● Allow retakes 	<ul style="list-style-type: none"> ● Higher level questioning with investigations/experiments ● Provide extension centers ● Leveled grouping ● Independent study
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	<ul style="list-style-type: none"> ● Highlight key directions ● Shorten task/assignment ● Study guides provided by teacher in native language ● Vary test formats ● Additional time ● Allow oral responses ● Read test/portions aloud ● Provide glossary with native language ● Allow for retakes 	<ul style="list-style-type: none"> ● Provide modified tests ● Additional time ● Allow oral responses ● Read test/portions aloud ● Allow for retakes 		
Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to</i>	Access (Resources and/or Process)		Expression (Products and/or Performance)	
	<ul style="list-style-type: none"> ● Chromebook ● Interactive Whiteboard ● Graphic organizers ● Vocabulary cards ● Turn and talk ● Modeling ● Partner/Group work ● Graphic organizers 		<ul style="list-style-type: none"> ● Presentations (Google Slides, Seesaw) ● Investigations/experiments 	

<p><i>express understanding)</i></p>	<ul style="list-style-type: none"> Note taking 	
<p>Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i></p>	<p>Tier II - question, research, investigate, experiment, data, analyze, conclusions, communicate, results, transfer, conductor, battery, gravity, speed</p> <p>Tier III - energy, kinetic energy, potential energy, conserve, acceleration, friction, circuit, insulator, electricity</p>	
<p>Integration of Technology SAMR</p>	<ul style="list-style-type: none"> S - Use Brainpop & Flocabulary videos to introduce lessons/concepts, Record findings in Google Docs/Slides A - Google Forms, Quizziz, Kahoot, etc. for review/assessment M - Students collaborate to complete graphic organizers/models in Google Docs/Slides R - Students collaborate to complete and explain scientific findings in Google Docs/Slides or Seesaw and present to the class 	
<p>Interdisciplinary Connections NJ Student Learning Standards</p>	<p>ELA Standards:</p> <ul style="list-style-type: none"> 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. SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. <p>Mathematics Standards:</p>	

- **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.
- **MP.4** Model with mathematics.
- **4.G.A.1** Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- **MP.2** Reason abstractly and quantitatively.
- **4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
- **MP.5** Use appropriate tools strategically.
- **3-5.OA** Operations and Algebraic Thinking

Technology Standards:

- **8.1.5.A.1** Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
- **8.1.5.A.3** Use a graphic organizer to organize information about problems or issues.
- **8.2.5.A.4** Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences.

Career Ready Practices:

- **CRP1** Act as a responsible and contributing citizen and employee.
- **CRP2** Apply appropriate academic and technical skills.
- **CRP4** Communicate clearly and effectively and with reason.
- **CRP 5** Consider the environmental, social, and economic impacts of decisions.
- **CRP6** Demonstrate creativity and innovation.
- **CRP8** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP11** Use technology to enhance productivity.
- **CRP12** Work productively in teams while using cultural global competence.

21 st Century Themes/Skills	Themes	Skills
<p><u>P21 Framework</u></p>	<ul style="list-style-type: none"> ● Global Awareness ● Environmental Literacy 	<ul style="list-style-type: none"> ● Creativity and Innovation ● Critical Thinking and Problem Solving ● Communication and Collaboration ● Flexibility and Adaptability ● Initiative and Self-direction ● Social and Cross-cultural skills ● Productivity and Accountability ● Leadership and Responsibility
<p>Resources/Materials</p>	<ul style="list-style-type: none"> ● Mystery Science materials for “Energizing Energy” lessons 1-8 and “Waves of Sound” lessons 1-3 (videos, experiments, readings, “End of Mystery” questions, extension activities, etc.) ● Chromebooks ● Flocabulary ● Brainpop & Brainpop Jr. ● Interactive websites (Kahoot, Quizziz, Seesaw, etc.) ● Google Classroom ● Science folder ● Teacher generated resources ● Vocabulary cards ● Graphic organizer 	

Instructional Unit Map

Course Title: Science

Unit Title:	Earth Science (The Birth of Rocks)	Start Date:	April-May
		Length of Unit:	4-6 weeks 3-4 times a week
<p>Content Standards <i>What do we want them to know, understand, & do?</i></p>	<p>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.</p> <p>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.</p> <p>4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth's features.</p> <p>4-ESS3-2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have</p>	<p>Learning Goals</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> ● Use patterns in rock to identify types of changes in land formations over time. ● Explore and understand the effects of weathering and erosion. ● Analyze and interpret data from maps to describe patterns of Earth's features. ● Compare and create solutions to reduce the impacts of natural Earth processes and climate change on humans.

	<p>on humans.</p> <p>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.</p> <p>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.</p> <p>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.</p>			
<p>Essential Questions</p>	<ol style="list-style-type: none"> 1. How and why is Earth constantly changing? 2. How do Earth's major systems interact? 3. Why do the continents move, and what causes earthquakes and volcanoes? 4. What happens to ecosystems when the environment changes? 5. How do natural hazards affect individuals and societies? 			
<p>Assessments <i>How will we know they have</i></p>	<p>Formative</p>	<p>Summative</p>	<p>Alternative</p>	

<p><i>gained the knowledge & skills?</i></p>	<ul style="list-style-type: none"> ● Vocabulary study ● Group discussion ● Turn and talk ● Teacher Observation ● Graphic organizers ● End of Mystery questions ● Experiment findings/notes ● Written responses ● Post-it note shares ● Interactive sites (Kahoot, Quizizz, Plickers, Padlet, Quizlet, etc.) ● Quizzes ● Self-evaluations 	<ul style="list-style-type: none"> ● Independent investigation ● End of unit assessment 	<ul style="list-style-type: none"> ● Google slide presentation ● Seesaw activity/ explanation
<p>Unit Pre-Assessment(s) <i>What do they already know?</i></p>	<ul style="list-style-type: none"> ● KWL Chart (individual or whole class) ● Kahoot/Quizizz/Plickers pre-assessment ● Seesaw pre-assessment activity (video, voice recording, drawing, or written explanation of what they already know) ● Post-it note/Padlet share 		
<p>Instructional Strategies/ Student Activities</p>	<ul style="list-style-type: none"> ● Inquiry, student-based instruction ● Turn and talk ● Modeling ● Partner/Group work ● Vocabulary cards ● Graphic organizers ● Note taking 		

	<ul style="list-style-type: none"> • Investigations/experiments • Mystery Science materials (videos, experiments, readings, “End of Mystery” questions, extension activities, etc.) 			
Instructional/ Assessment Scaffolds <i>(Modifications/ Accommodations) – planned for prior to instruction</i>	English Language Learners	Special Education Learners	Struggling Learners	Advanced Learners
	<ul style="list-style-type: none"> • Preferential seating • Peer buddy/study buddy • Refer to prior knowledge • Highlight/pre-teach vocabulary • Vocabulary cards • Simplify language/key words • Provide visual/verbal charts and cues • Provide concrete examples/models • Consistent lesson structure • Frequent checks for understanding • Give clear directions 	<ul style="list-style-type: none"> • Preferential seating • Peer buddy/study buddy • Refer to prior knowledge • Highlight key terms • Vocabulary cards • Provide concrete examples/models • Consistent lesson structure • Frequent checks for understanding • Give clear directions • Give directions visually and verbally 	<ul style="list-style-type: none"> • Preferential seating • Refer to prior knowledge • Vocabulary cards • Graphic organizers • Frequently check for understanding • Clear directions • Concrete examples • Consistent lesson structure • Vary test formats • Highlight key directions • Additional time • Provide study guides • Allow retakes 	<ul style="list-style-type: none"> • Analyze and build on independent prior knowledge • Higher level questioning with investigations/experiments • Provide extension centers • Leveled grouping • Independent study

	<ul style="list-style-type: none"> ● Give directions visually and verbally ● Repeat directions ● Give directions in native language ● Give single step directions ● Highlight key directions ● Shorten task/assignment ● Study guides provided by teacher in native language ● Vary test formats ● Additional time ● Allow oral responses ● Read test/portions aloud ● Provide glossary with native language ● Allow for retakes 	<ul style="list-style-type: none"> ● Repeat directions ● Allow for rest breaks ● Highlight key directions ● Shorten task/assignment ● Provide study guides ● Provide modified tests ● Additional time ● Allow oral responses ● Read test/portions aloud ● Allow for retakes 		
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Differentiated Instructional Methods:	Access (Resources and/or Process)	Expression (Products and/or Performance)
<i>(Multiple means for students to access content and multiple modes for student to express understanding)</i>	<ul style="list-style-type: none"> ● Chromebook ● Interactive Whiteboard ● Graphic organizers ● Vocabulary cards ● Turn and talk ● Modeling ● Partner/Group work ● Graphic organizers ● Note taking 	<ul style="list-style-type: none"> ● Presentations (Google Slides, Seesaw) ● Investigations/experiments
Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i>	<p>Tier II - question, research, investigate, experiment, data, analyze, conclusions, communicate, results, mapping, volcanoes, lava, erupt, earthquakes, landslide</p> <p>Tier III - weathering, erosion, tectonic plates, shield volcano, cone volcano, root wedging, ice wedging</p>	
Integration of Technology SAMR	<ul style="list-style-type: none"> ● S - Use Brainpop & Flocabulary videos to introduce lessons/concepts, Record findings in Google Docs/Slides ● A - Google Forms, Quizziz, Kahoot, etc. for review/assessment ● M - Students collaborate to complete graphic organizers/models in Google Docs/Slides ● R - Students collaborate to complete and explain scientific findings in Google Docs/Slides or Seesaw and present to the class 	
Interdisciplinary Connections NJ Student Learning Standards	<p>ELA Standards:</p> <ul style="list-style-type: none"> ● 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.4.7 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 Standards:

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- **CRP8** Utilize critical thinking to make sense of problems and persevere in solving them.

	<ul style="list-style-type: none"> ● CRP11 Use technology to enhance productivity. ● CRP12 Work productively in teams while using cultural global competence. 	
21st Century Themes/Skills P21 Framework	Themes	Skills
	<ul style="list-style-type: none"> ● Global Awareness ● Environmental Literacy 	<ul style="list-style-type: none"> ● Creativity and Innovation ● Critical Thinking and Problem Solving ● Communication and Collaboration ● Flexibility and Adaptability ● Initiative and Self-direction ● Social and Cross-cultural skills ● Productivity and Accountability ● Leadership and Responsibility
Resources/ Materials	<ul style="list-style-type: none"> ● Mystery Science materials for “Birth of Rocks” lessons 1-4 (videos, experiments, readings, “End of Mystery” questions, extension activities, etc.) ● Chromebooks ● Flocabulary ● Brainpop & Brainpop Jr. ● Interactive websites (Kahoot, Quizziz, Seesaw, etc.) ● Google Classroom ● Science folder ● Teacher generated resources ● Vocabulary cards ● Graphic organizer 	