Orange Public Schools

Office of Curriculum & Instruction

2019-2020 Science Curriculum Guide

Grade 4

Module 1: Soils, Rocks and Landforms

September 9, 2019 – November 27, 2019

Board Approved: 1.14.2020

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GRADE 4 Yearlong Scope and Sequence by Instructional Weeks

Week 1 9/9	Week 2 9/16	Week 3 9/23	Week 4 9/30	Week 5 10/7	Week 6 10/14	Week 7 10/21	Week 8 10/28	Week 9 11/4*	Week 10 11/11	Week 11 11/18	Week 12 11/25*

UNIT 1 – Earth Science: Soil, Rocks, and Landforms (Sept 9th – Nov 27th)

Investigation 1: Soils and Weathering (3 Weeks) Students investigate properties of soil by comparing four different soils. They begin to explore how rocks break into smaller pieces.	**Investigation 2: Landforms (2 Weeks)** Students investigate stream-tables, slopes, erosion, sediments, and fossils.	**Investigation 3: Mapping Earth's Surface (2 Weeks)** Students are introduced to the study of topography by building a model of a landform—a mountain.	**Investigation 4: Natural Resources (2 Weeks)** Students focus on earth materials as renewable and nonrenewable natural resources.

Week 13 12/2	Week 14 12/9	Week 15 12/16	Week 16 12/23*	Week 17 12/30*	Week 18 1/6	Week 19 1/13	Week 20 1/20	Week 21 1/27	Week 22 2/3	Week 23 2/10	Week 24 2/17*

UNIT 2 – Physical Science: Energy (Dec 2nd – Mar 9th)

Investigation 1: Energy and Circuits (3 Weeks) Students investigate the phenomenon of electric currents in circuits, the pathways through which electricity flows.	**December Break**	**Investigation 2: The Force of Magnetism (2 Weeks)** Students investigate the phenomenon of magnets and their interactions with materials and each other.	**Investigation 3: Electromagnets (2 Weeks)** Students investigate the phenomenon of electromagnets and learn how to use electricity to make an electromagnet.	**Investigation 4: Energy Transfer (2 Weeks)** Students observe the phenomenon of energy transfer that results in heat, light, sound, and motion.

February Break

Week 25 2/24	Week 26 3/2	Week 27 3/9	Week 28 3/16	Week 29 3/23	Week 30 3/30	Week 31 4/6	Week 32 4/13*	Week 33 4/20	Week 34 4/27	Week 35 5/4	Week 36 5/11

UNIT 2 – Physical Science: Energy

Investigation 5: Waves (3 Weeks)
Students experience the phenomenon of waves through firsthand experiences using ropes, demonstrations with waves in water, spring toys, and a sound generator.

Unit 3 – Life Science: Environments (Mar 16th – Jun 9th)

Investigation 1: Environmental Factors (3 Weeks) Students observe and describe the living and nonliving components (biotic and abiotic factors) in terrestrial environments.	**Investigation 2: Ecosystems (3 Weeks)** Students investigate the phenomenon of life in water and how organisms' needs are the same and different from life on land.	**Investigation 3: Brine Shrimp Hatching (2 Weeks)** Students conduct a controlled experiment to determine which of four salt concentrations allow brine shrimp eggs to hatch.

Week 37 5/18	Week 38 5/25	Week 38 6/1	Week 40 6/8	Week 41 6/15	Week 42 6/22	*** All days off are taken into planning**

Unit 3 – Life Science: Environments (Mar 16th – Jun 9th)

Investigation 4: Range of Tolerance
(3 Weeks)
Students return to the desert and rain forest environments they studied in Investigation 1 and engage with the phenomenon that different plants survive in each environment.

Grade/Course Overview:
In this unit of study, students develop an understanding of the effects of weathering and the rate of erosion by water, ice, wind, or vegetation. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts. Students demonstrate grade-appropriate proficiency in planning and carrying out investigations and constructing explanations. Students are also expected to use these practices to demonstrate an understanding of the core ideas.
Students apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from maps. The crosscutting concepts of patterns, cause and effect, and the influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, analyzing and interpreting data, and constructing explanations and designing solutions. Students are also expected to use these practices to demonstrate an understanding of the core ideas.

Soil, Rocks, and Landforms
Unit Summary: This module has four investigations that focus on the concepts that weathering by water, ice, wind living organisms and gravity breaks rocks into smaller pieces, erosion, (water, ice, and wind) transports earth materials to new locations and depositions is the result of that transport process that builds new land. Students conduct controlled experiments by incrementally changing specific environmental conditions to determine the impact of changing the variables of slope and amount of water in stream tables. Students interpret data from diagrams and visual representations to build explanations from evidence and make predictions of future events. They develop model mountains and represent the landforms from different perspectives to look for change. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; system and system models; structure and function; and stability and change.
Related Phenomena: Investigation 1: Students engage firsthand with the phenomenon of soils. They investigate properties of soil by comparing four different soils. They learn that soils are composed of essentially the same types of materials (inorganic earth materials and humus), but the amounts of the materials vary. They begin to explore how rocks break into smaller pieces through physical and chemical weathering. Students go outdoors to explore and compare properties of local soils. Investigation 2: Students engage with the phenomena of erosion and deposition of weathered earth material by flowing water. They use stream-table models to observe that water moves earth materials from one location to another. They investigate the variables of slope and water quantity and plan and conduct their own stream-table investigations. Students look for evidence of erosion and deposition outdoors. Students pursue explanations for the phenomenon of fossils found in layers of sedimentary rock. They think about what happens to sediments over long periods of time as sediments layer on top of each other. They learn about the different processes that can result in fossils and how fossils provide evidence of life and landscapes from the ancient past. Investigation 3: Students engage with the phenomena of Earth's mountains. They are introduced to the study of topography by building a model of the mountain landform. Investigation 4: Students engage with the phenomena of natural resources and how they are used. Students start by reviewing what they have learned in Investigations 1–3. Then they focus on earth materials as renewable and nonrenewable natural resources. They learn the importance of earth materials as resources. The class makes a stepping stone out of concrete and goes on a schoolyard walk to find objects and structures and consider what natural resources were used to construct them. Other Phenomena Worth Looking Into Landform Phenomena

Geological Phenomena

4-ESS1-1: Evidence from Rock Layers

4-ESS2-1: Weathering and Erosion

4-ESS2-2: Mapping Earth's Features

4-ESS3-1: Renewable and Non-renewable Energy

4-ESS3-2: Natural Hazard Design Solution

Essential Questions:

Investigation 1: How do soils form? What is soil? What causes big rocks to break down into smaller rocks? How are rocks affected by acid rain? What's in our schoolyard soils?

Investigation 2: How do erosion and deposition impact landforms? What do the location of fossils in rock layers tell us about past life on Earth? How do weathered rock pieces move from one place to another? How does slope affect erosion and deposition? How do floods affect erosion and deposition? Where are erosion and deposition happening in our schoolyard? How do fossils get in rocks and what can they tell us about the past?

Investigation 3: How do maps help us observe Earth's surface features? What might reduce the impact of catastrophic Earth surface events? How can we represent the different elevations of landforms? How can we draw a profile of a mountain from a topographic map? How can scientists and engineers help reduce the impacts that events like volcanic eruptions might have on people? What events can change Earth's surface quickly?

Investigation 4: What makes rock a natural resource and how is this resource used by people? What are natural resources and what is important to know about them? How are natural resources used to make concrete? How do people use natural resources to make or build things?

Enduring Understandings:

In this unit of study, students are expected to develop an understanding of the effects of weathering and the rate of erosion by water, ice, wind, or vegetation. As students plan and carry out investigations using models and observe the effects of earth processes in the natural environment, they learn to identify patterns of change; recognize cause-and-effect relationships among the forces that cause change in rocks, soil, and landforms; and construct explanations of changes that occur over time to earth materials. In the first portion of the unit, fourth graders develop an understanding of cause-and-effect relationships when studying physical weathering and the rate of erosion by water, wind, ice, or vegetation. Students learn that rainfall helps to shape the land and affects the types of living things found in a region, and that living things affect the physical characteristics of a region. Students should make observations of their local environment to observe the types of living things that are common in the region, and they should look for evidence that water, ice, wind, organisms, and gravity have broken down rocks, soils, and sediments into smaller pieces and have moved them from one place to another. In the classroom, students should build and use models that demonstrate how wind, water, and ice cause change to the surface of the earth. Students should use stream tables, soil, sand, and water to simulate the effects of moving water (rain, rivers) on rocks and soil. Following these types of experiences, students need opportunities to ask questions that will lead to further investigations. They can change a variable—such as the type of earth material (sand, soil, clay, silt), the angle of a hill's slope, the volume of water flow, the speed of water flow, and the relative rate of deposition—then collect and analyze data in order to determine the effects.

Possible Student Misconceptions:

All rocks are the same, and it's hard to tell how they originated.

Rocks and minerals are the same thing; distinguishing them is not important.

Humans can fabricate rocks and minerals; artifacts are the same as rocks and minerals.

Minerals are not important to my life.

NGSS Performance Expectations: ***Students who demonstrate understanding can…***

Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.] **(4-ESS1-1)**

Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.] **(4-ESS2-1)**

Analyze and interpret data from maps to describe patterns of Earth's features. [Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.] **(4-ESS2-2)**

Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.] **(4-ESS3-1)**

Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations **Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.** • **Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1)** **Analyzing and Interpreting Data** **Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.** • **Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)** **Constructing Explanations and Designing Solutions** **Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.** • **Identify the evidence that supports particular points in an explanation. (4-ESS1-1)** • **Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2)**	**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)** **ESS2.A: Earth Materials and Systems** • **Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)** **ESS2.B: Plate Tectonics and Large-Scale System Interactions** • **The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2)** **ESS2.E: Biogeology** • **Living things affect the physical characteristics of their regions. (4-ESS2-1)** **ESS3.B: Natural Hazards** • **A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2)** ***(Note: This Disciplinary Core Idea can also be found in 3.WC.)***	**Patterns** • **Patterns can be used as evidence to support an explanation. (4-ESS1-1),(4-ESS2-2)** **Cause and Effect** • **Cause and effect relationships are routinely identified, tested, and used to explain change. (4- ESS2-1),(4-ESS3-2)** --- ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Engineering, Technology, and Science on Society and the Natural World** • **Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)** --- ***Connections to Nature of Science*** **Scientific Knowledge Assumes an Order and Consistency in Natural Systems** • **Science assumes consistent patterns in natural systems. (4-ESS1-1)**

	ETS1.B: Designing Solutions to Engineering Problems • **Testing a solution involves investigating how well it performs under a range of likely conditions.** ***(secondary to 4-ESS3-2)***	

Primary CCSS ELA/Literacy Connections:

English Language Arts/Literacy To support integration of the language arts standards in this unit, students can read content-specific texts to deepen their understanding of the cause-and effect relationships within earth systems. As they read, students should take notes, which can be used to help them understand and explain how earth processes affect the world around them. They should ask questions, such as: What types of soil erode faster? Why do some rocks weather more easily or more quickly than others? What patterns of change can be observed using models? As they attempt to answer these questions, students can cite evidence from observations and from texts to support their thinking. In addition, students can conduct short research projects that will help them gather additional evidence to support explanations. Throughout this unit, students should collect and record data in science journals and analyze the data to identify patterns of change.

- RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-ESS3-2)
- RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on

Primary CCSS Mathematics Connections:

Mathematics To support integration of the Mathematics standards into this unit, students are expected to use mathematics when analyzing quantitative data to identify patterns, explain cause-and-effect relationships, and make predictions. Students need opportunities to measure earth materials using tools, such as balances and graduated cylinders, and to measure distance and heights using rulers and tape measures. Students also will be required to solve problems involving measurements and data.

- MP.2 Reason abstractly and quantitatively. (4-ESS1-1),(4-ESS2-1),(4- ESS3-2)
- MP.4 Model with mathematics. (4-ESS1-1),(4-ESS2-1)(4-ESS3-2)
- MP.5 Use appropriate tools strategically. (4-ESS2-1)
- 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. (4-ESS1-1),(4-ESS2-1)
- 4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money,

Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2) ● RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2) ● W.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS1-1),(4-ESS2-2) ● W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS1-1),(4-ESS2-1) ● W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1)	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-ESS2-1),(4-ESS2-2) ● 4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 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. (4-ESS3-2)

Unit Performance Task:

- Natural resources in your area: page 288 of Investigations Guide
- Art extension project: How earth materials are used for decoration, page 290 of Investigations Guide

Lesson Scope and Sequence			
Unit Pacing and Duration 1 session = 45 min **Readings should be completed at home to maximize class time*	**Focus Standards**	**Main Activities to be undertaken and Primary Materials to be used during lesson**	**Assessment**
# of Sessions: 4-5 **Assessment**: 1 Session, See Assessment Column* **Investigation:** 2-3 Sessions **Reading(s)*:** 1 Session	NGSS: 4-ESS2-1	Primary Resources: **Investigation 1 Part 1: Soil Composition** Students will be able to speculate and identify where different types of soils can be found based upon evidence of weathering. FQ: What is Soil? Science Resource Book: "What is Soil?" Supplements:	Benchmark Assessment: Survey (Foss Web Assessment Masters, Pg 1-8) Embedded Assessment: (See TE Pg 314) Science Notebook entry
# of Sessions: 2 **Assessment**: - **Investigation:** 2 Sessions **Reading(s)*:** -	NGSS: 4-ESS2-1	Primary Resources: **Investigation 1 Part 2: Physical Weathering** Students will be able gather evidence to forma an explanation regarding how rocks break smaller into size. FQ: What causes big rocks to break down into smaller rocks? Supplements:	Embedded Assessment: (See TE Pg 314) Response Sheet
# of Sessions: 3-4 **Assessment**: - **Investigation:** 2-3 Sessions **Reading(s)*:** 1 Session	NGSS: 4-ESS2-1	Primary Resources: **Investigation 1 Part 3: Chemical Weathering** Students will gather evidence to form an explanation regarding how naturally occurring chemical compounds may break down some rocks but not others. FQ: How are rocks affected by acid rain? Science Resources Book: "Weathering" Video: Weathering and Erosion Supplements:	Embedded Assessment: (See TE Pg 314) Performance assessment

# of Sessions: 4 **Assessment**: - **Investigation:** 2 Sessions **Reading(s)*:** 2 Session	NGSS: 4-ESS2-1	Primary Resources: **Investigation 1 Part 4: Schoolyard Soils** Students gather evidence regarding the composition of local soils. FQ: What is in our schoolyard soil? Supplements:	Benchmark Assessment: Investigation 1 I- Check (Foss Web Assessment Masters, Pg 9-14)
# of Sessions: 2 **Assessment**: - **Investigation:** 1 Session **Reading(s)*:** 1 Session	NGSS: 4-ESS2-1	Primary Resources: **Investigation 2 Part 1: Erosion and Deposition** Students gather evidence to form an explanation regarding the ability that water has to move and change different Earth materials while breaking them down. FQ: How do weathered rock pieces move from one place to another? Science Resource Book: "Erosion and Deposition" Supplements:	Embedded Assessment: (See TE Pg 314) Science Notebook entry
# of Sessions: 2-4 **Assessment**: - **Investigation:** 2-4 Sessions **Reading(s)*:** -	NGSS: 4-ESS2-1	Primary Resources: **Investigation 2 Part 2: Stream Table Investigation** Students gather evidence to compare the variables play a role in the deposition of materials and the breakdown of materials in our environment. FQ: How does Slope affect erosion and deposition? How do floods affect erosion and deposition? Video: Weathering and Erosion Online Activities: "Geology Lab: Stream Tables" "Tutorial – Stream Tables: Slope and Flood" Supplements:	Embedded Assessment: (See TE Pg 314) Performance assessment
# of Sessions: 1 **Assessment**: - **Investigation:**	NGSS: 4-ESS2-1	Primary Resources: **Investigation 2 Part 3: Schoolyard Deposition** Students will gather evidence to support a claim regarding whether erosion and deposition caused from rain and water sources is happening in their school yard. FQ: Where are erosion and deposition happening in our schoolyard?	Embedded Assessment: (See TE Pg 314) Response Sheet

1 Session **Reading(s)*:** -		Online Activity: "Virtual Investigation – Stream Tables" Supplements:	
Assessment: 2 Session, See Assessment Column* **Investigation:** 1 Sessions **Reading(s)*:** 2 Session	NGSS: 4-ESS2-1	Primary Resources: **Investigation 2 Part 4: Fossil Evidence** Students gather evidence to support a claim that fossils are more likely to be found in certain types of rocks. Students use fossil evidence to develop an explanation regarding how Earth's surface has changed over time. FQ: How do fossils get in rock and what can they tell us about the past? VIDEO: Fossils Supplements:	Embedded Assessments: Science notebook entry Benchmark Assessment: Investigation 2 I-check (Foss Web Assessment Masters, Pg 15-20)
Assessment: - **Investigation:** 1 Session **Reading(s)*:** -	NGSS: 4-ESS2-2	Primary Resources: **Investigation 3 Part 1: Making a Topographic Map** Students will develop a model to simulate topographic changes on Earth's surface. FQ: How can we represent the different elevations of landforms? Science Resource Book: "Topographic Maps" Supplements:	Embedded Assessment: (See TE Pg 314) Science Notebook entry
Assessment: - **Investigation:** 1 Session **Reading(s)*:** 2 Sessions	NGSS: 4-ESS2-2	Primary Resources: **Investigations 3 Part 2: Drawing a Profile** Students will develop a model to simulate the interior and exterior profile of a mountain range. Students will gather evidence to support a claim that some mountains are formed by volcanic activity. FQ: How can we draw the profile of a mountain from a topographic map? Science Resource Book: "The Story of Mount Shasta" Video: Volcanoes Online activity: Topographer Supplements:	Embedded Assessment: (See TE Pg 314) Response Sheet

Assessment: - **Investigation:** 1 Session **Reading(s)*:** -	NGSS: 4-ESS2-2	Primary Resources: **Investigations 3 Part 3: Mount St Helen Case Study** Students will gather evidence to support a claim regarding the impact that volcanic eruptions can have on the size and shape of a mountain. Students explore the role scientists and engineers play in predicting and mitigating the effects of a volcanic eruption. FQ: How can scientists and engineers help reduce the impact that events like volcanic eruptions might have on people? Video: Mt. St Helen Impact Supplements:	Embedded Assessment: (See TE Pg 314) Performance assessment
Assessment: 2 Sessions, See Assessment Column* **Investigation:** 1 Session **Reading(s)*:** 1 Session	NGSS: 4-ESS2-1	Primary Resources: **Investigations 3 Part 4: Rapid Changes** Students gather evidence to develop an explanation regarding events that can rapidly change Earth's surface. FQ: Why events can change Earth's surface quickly? Science Resource Book: "Its Happened So Fast Supplements:	Embedded Assessment: (See TE Pg 314) Science Notebook entry Benchmark Assessment: Investigation 3 I-Check (Foss Web Assessment Masters, Pg 21-26)
Assessment: - **Investigation:** 2 Sessions **Reading(s)*:** 1 Session	NGSS: 4-ESS3-1	Primary Resources: **Investigation 4 Part 1: Introduction to Natural Resources** Students will gather evidence to support a claim that soil is a valuable natural resource. FQ: What are natural resources and what is important to know about them? Video: Natural Resources Online Activity : "Resource ID" Supplements:	Embedded Assessment: (See TE Pg 314) Response Sheet
Assessment: - **Investigation:** 1 Session **Reading(s)*:**	NGSS: 4-ESS3-1	Primary Resources: **Investigation 4 Part 2: Making Concrete** Students explore one common use of soil as a natural resource to solve a human infrastructure need.	Embedded Assessment: (See TE Pg 314) Science Notebook Entry

1 Session		FQ: How are natural resources used to make concrete? Science Resource Book: Making Concrete Supplements:	
Assessment: 2 Sessions, See Assessment Column* **Investigation:** 1 Session **Reading(s)*:** 1 Session	NGSS: 4-ESS3-1	Primary Resources: **Investigation 4 Part 3: Materials in Use** Students gather evidence regarding how different earth based materials are being used to create the buildings around them. FQ: How do people use natural resources to make or build things? Science Resource Book: "Earth Materials in Art" "Where do rocks come from" Supplements:	Embedded Assessment: (See TE Pg 314) Performance assessment Benchmark Assessment: Posttest (Foss Web Assessment Masters, Repeat Pg 1-8)

Field Trip Ideas: Great Falls National Historic Park, Rifle Camp Park, Sterling Mines, Franklin Mines, American Museum of Natural History
https://geologymuseum.rutgers.edu/museum-events/field-trips
https://eesc.columbia.edu/files/uploaded/file/NY-NJ_MineralTrip_Final_opt(1).pdf

Modifications	
Special Education/ 504:	**English Language Learners:**
• Adhere to all modifications and health concerns stated in each IEP. • Give students a MENU of options, allowing them to choose assignments from different levels based on difficulty. • Accommodate Instructional Strategies: use of post-its, reading aloud text, graphic organizers, one-on-one instruction, class website (Google Classroom), handouts, definition list with visuals, extended time • Allow extra time to complete assignments or tests • Allow students to demonstrate understanding of a problem by drawing a functional model of the answer and then explaining the reasoning orally and/or writing. • Provide breaks between tasks, use positive reinforcement, use proximity • Work in a small group • Use large print books, Braille, or digital texts Strategies for students with 504 plans	• Simplify written and verbal instructions • Use manipulatives to promote conceptual understanding and enhance vocabulary usage • Allow for alternate forms of responses- drawing or speaking instead of writing to demonstrate knowledge when you are not specifically assessing writing • Allow the use of an online dictionary to look up the definition and hear the pronunciation of unknown words • Provide graphic representations, gestures, drawings, equations, and pictures during all segments of instruction • Utilize program translations tools such as Snap and Read (if available) • Utilize graphic organizers which are concrete, pictorial ways of constructing knowledge and organizing information • Use sentence frames and questioning strategies so that students will explain their thinking/ process of how to solve real life problems. • Reword questions in simpler language • Provide class notes ahead of time to allow students to preview material and increase comprehension • Provide extended time

Gifted and Talented:	Students at Risk for Failure:

• Organize and offer flexible small group learning opportunities / activities.
• Utilize elevated contextual complexity
• Inquiry based or open ended assignments, performance tasks and projects
• Allow more time to study concepts with greater depth
• Provide options, alternatives and choices to differentiate and broaden the curriculum.
• Promote the synthesis of concepts and making real world connections
• Provide students with enrichment practice that are imbedded in the curriculum
  ○ allowing students to design problems to be addressed by the class
  ○ allowing students to modify the lesson by introducing a related phenomena
  ○ allow for interest-based extension activities
• Utilize an enhanced set of introductory activities (e.g. phenomena, organizers, concept maps etc)
• Provide whole group enrichment explorations.
• Teach cognitive and methodological skills
• Allow for the use of stations
• Organize integrated problem-solving simulations.
	• Assure students have experiences that are on the Concrete- Pictorial- Abstract spectrum
	• Modify Instructional Strategies; extended time, reading aloud text, graphic organizers, flexible grouping, one-on-one instruction, class website (Google Classroom), inclusion of more visuals and manipulatives, Utilize Scaffolded Questioning, Field Trips, Google Expeditions, Peer Support, Modified Assignments, Chunking of Information, Peer Buddies
	• Assure constant parental/ guardian contact throughout the year with successes/ challenges
	• Provide academic contracts to students and guardians
	• Create an interactive notebook with samples, key vocabulary words, student goals/ objectives.
	• Always plan to address students at risk in the designing of learning tasks, instructions, and directions.
	• Try to anticipate where the needs will be and then address them prior to lessons.
	• Teacher should allow for preferential seating
	• Include Visual Cues/Modeling
	• Allow for technology Integration, especially Assistive Technology

21st Century Life and Career Skills:

Career Ready Practices describe the career-ready skills that all educators in all content areas should seek to develop in their students. They are practices that have been linked to increase college, career, and life success. These skills enable students to make informed decisions that prepare them to engage as active citizens in a dynamic global society and to successfully meet the challenges and opportunities of the 21st century workplace. As such, they should be taught and reinforced in all career exploration and preparation programs, with increasingly higher levels of complexity and expectation as a student advances through a program of study.

https://www.state.nj.us/education/cccs/2014/career/9.pdf

- **CRP1**. Act as a responsible and contributing citizen and employee.
- **CRP2**. Apply appropriate academic and technical skills.
- **CRP3**. Attend to personal health and financial well-being.
- **CRP4**. Communicate clearly and effectively and with reason.
- **CRP5**. Consider the environmental, social and economic impacts of decisions.
- **CRP6**. Demonstrate creativity and innovation.
- **CRP7**. Employ valid and reliable research strategies.
- **CRP8**. Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9**. Model integrity, ethical leadership and effective management.
- **CRP10**. Plan education and career paths aligned to personal goals.
- **CRP11**. Use technology to enhance productivity.
- **CRP12**. Work productively in teams while using cultural global competence.

Students are provided with an equitable opportunity to communicate with peers effectively, clearly, and with the use of technical language. They are also encouraged to reason through experiences and exposure to phenomena that promote critical thinking and emphasize the importance of perseverance. Students are exposed to various mediums of technology, such as digital learning, and educational websites.

Technology Standards:

All students will be prepared to meet the challenge of a dynamic global society in which they participate, contribute, achieve, and flourish through universal access to people, information, and ideas.
https://www.state.nj.us/education/cccs/2014/tech/

8.1 Educational Technology:

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.

A. **Technology Operations and Concepts:** Students demonstrate a sound understanding of technology concepts, systems and operations.
B. **Creativity and Innovation:** Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
C. **Communication and Collaboration:** Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
D. **Digital Citizenship:** Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
E. **Research and Information Fluency:** Students apply digital tools to gather, evaluate, and use of information.
F. **Critical thinking, problem solving, and decision-making:** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming:

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.

A. **The Nature of Technology: Creativity and Innovation-** Technology systems impact every aspect of the world in which we live.
B. **Technology and Society:** Knowledge and understanding of human, cultural, and societal values are fundamental when designing technological systems and products in the global society.
C. **Design:** The design process is a systematic approach to solving problems.
D. **Abilities in a Technological World:** The designed world in a product of a design process that provides the means to convert resources into products and systems.
E. **Computational Thinking: Programming-** Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.