

Unit Title: Earth Materials and Rock Cycles

INSTRUCTIONAL UNIT AUTHORS

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BASED ON A CURRICULUM

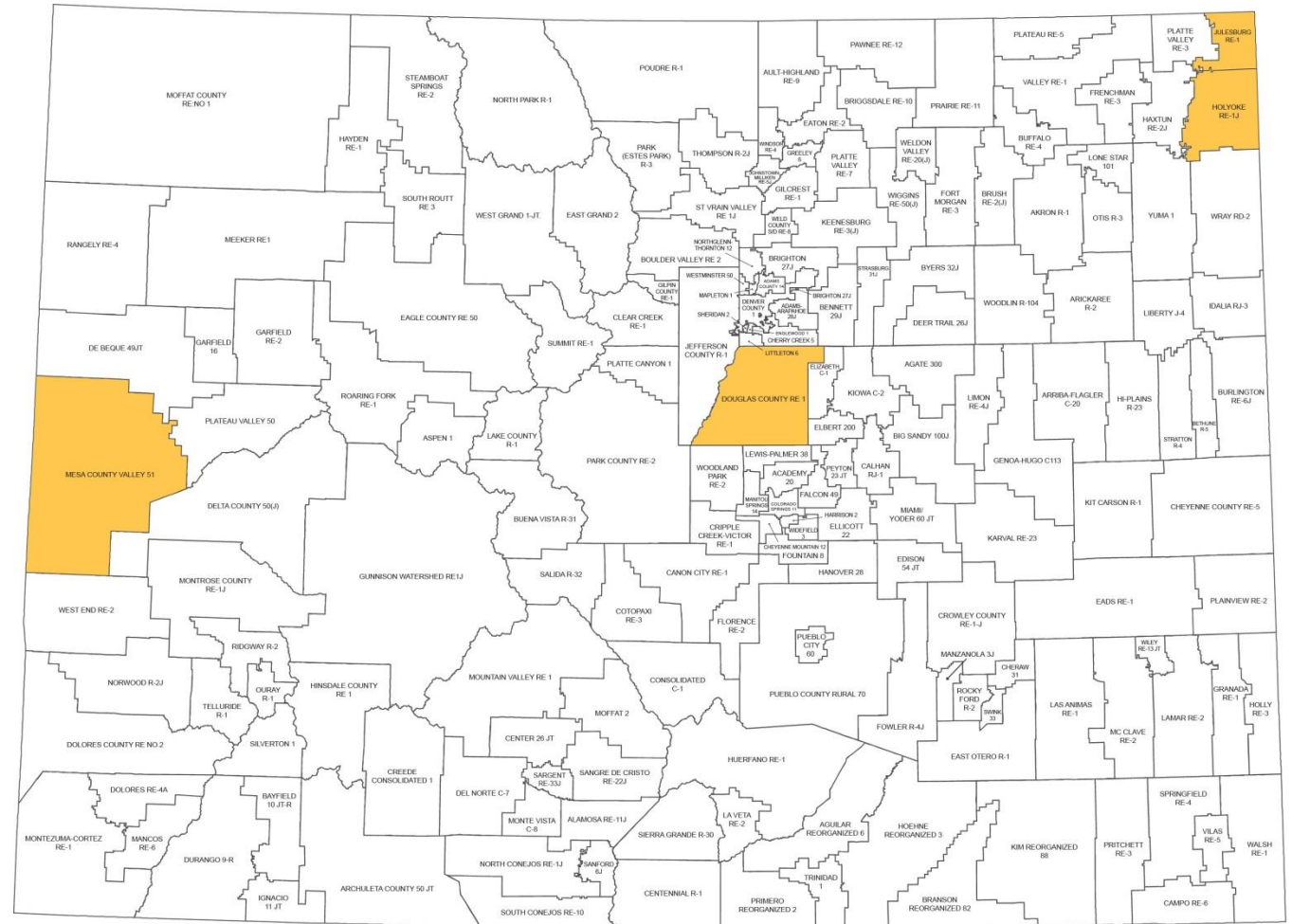
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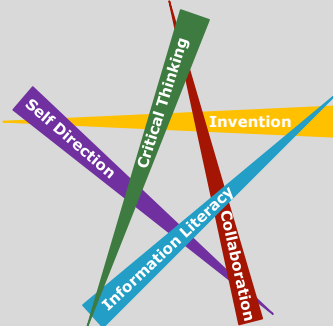
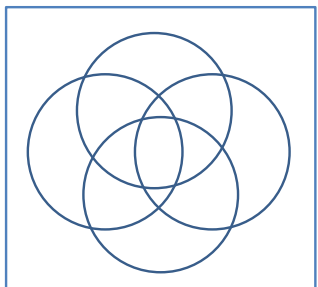


This unit was authored by a team of Colorado educators. The template provided one example of unit design that enabled teacher-authors to organize possible learning experiences, resources, differentiation, and assessments. The unit is intended to support teachers, schools, and districts as they make their own local decisions around the best instructional plans and practices for all students.

Colorado Teacher-Authored Sample Instructional Unit

Content Area	Science	Grade Level	3 rd Grade
Course Name/Course Code			

Standard	Grade Level Expectations (GLE)	GLE Code
1. Physical Science	1. Matter exists in different states such as solids, liquids, and gases and can change from one state to another by heating and cooling	SC09-GR.3-S.1-GLE.1
2. Life Science	1. The duration and timing of life cycle events such as reproduction and longevity vary across organisms and species	SC09-GR.3-S.2-GLE.1
3. Earth Systems Science	1. Earth's materials can be broken down and/or combined into different materials such as rocks, minerals, rock cycle, formation of soil, and sand – some of which are usable resources for human activity	SC09-GR.3-S.3-GLE.1

<p align="center">Colorado 21st Century Skills</p>  <p>Critical Thinking and Reasoning: <i>Thinking Deeply, Thinking Differently</i></p> <p>Information Literacy: <i>Untangling the Web</i></p> <p>Collaboration: <i>Working Together, Learning Together</i></p> <p>Self-Direction: <i>Own Your Learning</i></p> <p>Invention: <i>Creating Solutions</i></p>	<p>Intragrated Curriculum Design: This intradisciplinary approach matches basic elements in each of the science strands – physical, life, earth systems sciences - forming overlaps in instruction of certain topics and concepts in an authentic integrated model.</p> 
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Unit Titles	Length of Unit/Contact Hours	Unit Number/Sequence
Earth Materials and Rock Cycles	3 – 5 weeks	3

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Unit Title	Earth Materials and Rock Cycles		Length of Unit	3 – 5 weeks
Focusing Lens(es)	Change Cause/Effect	Standards and Grade Level Expectations Addressed in this Unit	SC09-GR.3-S.3-GLE.1	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • What would the world look like if the Earth’s surface never changed? (SC09-GR.3-S.3-GLE.1; IQ.3) • If there was only one type of rock would the Earth still be round and have layers? 			
Unit Strands	Earth Systems Science			
Concepts	materials, erosion, weathering, change, rock cycle,			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
The rock cycle breaks down and/or combines Earth’s materials in different ways (SC09-GR.3-S.3-GLE.1-EO.a,b; IQ.1,4; N.2)	What ways can Earth’s materials be broken down or combined? (SC09-GR.3-S.3-GLE.1-EO.a,b; IQ.1,4) What are some of the ways Earth’s materials are formed? (SC09-GR.3-S.3-GLE.1; IQ.1)	How does the type of material determine how it is broken down or combined? (SC09-GR.3-S.3-GLE.1-EO.a,b; IQ.1,4) How do rocks “cycle”? (SC09-GR.3-S.3-GLE.1; IQ.4)
Weathering and erosion brought about by wind and water result in continual changes to the Earth’s surface (SC09-GR.3-S.3-GLE.1-EO.b; IQ.3; N.2)	Where do materials such as soil, sand, and rocks come from? (SC09-GR.3-S.3-GLE.1-EO.b; IQ.2; N.2) What is the process by which the materials were formed? (SC09-GR.3-S.3-GLE.1; IQ.2)	How are the processes similar and different? How can weathering be applied to objects (i.e. rusty nail, new/old wood, car paint)?

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Critical Content: My students will Know...	Key Skills: My students will be able to (Do)...
<ul style="list-style-type: none"> • The ways in which Earth’s materials can be broken down and/or combined in different ways (such as minerals, rocks, soil, and sand). (SC09-GR.3-S.3-GLE.1-EO.a) • The consequences and effects of water and wind on Earth’s materials (SC09-GR.3-S.3-GLE.1-EO.b) • a variety of tools and media sources that could be used to collect and analyze data around earth’s materials (SC09-GR.3-S.3-GLE.1-EO.c) • The rock cycle (SC09-GR.3-S.3-GLE.1; N.1) • Processes that breakdown and/or combine Earths materials (SC09-GR.3-S.3-GLE.1-EO.b) 	<ul style="list-style-type: none"> • Investigate and identify two or more ways that Earth’s material can be broken down and/or combined in different ways such as minerals into rocks, formation or soil, and sand (SC09-GR.3-S.3-GLE.1-EO.a) • Use evidence to develop a scientific explanation about one or more processes that breakdown and/or combine Earth material (SC09-GR.3-S.3-GLE.1-EO.b) • Utilize a variety of media sources to collect and analyze data around Earth’s materials and the processes by which they are formed (SC09-GR.3-S.3-GLE.1-EO.c) • Ask testable questions about the composition and formation of rocks (SC09-GR.3-S.3-GLE.1; N.1) • Use models to demonstrate the rock cycle or other ways Earth’s materials are broken down or combined (SC09-GR.3-S.3-GLE.1; N.2)

<p>Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: <i>“Mark Twain exposes the hypocrisy of slavery through the use of satire.”</i></p>	
<p>A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):</p>	<p><i>The rock cycle is the process of the formation of rocks</i> <i>Fossil fuels are resources that develop over time into useful materials</i></p>
<p>Academic Vocabulary:</p>	<p>investigate, identify, evidence, develop, scientific explanation, processes, demonstrate</p>
<p>Technical Vocabulary:</p>	<p>combined, minerals, rocks, rock cycle, formation, soil, sand, earth materials, surface, resources, fossil fuels, composition, water, wind, sedimentary, metamorphic, igneous</p>

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Unit Description:	This unit focuses on the factors that cause continual change of the Earth surface and the features that can change suddenly because of earthquakes, volcanoes, landslides, floods, or slowly because of weathering and erosion. Some of Earth’s resources include minerals, rocks (sedimentary, igneous, and metamorphic), and soil. The unit includes the rock cycle and how rocks transform due to the effects of changes in pressure and temperature. . Beginning with the layers of the Earth, across the unit students investigate physical features of the Earth’s surface, different types of rocks, components and the formation of soil, minerals, resources, and weathering. The unit culminates in a performance assessment that asks students to capture images of Colorado landscapes that document how the earth is continually changing (Glaciers, landslides, floods, earthquakes, river formation, holes in rocks, cliffs, canyons, rocky mountains, plains, sand dunes, etc.).
Considerations	Teachers need to consider timing of the unit based on how often science is taught during a week and the length of time for each science block.
Unit Generalizations	
Key Generalization:	Weathering and erosion brought about by wind and water result in continual changes to the Earth’s surface
Supporting Generalizations:	The rock cycle breaks down and/or combines Earth’s materials in different ways

Performance Assessment: <i>The capstone/summative assessment for this unit.</i>	
Claims: (Key generalization(s) to be mastered and demonstrated through the capstone assessment.)	Weathering and erosion brought about by wind and water result in continual changes to the Earth’s surface.
Stimulus Material: (Engaging scenario that includes role, audience, goal/outcome and explicitly connects the key generalization)	You are a photographer capturing Colorado images (magazine pictures, internet photos, your own photos, post cards, etc.) of how the Earth is continually changing. You need to compile these images into a photo presentation and include labels of the types of weathering and/or erosion that is occurring or has occurred, as well as labels for the types of rocks found in the images. Then you must explain how the landform may have been created in order to look the way it is. You must present your findings through an oral report.
Product/Evidence: (Expected product from students)	Students must create a photo presentation (photo album, Power Point, visual/video diary, etc.) that captures images of how the earth is continually changing (Glaciers, landslides, floods, earthquakes, river formation, holes in rocks, cliffs, canyons, rocky mountains, plains, sand dunes, etc.) in Colorado. They must label the types of weathering and/or erosion that is occurring or has occurred, as well as label the types of rocks found in the images. Then they must explain how the landform may have been created in order to look the way it is and present their findings through an oral report.
Differentiation: (Multiple modes for student expression)	<ul style="list-style-type: none"> • The teacher may allow students to match weathering and/or erosion and types of rocks labels with pictures • The teacher may provide a vocabulary bank with definitions • The teacher may provide visual representation of vocabulary • The teacher may provide sentence frames • The teacher may allow for one-on-one presentation with teacher • The teacher may allow use of voice-activated presentation • The teacher may allow presentation in native language

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- The teacher may allow for the use of “Speech Journal” application with iPads
- The teacher may reduce the number of landforms examined
- The teacher may provide the landform that the student will investigate

- To extend this work, students could identify the implications for weathering and erosion within their local context (agriculture, mountains, etc.) OR students could write a descriptive paragraph detailing their experiences and observations related to a geographic landmark (they must include concepts of continual change related to weathering and/or erosion).

Texts for independent reading or for class read aloud to support the content

Informational/Non-Fiction	Fiction
<p><i>Investigating Rocks</i> - Will Hurd [Lexile level 940] <i>Minerals</i> - Jenna Dunlop & Adrianna Morganelli [Lexile level 1020] <i>The Rock Cycle</i> - Patricia Brinkman [Lexile level 320] <i>Weathering and Erosion</i> - Lisa Trumbauer [Lexile level 410] <i>How is Soil made?</i> - Heather L. Montgomery [Lexile level 830] <i>What is a Landform</i> - Rebecca Rissman [Lexile level 310] <i>Investigating Landforms</i> - Lynn van Gorp [Lexile level 690] <i>Landforms: The Ever-Changing Earth</i> - Emily Sohn & Adam Harter [Lexile level 820] <i>The Magic School Bus: Inside the Earth</i> - Joanna Cole & Bruce Degen [Lexile level 500] <i>Experiments with Rocks and Minerals</i> - Carol Hand [Lexile level 670] <i>Incredible Earth</i> - Richard Northcott [Lexile level 640] <i>The Big Rock</i> - Bruce Hiscock [Lexile 890] <i>Jump Into Rocks & Minerals</i> - Steve Tomecek [Lexile 860] <i>Jump Into Science: Dirt</i> - Steve Tomecek [Lexile 840] <i>If You Find a Rock</i> - Peggy Christian [Lexile 930] <i>Dirt: Scoop On Soil</i> - Natalie Rosinsky [Lexile 200-900] <i>El suelo: Tierra y arena (Dirt: The Scoop on Soil)</i> - Natalie M. Rosinsky [Lexile 200-900] <i>National Geographic Kids Everything Rocks and Minerals: Dazzling gems of photos and info that will rock your world...</i> - Steve Tomecek [Lexile 230-500]</p>	<p><i>Pandas Earthquake Escape</i> - Phyllis J. Perry [Lexile level 580] <i>The Earth Cries Out</i> - Kenneth McIntosh [Lexile level 900] <i>Rocks in His Head</i> - Carol Otis Hurst [Lexile Level 440] <i>Everybody Needs a Rock</i> - Byrd Baylor [Lexile 430] <i>Roxaboxen</i> - Alice McLerran [Lexile 710] <i>Pebble</i> - S. Milord [Lexile ages 2 and up] <i>Dave’s Down-to-Earth rock shop</i> - S. Murphy [Lexile ages 5 and up] <i>The Jade Stone</i> - Caryn Yacowitz [Lexile age 4 and up]</p>

Ongoing Discipline-Specific Learning Experiences

1.	Description:	Communicating like a scientist: Use academic language and recognize root words	Teacher Resources:	http://www.learnthat.org/pages/view/roots.html (Root words and affix dictionary-medical) http://www.dummies.com/how-to/content/common-latin-and-greek-roots-in-biology-vocabulary.html (Root words and affix dictionary -biology) http://www.dummies.com/how-to/content/common-latin-and-greek-roots-in-biology-vocabulary.html (Biology vocabulary builder website)
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		Student Resources:	http://www.learnthat.org/pages/view/roots.html (Root words and affix dictionary-medical) http://www.dummies.com/how-to/content/common-latin-and-greek-roots-in-biology-vocabulary.html (Root words and affix dictionary -biology) http://www.dummies.com/how-to/content/common-latin-and-greek-roots-in-biology-vocabulary.html (Biology vocabulary builder website)
Skills:	Identify prefixes and suffixes Identify and use cognates Comprehension of academic vocabulary	Assessment:	Students will demonstrate their understanding of key scientific language through white board checks, quizzes, Pictionary, charades, etc.

Prior Knowledge and Experiences
<p>Students must have an understanding of basic land formations, basic types of weather, types of catastrophic events, and an understanding of how to compare and contrast.</p> <p>Vertical Articulation: Students have last seen concepts related to this unit (through weather and seasons) in 2nd grade. This is the first time they have been introduced to the rock cycle.</p>

**Learning Experiences # 1 – 2
Instructional Timeframe: Weeks 1-2**

Learning Experience # 1	
The teacher may use reading material, videos, activities, or technology to introduce the different layers of the Earth so that students can begin identifying the layers of the earth and understanding the composition of the Earth.	
Generalization Connection(s):	The rock cycle breaks down and/or combines Earth’s materials in different ways Weathering and erosion brought about by wind and water result in continual changes to the Earth’s surface
Teacher Resources:	http://www.youtube.com/watch?v=NAHY6965o08 (Video on layers of the Earth) http://www.eduplace.com/kids/hmsc/activities/wordfind/index.html?grade=3&unit=c&chapter=6 (Interactive activities layers of Earth) http://www.eduplace.com/science/hmsc/content/investigate/3/inv_3c_6_1.pdf (Worksheet for Earth’s surface) http://www.youtube.com/watch?v=1B4nRGFHzXs (Bill Nye the Science Guy-Earth’s Crust video) http://science.lotsoflessons.com/layers.html (Contains a variety of resources for the layers of Earth) http://www.brainpop.com/science/earthsystem/earthstructure/ (Brain Pop Earth’s Structure video) http://www.superteacherworksheets.com/rocks.html (Super Teacher Worksheets; contains worksheets with informational articles with comprehension questions, Label Layers of Earth, and Layers of Earth booklet; Membership required)

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Student Resources:	http://www.wartgames.com/themes/science/index.html (Science games by topic) http://www.wicked.org.nz/r/wick_ed/science/spheres.php (Free Flash Games and Presentations for kids; Layers of the Earth) http://www.sciencemonster.com/earth-science/layers-of-the-earth.html (ScienceMonster.com; Layers of the Earth presentation/flipchart with quiz)	
Assessment:	Students will use a graphic organizer to identify and explain the difference among the layers of the Earth by producing a model. http://mjksciteachingideas.com/pdf/EarthFoldable.pdf (Earth layers foldable)	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	http://www.education.com/worksheet/article/color-earth-layers/ (Earth's layers coloring page) The teacher may allow students to work either a partner or small group The teacher may provide the student with pictures of the Earth that they can color in the layers	The student may produce a visual where they colored in the layers of the Earth
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may allow students to investigate the different temperatures within the layers of the Earth	The student may compile their findings (in a chart, graph, or paragraph) around the temperatures of the layers of the Earth and present it to the class
Critical Content:	<ul style="list-style-type: none"> • Layers of the Earth (crust, mantle, core) • Earth's surface 	
Key Skills:	<ul style="list-style-type: none"> • Identify layer of the Earth • Explain the differences between the layers of the Earth 	
Critical Language:	Earth, crust, core, mantle, temperature, identify, explain, layers, surface, model	

Learning Experience # 2	
The teacher may present physical features of the Earth's surface (visuals, models, informational booklet, etc.) so that students can describe Earth's landforms and features.	
Generalization Connection(s):	Weathering and erosion brought about by wind and water result in continual changes to the Earth's surface The rock cycle breaks down and/or combines Earth's materials in different ways
Teacher Resources:	http://www.edu.pe.ca/southernkings/landforms.htm (Examples of landforms) http://www.youtube.com/watch?v=kNc8NTiisUM (Introduction to feature of the Earth) http://www.mapsofworld.com/usa/states/colorado/colorado-river-map.html (Map of Colorado rivers) http://www.eduplace.com/science/hmsc/content/investigate/3/inv_3c_6_2.pdf (Lab activity) http://www.mixbook.com/photo-books/education/abc-book-of-earth-s-physical-features-7967209 (Online pamphlet on Earth's landforms)

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Student Resources:	http://volcano.oregonstate.edu/education/vwlessons/lessons/Ch1CMB/Handson1.html (Hands on representation of the Earth’s layers using an apple) http://www.mixbook.com/photo-books/education/abc-book-of-earth-s-physical-features-7967209 (Online book on land features) http://www.brainpop.com/science/earthsystem/ (Online student games on Earth’s features) http://www.wartgames.com/themes/science/index.html (Science Games for Kids by Topic)	
Assessment:	The student will complete a graphic organizer (cluster web) to demonstrate their understanding of the features of the Earth’s surface and different landforms. http://eltbakery.edublogs.org/2010/01/12/graphic-organizers/ (Cluster web graphic organizer example)	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide a graphic organizer to describe features of Earth’s surface http://www.eisd.net/cms/lib04/TX01001208/Centricity/Domain/599/BubbleMap.pdf (Simple cluster map) The teacher may allow students to work with a partner or small group The teacher may provide students with images of land features	The student may verbally describe land features The student may create a picture of a specific land feature
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may allow students to investigate different landforms using internet, encyclopedia, and other resources to gain deeper understanding of an individual landform The teacher may allow students to compare and contrast Earth’s water features (rivers, streams, ponds, and glaciers that contain fresh water) to understand the similarities and differences of water features http://www.postermywall.com/index.php/p/classroom-posters (Free classroom poster creator)	The students may create a visual representation of the features of the Earth (Diorama, Power Point, Model, etc.) The students may write a descriptive paragraph about the landform The students may create and/or present visuals, posters, or a paragraph that demonstrate the differences between the Earth’s water features
Critical Content:	<ul style="list-style-type: none"> • Features of the Earth (Oceans, Mountains, Valleys, Plains, Plateaus etc.) 	
Key Skills:	<ul style="list-style-type: none"> • Describe Earth’s land features 	
Critical Language:	Features, landform, ocean, continent, investigate, model, mountains, valleys, plains, plateaus, describe	

Learning Experiences # 3 – 4
Instructional Timeframe: Week 3

Learning Experience # 3

The teacher may present videos, a rock chart, or rock samples of different types of rocks (metamorphic, igneous, and sedimentary) so that the students can begin categorizing and classifying them.

Generalization Connection(s):

The rock cycle breaks down and/or combines Earth’s materials in different ways

Teacher Resources:

- <http://www.bwctc.northants.sch.uk/Learning/Science/Rocks/> (Rock identification activity)
- <http://www.cliffshade.com/colorado/rocks.htm#types> (Background information about igneous, sedimentary, metamorphic)
- <https://sites.google.com/site/3rdgradesciencelessons/types-of-rocks> (Uncovering the rock types)
- <http://www.watchknowlearn.org/Video.aspx?VideoID=44185&CategoryID=4761> (Video of rock types & rock cycle)
- <http://prezi.com/8hkggg5p8giu/rocks-and-minerals-3rd-grade-science/> (This Prezi describes the properties of rocks and minerals and how we use rocks and minerals daily includes a YouTube video.)
- <http://teachersites.schoolworld.com/webpages/BBandy/study.cfm> (Smorgasbord of science activities including Rock Jeopardy, Rocks & Minerals Guess the Word PP game, and a mineral PowerPoint to list only a few of the resources available)
- <http://www.readwritethink.org/files/resources/printouts/Venn3Circles.pdf> (Link to a Venn diagram with 3 circles)
- <http://www.bwctc.northants.sch.uk/Learning/Science/Rocks/> (Rock identification activity)
- <http://www.youtube.com/watch?v=9Xv1DoqkARQ> (Bill Nye video on Rocks)
- <http://www.kidsgeo.com/geology-games/rocks-game.php> (Game on rock types)
- <http://www.bwctc.northants.sch.uk/Learning/Science/Rocks/> (Rock identification activity)
- <http://www.youtube.com/watch?v=1mfpmUNMtNc> (World of Rock song video)
- <http://www.youtube.com/watch?v=53IMdHzvGCQ> (Rock Cycle song video)
- http://www.shutterstock.com/cat.mhtml?searchterm=sedimentary+rock&search_group=&lang=en&search_source=search_form (Sedimentary rock images)
- http://www.shutterstock.com/cat.mhtml?searchterm=igneous+rock&search_group=&lang=en&search_source=search_form (Igneous rock images)
- http://www.shutterstock.com/cat.mhtml?searchterm=metamorphic+rock&search_group=&lang=en&search_source=search_form (Metamorphic rock images)

Student Resources:

- <http://www.bwctc.northants.sch.uk/Learning/Science/Rocks/> (Rock identification activity)
- <https://sites.google.com/site/3rdgradesciencelessons/hands-on-project> (Rock hunt activity)
- <http://quizlet.com/353820/science-rocks-3rd-grade-flash-cards/> (Make a “Rock” in a cup hands-on activity)
- <http://quizlet.com/353820/science-rocks-3rd-grade-flash-cards/> (Student resource with basic vocabulary flashcards & study tools)
- <http://quizlet.com/353820/science-rocks-3rd-grade-flash-cards/> (Rocks for Kids – 15 Fun Activities and Ideas that are hands-on includes video link and “edible rock buffet” activity)
- <http://www.bwctc.northants.sch.uk/Learning/Science/Rocks/> (Rock identification activity)
- <http://www.eduplace.com/kids/hmsc/activities/wordfind/index.html?grade=3&unit=c&chapter=6> (Interactive game on rocks)
- <http://www.kidsgeo.com/geology-games/rocks-game.php> (Game on rock types)
- <http://www.bwctc.northants.sch.uk/Learning/Science/Rocks/> (Rock identification activity)

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Assessment:	Students will categorize visuals of rocks as sedimentary, igneous or metamorphic using a T-chart. http://www.worksheetworks.com/miscellanea/graphic-organizers/tchart.html (T-chart graphic organizer)	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may present the student with 3 real rocks from each category and the definitions The teacher may allow students to write vocabulary terms which are associated with types of rock with the definitions	The student may verbally describe the differences between the types of rocks The student may match pictures of the different types of rocks to labels
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide a topographic map, books or internet access for the student to use to research and create a map of Colorado landscape	The student may develop a map of Colorado depicting where the different types of rocks are located
Critical Content:	<ul style="list-style-type: none"> Metamorphic, igneous, sedimentary 	
Key Skills:	<ul style="list-style-type: none"> Categorize, classifying 	
Critical Language:	Metamorphic, igneous, sedimentary, topographic, depicting, Venn diagram, categorize	

Learning Experience # 4	
The teacher may explain how temperature and pressure effect the rock cycle so that student can model the continual process of rock formation.	
Generalization Connection(s):	The rock cycle breaks down and/or combines Earth’s materials in different ways
Teacher Resources:	http://www.watchknowlearn.org/Video.aspx?VideoID=22732&CategoryID=4761 (Rock cycle video includes how rocks brought to Earth by Apollo astronauts have helped scientists understand rocks on Earth) http://www.watchknowlearn.org/Video.aspx?VideoID=52643&CategoryID=4761 (Rock cycle video in Spanish) http://www.kidsgeo.com/geology-for-kids/0025B-rock-cycle.php (Interactive diagram of the rock cycle) http://www.kidsknowit.com/educational-songs/play-educational-song.php?song=Rocks%20And%20Gems%20And%20Minerals (Song about gems and rocks that explains about minerals in rocks) http://www.cotf.edu/ete/modules/mse/earthsysflr/rock.html (Basic diagram of rock cycle- colorful) http://www.mineralogy4kids.org/rock-cycle (Detailed rock cycle picture) http://www.youtube.com/watch?v=XxoSUGlgQFO (Types of rocks and rock cycle) http://www.youtube.com/watch?v=1mfpmUNMtNc (World of Rock song video) http://www.youtube.com/watch?v=53IMdHzvGCQ (Rock Cycle song video)
Student Resources:	http://www.kidsgeo.com/geology-for-kids/0025B-rock-cycle.php (Interactive diagram of the rock cycle) http://www.kidsknowit.com/educational-songs/play-educational-song.php?song=Rocks%20And%20Gems%20And%20Minerals (Song about gems and rocks that explains about minerals in rocks) http://www.youtube.com/watch?v=XxoSUGlgQFO (Types of rocks and rock cycle)

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Assessment:	The student will create an informational brochure or a rock cycle wheel to demonstrate the rock cycle. https://sites.google.com/a/lakeviewlocal.org/mrs-mazur-s-classroom-website/rock-cycle-brochure (Rock cycle brochure) http://www.cpet.ufl.edu/wp-content/uploads/2013/03/Rock-Recycle-Wheel-Teach-the-Rock-Cycle-with-a-Moving-Graphic-Organizer.pdf (Rock cycle wheel)	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide the pictures, labels and/or partially finished flow chart	The student may create a visual dictionary with pictures and a flow chart around the rock cycle The student may match pictures and/or labels of the different types of rocks and their placement within the rock cycle
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may allow students to design “Extreme Makeover” brochures featuring a rock going through the rock cycle. Each brochure needs to advertise three “treatments” where the rock will change during the cycle. Students may start with a rock from a rock collection or select a different one http://www.rocksforkids.com/RFK/howrocks.html#Cycle (More detailed exploration of rock cycle)	The student may present their brochures (construction paper, electronic, etc.) to the class and discuss how the rock was formed and changed through the cycle
Critical Content:	<ul style="list-style-type: none"> Temperature, pressure, rock cycle, continual process, rock formation 	
Key Skills:	<ul style="list-style-type: none"> Model, organize, expression, dialogue 	
Critical Language:	Model, temperature, pressure, rock cycle, continual process, rock formation, model, organize, express, dialogue	

Learning Experiences # 5 – 6
Instructional Timeframe: Week 4

Learning Experience # 5	
The teacher may lead discussions to introduce the various types of Earth’s materials so the students can understand that there are multiple resources on the Earth.	
Generalization Connection(s):	The rock cycle breaks down and/or combines Earth’s materials in different ways
Teacher Resources:	http://www.eduplace.com/graphicorganizer/ (Graphic organizers) http://www.eduplace.com/science/hmsc/content/organizer/1/org_1c_6_2.pdf (Worksheet for Rocks and Minerals) http://www.kidsknowit.com/educational-songs/play-educational-song.php?song=Rocks%20And%20Gems%20And%20Minerals (Song about gems and rocks that explains about minerals in rocks) http://www.kidsloverocks.com/html/activity_books.html (Great website with minerals and activities books to make, great pictures) http://www.brainpop.com/science/earthsystem/soil/ (Video-how soil is made)

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Student Resources:	http://www.kidsknowit.com/educational-songs/play-educational-song.php?song=Rocks%20And%20Gems%20And%20Minerals (Song about gems and rocks that explains about minerals in rocks) http://www.brainpop.com/science/earthsystem/soil/ (Video- how soil is made)	
Assessment:	Students will create a visual word wall for various resources on Earth. http://www.schoolexpress.com/wordwalls/wordwalls.php (Site to create word-wall flash cards)	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may group or pair students	N/A
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	N/A	N/A
Critical Content:	<ul style="list-style-type: none"> Materials, minerals, sand, oil, soil, rocks, resources 	
Key Skills:	<ul style="list-style-type: none"> Present information(resources related to the Earth) Create visuals 	
Critical Language:	Materials, minerals, sand, oil, soil, rocks, resources, create, present, construct	

Learning Experience # 6		
The teacher may present minerals so the students can compare and contrast them by their properties (luster, streak, hardness, etc.).		
Generalization Connection(s):	The rock cycle breaks down and/or combines Earth’s materials in different ways	
Teacher Resources:	http://beyondpenguins.ehe.osu.edu/issue/rocks-and-minerals/hands-on-science-and-literacy-activities-about-rocks-and-minerals (K-5 Hands-On Science and Literacy Activities about Rocks and Minerals) http://www.eduplace.com/graphicorganizer/ (Graphic organizers) http://www.eduplace.com/science/hmsc/content/organizer/1/org_1c_6_2.pdf (Worksheet for Rocks and Minerals) http://science.lotsoflessons.com/rocks.html (Rock resources for teachers)	
Student Resources:	http://wveis.k12.wv.us/teach21/public/iblp/GuideV.cfm?rtype=SSLP&tsele1=3&tsele2=103&upid=3632 (Mystery Mineral Lab activity) http://www.wartgames.com/themes/science/index.html (Science Games for Kids by Topic)	
Assessment:	Students will use a graphic organizer (chart, Venn diagram, etc.) to compare and contrast the different properties of minerals. http://www.eduplace.com/graphicorganizer/ (Graphic organizers)	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may partner students to work on the construction of the Venn diagram	N/A

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Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide lists of national monuments and the student will research the type of mineral(rock) contained in the monument and the rationale used in picking that rock	The student may present their research to the class through a presentation (oral, voice thread, power point, etc.)
Critical Content:	<ul style="list-style-type: none"> Resources, minerals, materials, soil, sand, rocks, oil 	
Key Skills:	<ul style="list-style-type: none"> Present information (resources related to the Earth) Create visuals 	
Critical Language:	Resources, minerals, materials, soil, sand, rocks, oil, create, present	

Learning Experiences # 7 – 8
Instructional Timeframe: Week 5

Learning Experience # 7		
The teacher may create activities centered on the types and components of soil so that students can recognize what soil is and its composition.		
Generalization Connection(s):	Weathering and erosion brought about by wind and water result in continual changes to the Earth’s surface The rock cycle breaks down and/or combines Earth’s materials in different ways	
Teacher Resources:	http://www.soil-net.com/dev/page.cfm?pageid=activities_sheets (Soil activity sheets) http://school.discoveryeducation.com/schooladventures/soil/down_dirty.html (What is the difference between soil & dirt) http://www.brainpop.com/science/earthsystem/soil/ (Video- about how soil is formed) http://www.kidsgeo.com/geology-for-kids/0009-components-of-soil.php (Good informational site on soil) http://www.soils4kids.org/experiments (Soil experiments, games and information)	
Student Resources:	http://www.soil-net.com/primary/ (Video/game for students around the formation and importance of soil) http://thirdgradethinkers8.blogspot.com/2012/05/types-of-soil-investigation-and.html (Types of soil investigation) http://www.brainpop.com/science/earthsystem/soil/ (Video- about how soil is formed) http://www.soils4kids.org/games (Games on soil)	
Assessment:	The students will compare and contrast soil and dirt and categorize the different types of soil. http://www.eisd.net/cms/lib04/TX01001208/Centricity/Domain/599/DoubleBubbleMap.pdf (Thinking map for comparing and contrasting)	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may use illustrations to show soil sequences The teacher may offer sentence frames, word banks, etc.	Students may draw and label a picture of soil layers Students may make a foldable guide that summarizes what he/she learned about soil

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Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may allow students to research the formation and uses of soil using Internet, encyclopedias and other informational text to increase knowledge on soil concepts	Students may create a concept map that summarizes the formation and uses of soil
Critical Content:	<ul style="list-style-type: none"> • Soil is made up of broken down rocks, minerals, and once-living things • Topsoil, subsoil, bedrock, humus 	
Key Skills:	<ul style="list-style-type: none"> • Explore soil and its components 	
Critical Language:	Soil, topsoil, subsoil, bedrock, humus, texture, weathered, sequence, summarize, formation, sand, explore	

Learning Experience # 8		
The teacher may lead discussions around the amount of time it takes soil and other materials to develop into usable resources so that students can deepen their understanding that Earth’s materials are continually changing.		
Generalization Connection(s):	The rock cycle breaks down and/or combines Earth’s materials in different ways	
Teacher Resources:	http://www.eduplace.com/graphicorganizer/pdf/tchart_eng.pdf (T-chart Graphic Organizer) http://www.eduplace.com/science/hmsc/content/organizer/1/org_1c_6.pdf (Natural Resources worksheet) http://www.youtube.com/watch?v=a_6M3CNZRkU (Video for natural resources- renewable and non-renewable) http://www.ecokids.ca/pub/eco_info/topics/energy/ecostats/ (Fossil games, activities, and worksheets) http://studyjams.scholastic.com/studyjams/jams/science/energy-light-sound/fossil-fuels.htm (Video) http://www.teachervision.fen.com/natural-disasters/web-book/71477.html?detoured=1 (Online book on Natural Resources)	
Student Resources:	http://ell.tamucc.edu/files/module_8_activity.pdf (Layers of Soil Investigation--includes an edible soil activity) http://www.ecokids.ca/pub/eco_info/topics/energy/ecostats/ (Fossil games activities)	
Assessment:	The student will create a brochure that provides information on the development and the formation of useable soil.	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide word banks, visuals, sentence frames, dictionaries, T-Charts, etc The teacher may allow small group, one-one, or partner work	N/A
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may allow students to start and maintain a compost pile	The student may keep a composting journal
Critical Content:	<ul style="list-style-type: none"> • Time in relation to earth changes, soil formation, compost 	
Key Skills:	<ul style="list-style-type: none"> • Identify the formation and development of soil 	
Critical Language:	Resources, recognize, create loam, clay, silt, sand, formation compost	

Learning Experiences # 9 – 10
Instructional Timeframe: Weeks 6-7

Learning Experience # 9		
The teacher may lead discussions on natural disasters such as volcanoes, earthquakes, landslides and floods, so that students can recognize how these disasters continually change the Earth’s surface.		
Generalization Connection(s):	Weathering and erosion brought about by wind and water result in continual changes to the Earth’s surface The rock cycle breaks down and/or combines Earth’s materials in different ways	
Teacher Resources:	http://www.teachervision.fen.com/natural-disasters/web-book/71477.html?detoured=1 (Online book-needs subscription) http://www.teachervision.fen.com/natural-disasters/teacher-resources/48771.html (Natural Disasters resources-need membership) http://www.prometheanplanet.com/en/Resources/Item/42590/natural-disasters#.Un0vT8rOE4 (Promethean Flip chart on Natural disasters) http://www.eduplace.com/science/hmsc/content/investigate/3/inv_3c_6_2.pdf (Lab activity for natural disasters)	
Student Resources:	http://www.instructorscorner.org/media/resources/schools/Masters/EDU_Earthquakes/k-2%20Plate%20Tectonics.pdf (Hands on activities looking at changes in the Earth’s surface) http://www.teachervision.fen.com/natural-disasters/web-book/71477.html?detoured=1 (Online book-need subscription) http://www.brainpop.com/science/earthsystem/naturaldisasters/ (Student games and activities) http://www.neok12.com/diagram/Natural-Disasters-01.htm (Online game to identify natural disasters) http://www.wartgames.com/themes/science/index.html (Science Games for Kids by Topic)	
Assessment:	The student will describe in their science notebooks what an earthquake, a volcano, a flood, and a landslide are and how the Earth’s surface changes due to the outcome of natural disasters.	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide visuals, multiple choice, vocabulary words and definitions to list and explain natural disasters The teacher may allow small group or partner	Students may list and/or explain four natural disasters that can cause sudden changes to the Earth’s surface. (verbal, written, matching activity) Students may use images to identify and label natural disasters
Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may allow students to research a recent natural disaster using internet, news reports, etc. to apply information to real-world situations http://moodle.urbandale.k12.ia.us/pluginfile.php/69739/mod_resource/content/1/News%20Article%20Organizer.pdf (News article template)	Students may write a newspaper article on a recent natural disaster and present to the class

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Critical Content:	<ul style="list-style-type: none"> Natural occurrences change the Earth’s surface (earthquake, landslide, volcano)
Key Skills:	<ul style="list-style-type: none"> Recognize how natural disasters continually change the Earth’s surface
Critical Language:	Natural disasters, Earth’s surface, volcano, earthquakes, landslides, floods, demonstrate, recognize

Learning Experience # 10

The teacher may design labs/activities around concepts of weathering and erosion so that students can understand the consequences and effects of water and wind on Earth’s materials.

Generalization Connection(s):	Weathering and erosion brought about by wind and water result in continual changes to the Earth’s surface	
Teacher Resources:	http://www.youtube.com/watch?v=9Xv1DoqkARQ (Bill Nye video on weathering) http://www.brainpop.com/science/weather/weathering/ (Video- on weathering) http://www.brainpop.com/science/earthsystem/erosion/ (Video- on erosion) http://www.geography4kids.com/files/land_erosion.html (Geography4kids.com; Informational text regarding erosion and weathering) http://www.brainpop.com/science/earthsystem/erosion/ (Brain Pop; Erosion video) http://www.brainpop.com/science/weather/weathering/ (Brain Pop; Weathering video) http://academickids.com/encyclopedia/index.php/Erosion (Academic Kids Encyclopedia) http://www.youtube.com/watch?v=9Xv1DoqkARQ (Bill Nye the Science Guy Rocks and Weathering video)	
Student Resources:	http://www.brainpop.com/science/weather/weathering/ (video- on weathering) http://www.brainpop.com/science/earthsystem/erosion/ (video- on erosion) http://www.wartgames.com/themes/science/index.html (Science Games for Kids by Topic) http://www.onegeology.org/eXtra/kids/earthProcesses/weathering.html (NE Geology Kids; contains visuals and informational text regarding weathering and erosion) http://academickids.com/encyclopedia/index.php/Erosion (Academic Kids Encyclopedia) http://science.nationalgeographic.com/science/photos/weathering-erosion-gallery/#/sand-tufa_1179_600x450.jpg (National Geographic Photo Gallery: Erosion and Weathering)	
Assessment:	The student will compare and contrast weathering and erosion and explain the implications of both on the Earth’s materials. http://www.eisd.net/cms/lib04/TX01001208/Centricity/Domain/599/DoubleBubbleMap.pdf (Thinking map for comparing and contrasting)	
Differentiation: (Multiple means for students to access content and multiple modes for student to express understanding.)	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may provide magazines, newspapers, Internet The teacher may allow partner work, small group or one-one The teacher may provide sentence frames and necessary vocabulary The teacher may allow students to find examples of weathering around the school or their homes	Students may use images to describe one example of weathering Students may create a mural that provides examples of weathering and erosion

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Extensions for depth and complexity:	Access (Resources and/or Process)	Expression (Products and/or Performance)
	The teacher may allow students to research how the Rocky Mountains were formed using internet, informational texts, etc. to gain knowledge of Colorado’s land formations	Students may create a poster that represents the formation of the Rocky Mountains
Critical Content:	<ul style="list-style-type: none"> • Effects of Weathering and Erosion on the Earth’s surface (glacier, etc.) 	
Key Skills:	<ul style="list-style-type: none"> • Identify how weathering and erosion have continually changed the Earth’s surface 	
Critical Language:	Weathering, erosion, materials, glacier, consequences, effect, materials, identify, create, describe	