



The Rock Cycle

Rocks & Minerals Unit



Standards Covered

<u>ELA</u>	Math	Science	Social Studies
SL.8.1, L.8.4, L.8.6, L.7.6, SL.6.1, SL.7.1, L.6.6, RI.6.1, RI.7.1, RI.8.1, RI.6.4, RI.7.4, RI.8.4, W.8.9, W.8.8, L.8.4, L.8.6, W.6.8, W.7.8, W.6.9, W.7.9, L.6.4, L.7.4	6.NS.5	6.PS.1, 6.ESS.3, 6.ESS.4, 6.ESS.2, 6.ESS.3, 7.ESS.1, 8.ESS.1, 8.ESS.2, 8.ESS.3, 8.ESS.4, 8.LS.1	SS.8.16



Vocabulary

See *Unit Vocabulary* folder



Text Set

See *Rocks and Minerals Text Set* from the OCALI Lending Library

Note: this kit will be updated soon – print packing list after updated



Materials

Materials for these lessons will be linked within the daily outline – General resource [CKLA Processes That Shape the Earth](#) books and resources



Teaching All Learners Center



Instructional Outline

Week One – Introduction to the Rock Cycle

Day 1 – What is the rock cycle and how does it form new rocks? Watch the [Minerals and Rock Stars](#) PBS video.

Reminder: In previous learning this [Rock Cycle video and diagram](#) we used.

Use the new [Rock Cycle-3 graphic](#) to discuss what is happening above, below and at the Earth's surface during weathering, erosion, movement, pressure and heat events.

Simulation Lab: Use Wikki Stix, Playdoh and/or other malleable, tactile materials to create a tactile model to overlay the printed [Rock Cycle-3 graphic](#) that demonstrates how rocks are formed through in the rock cycle.

Directions: Print colored paper copies of the [Rock Cycle-3 graphic](#) or [Rock Cycle-1 graphic](#) (possibly laminate to reuse)

Earth's surface – Wikki Stix

Day 2 – Continue adding tactile reminders to Rock Cycle graphic

Magma – pink, orange or red sensory dough, slime dough, kinetic sand or cloud dough (use non-toxic doughs only)

Metamorphic rock – crayon shavings of different colors melted under wax paper with a craft iron

Day 3 – Continue adding tactile reminders to Rock Cycle graphic

Igneous rock (crystalized magma) – Make [salt dough](#). Form ½ of dough into rocks that will harden overnight. Save other half in airtight baggie or container for Day 4. DO NOT let it harden.

Day 4 – Continue adding tactile reminders to Rock Cycle graphic

Sedimentation – two hardened flats of salt dough rubbed together to create sediment or crushed dried pasta pieces that are pressed under hardened flats of salt dough to create sediment

Sedimentary rock – playdough layered over salt dough and sediment that is hardened over time and can be broken apart to see layers or sediment pieces

Now that each student has a completed tactile rock cycle model, match examples given in this video with each area within the tactile rock cycle models.

Watch an overview video of [The Rock Cycle](#) (beginning at the 0:22 timestamp) and point to and explore each of the areas within the cycle as Dr. Dave explains how rock is formed, broken down and reformed. Prompt students to point to their visual/tactile model as each part of the process is shown on screen.

Day 5 – Erosion and Deposition

New rock depends on erosion and deposition.



What is erosion? Wind, water and friction can cause erosion that changes Earth's surface. One example of these changes can be seen in Hawaii. The water erosion from rains can be very damaging to the landscape there as seen in this video on [Water Erosion](#) from PSB.

Waterfalls and rivers were mentioned in the video as water erosion. Did you know there are many waterfalls right here in Ohio? Use this [Ohio Waterfalls interactive map](#) showing pictures and locations of each waterfall. Is there a waterfall near you?

Rain, floods, and catastrophic weather events like hurricanes, tornadoes, volcanic eruptions and earthquakes, etc. can also make changes to Earth's surface.

Experiment: [Water erosion simulation](#)

Materials: 2 large pans with sides, 2 bread pans, stack of books, plastic forks, soil to fill 2 bread pans, 2 - ½ gallon jugs of water. Additional options materials rocks, mulch, sand, other materials used locally in landscaping.

Students set up 2 sets of materials. One with "plants". One without.

In the Experiment Journal record

Week Two – Un-Earthing Tectonic Plates

Day 1 - Tectonic Plates Puzzle

Learn about the plates within the [Layers of the Earth](#) video or the [Moving Earth](#) video.

Use the [EarthHow Map](#) to locate where the tectonic plates meet across the globe. Look more closely at the North American Plate. Does it lay under any of the 50 states? Use a [Plate Tectonics puzzle](#) to put the Earth's plates together and see how they move and shift.

Inquiry question: What might happen on the west coast of the United States if/when the plates move?

Day 2 – Begin Tectonic Plates Lab

Simulation Lab: Demonstrate plate boundaries by laying two graham crackers (to represent **Earth's plates**) on top of a layer of red frosting (to represent **magma** - molten rock) on a paper plate, waxed paper or covered tray. Identify the **plate boundary**.

Model what happens to plates at a **transform boundary** when the touching plates slide in opposite directions.

Day 3 – Convergent Plate Boundaries



Model **convergent boundary**. “Convergent boundaries or subduction zones are where two plates collide with each other. Because matter cannot be destroyed, it forces one of the plates into the mantle underneath.” (Earth How). Model a **subduction zone** where the crackers/“tectonic plates” move together (**convergent boundary**) and one overlaps the other (**subduction zone**). One last type of plate boundary is a **transform boundary** where the plates slide next to each other in opposite directions as they grind together creating friction and erosion.

Day 4 – Divergent Plate Boundaries

Model **divergent boundaries**. “Most divergent plates are beneath the oceans and we don’t realize it’s even happening. Lava erupts out from underwater volcanoes at mid-oceanic ridges. If you removed all the water from Earth, these ridges would be the most prominent feature on Earth.” Earth How. Model a **divergent boundary** where the crackers/“tectonic plates” move apart and as they do press down on the plates causing the red frosting to grow up from under the plates to form elevation areas. These elevation areas could force magma upward and produce a volcanic area.

Optional idea to link back to the rock cycle graphic – add a layer of fruit leather with a very thin layer of chocolate/brown frosting over top of the graham cracker “plates” to show how the earth’s surface made of soil, dirt and vegetation may be affected during plate movement.

Day 5 – Bake and Paint Realistic Rock Cookies

Using premade or homemade sugar cookie dough have each student shape their cookie into a desired rock shape. Rocks can be made in a variety of shapes, sizes and textures. Place on cookie sheet with parchment paper labeled with each child’s name. Bake and cool.

Using premade or homemade royal icing frost or dip each cookie in icing and let dry.

Use clean food-safe brushes and allergy free food dyes in black, browns, orange, red, yellow and green to paint cookies. **Use assistive technology tools for painting and baking as needed including pencil/paintbrush grips, slant boards, switch adapted paint spinner or Guided Hands Mobility AT (available in OCALI Lending Library) etc.

Before eating cookies students identify where their “rock” was formed within the Rock Cycle and the type of rock they created. (igneous, sedimentary, metamorphic) And simulate the different types of plate boundary interactions rocks may have. (convergent, subduction, divergent, transform) Now students can eat their cookies or have an alternate snack if allowed.

**One note of caution regarding the Bakers Brigade recipe – they suggest an alcohol base for food colors for painting. Obviously, that would be replaced with water for school use. Additional drying time may be needed with this substitution once cookies are painted.



Week Three – A Deeper Look at the Earth’s Layers

Day 1 – The Earth and Its Spheres

Watch [The Geosphere](#) PBS video. As you listen label the 4 main layers on the *Earth’s Layers*

Notes graphic organizer in the folder.

[Build a Flip Book](#) using 3 pieces of paper. Label each page to represent each of the Earth’s Layers. Fill pages with notes (images, words, sentences) about each layer as students learn each day this week.

Day 2 – The Crust

The crust is wafer thin, only 3 to 22 miles thick. The crust is broken up into enormous sections the size of continents, called tectonic plates. Earthquakes and volcanoes are common along the ridges and gaps between these moving plates.

Day 3 – The Mantle

The mantle is about 1,800 miles thick and is under pressure and therefore denser and hotter than the crust. The upper mantle is hot enough to move at a very slow rate of speed which moves the Earth’s tectonic plates (crust). The inner mantle rises cools and then sinks back toward the core again.

Day 4 – The Outer Core

The outer core is molten and responsible for Earth’s magnetic field.

Day 5 – The Inner Cores & Post Assessment

The inner core is extraordinarily dense, solid metal.

Post Assessment: Use the *Rock Cycle Match and Rock Types Assessment* in folder to gather final knowledge data.





Pre and Post Assessment

Included in the unit plans:

- ☐ Work sample with checklist, rubric, or notes
- ☐ Learning progressions (task analysis) rubric
- ☐ Diagnostic data – specific skill set:
- ☐ Project with rubric

Could be added to the unit plans:

- ☐ Captioned photos
- ☐ Test or quiz in accessible format
- ☐ Audio or video recording with data sheet
- ☐ Benchmark assessment formatted like alternate assessment
- ☐ Other




Providing All Students Access

When planning tools and supports, consider adapting and expanding teaching materials, student materials, technology, and curricular resources.

Student specific supports and services across the tier aligned to this lesson should be pulled from the IEP, RIMP, gifted, 504 plan, behavior plan, ELL plan, diversity profile, etc. Consider assistive technology, instructional strategies, and environmental adaptations.

Designing to the Edges (Tip to Tip)

Universal Tools and Supports	Activity Specific Multiple Means & Differentiated Tools	 Student Specific Supports & AT (*add student initials or code to note individual student supports or SDI)
Examples include: <ul style="list-style-type: none"> • Learning Progression rubric to track own skill development • Test format like AA • Manipulatives • chunking of tasks/items • access to sensory breaks • cues to refocus attention to task • instructions and/or text read aloud 	Examples include: <ul style="list-style-type: none"> • social stories • verbal and/or visual models with appropriate social and transition skills (ex. hands to self, sit in seat, wait in line) • preferential/flexible seating in the classroom to minimize distraction while working on academic tasks 	Examples include: L- <ul style="list-style-type: none"> • flexible seating choice • deep pressure touch i.e. weighted blanket and/or weighted vest as needed, heavy work activities T- <ul style="list-style-type: none"> • sensory chew toys • customized seating

<ul style="list-style-type: none"> • goods and services T chart with sorting cards with pictures and words on each card 	<ul style="list-style-type: none"> • verbal and/or picture prompting to task • instructions and/or texts read aloud • Pictures, visual cues for reading • Boardmaker picture cues 	<ul style="list-style-type: none"> • presentation of communication symbols on the left in a vertical array • choice making with voice output single message switches
<ul style="list-style-type: none"> • videos with CC • music • map of Ohio • transition supports music, movement, objects/materials 	<ul style="list-style-type: none"> • multiple choice selection from an array of word or word+picture choices • manipulatives • flexible seating options • tactile/object choices • sensory supports • reteaching as needed • redirection as needed 	
<ul style="list-style-type: none"> • repetition of instruction • verbal and/or visual cues • visual/auditory timer • Manipulatives • Modeling • information broken down, segmented • chunking of tasks • access to sensory breaks • cues to refocus attention to task • instructions and/or text read aloud 	<ul style="list-style-type: none"> • social stories • verbal and/or visual models with appropriate social and transition skills (ex. hands to self, sit in seat, wait in line) • preferential seating in the classroom to minimize distraction while working on academic tasks • verbal and/or picture prompting • instructions and/or texts read aloud • Pictures, visual cues for reading • Boardmaker picture cues 	<p>C-</p> <ul style="list-style-type: none"> • flexible seating choice • deep pressure touch i.e. weighted blanket and/or weighted vest as needed, heavy work activities <p>D-</p> <ul style="list-style-type: none"> • Wiggle cushion <p>R-</p> <ul style="list-style-type: none"> • reinforcers <p>J-</p>



<ul style="list-style-type: none"> ● adult support to increase independence in the school environment and during classroom tasks ● Paraprofessional to model appropriate behavior, facilitate academic tasks, implement de-escalation strategies 		<ul style="list-style-type: none"> ● adult/peer modeling of appropriate behavior/ appropriate social communication ● adult/peer modeling/facilitation for calming strategies ● Personal communication device ● LAMP- Words for Life program for communication <p>T-</p> <ul style="list-style-type: none"> ● visual models for correct way to form letters and numbers ● picture cues to aide in comprehension <p>W-</p> <ul style="list-style-type: none"> ● visual model for writing
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