



Earth's Layers and History

Rocks & Minerals Unit



Standards Covered

ELA	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, SL.8.5, RI.6.7, W.8.9, W.6.2, W.7.2, W.8.2, L.8.6, W.6.6, W.7.4, W.7.6, W.6.7, W.7.7, W.8.6, W.8.7, L.7.6, SL.7.5, 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	7.NS.3, 8.NS.1, 6.NS.5, 6.NS.6, 6.NS.8, 6.RP.3, 6.RP.1	6.PS.1, 6.ESS.4, 6.ESS.5, 6.ESS.1, 6.ESS.2, 6.ESS.3, 7.ESS.1, 7.PS.1, 8.ESS.1, 8.ESS.2, 8.ESS.3, 8.ESS.4, 8.LS.1	SS.8.16, SS.8.17, SS.7.20, SS.8.3, SS.8.11, SS.7.1, SS.8.15, SS.7.13, SS.6.4, SS.6.6



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





Instructional Outline

Week One – Layers of Fossil History

Want to explore the use of CKLA as an integrated part of this series of lessons? See the [Knowledge 7 Lesson on Fossils](#) modeled by a grade-level teacher. The CKLA [The History of the Earth](#) shared story cards are embedded into the slides used within this video and share ideas through imagery.

Day 1 – Rock Layers and Fossils

Activity: Edible Rock Layers (Superposition): Use graham crackers, animal crackers, different pudding types, dyed coconut, chopped cookies, mini-marshmallows, gummies and sprinkles to represent sedimentary rock layers. Students learn that lower layers are older (were put in first), demonstrating the principle of superposition. Label the outside of the clear container. Add gummy “fossils” to the layers after hearing about the Earth’s surface life during that time period in history.

In a tall clear plastic cup have students add in 1-2 scoops of each ingredient listed below.

Ingredient Layers:

- 1) Finely ground sandwich cookies (sediment layer)
- 2) Gummy sea creatures or shells (early ocean fossils)
- 3) Ground graham crackers (sand)
- 4) Dark chocolate pudding layer (mud, tar or water and pressure layer)
- 5) Chunks of chopped cookies with chips and mini marshmallows inside (broken rock layer from an earthquake, weathering or plate movement)
- 6) Sprinkles (flower and plant fossils)
- 7) Vanilla, butterscotch or pistachio pudding layer (mud or decaying plants)
- 8) Animal cracker (animal fossil)
- 9) Finely ground sandwich cookies (sediment layer)
- 10) Brown pudding (mud) mixed with finely ground sandwich cookies (sediment) = (dirt layer)
- 11) Shredded green coconut (grass)



Note: participation in making sedimentary rock layers for switch users can include the use of a PowerLink and electric tools for mixing (pudding), pouring (switch adapted pouring cups), a chopper or food processor (to break up cookies into sediment and rock chunks), etc.

Get creative! ☺

Day 2 – Earth’s Layers and The Fossil Record

The geologic record is a record of the major events in Earth’s history told within the layers of rock sediment and fossils. Geologists use many laws to help them determine when a specific rock layer was formed and what that time period was like. Let’s watch a [quick video](#) to help us learn more about these laws at a visit to the Grand Canyon. Wow! That was a lot to remember! Let’s focus on the **Law of Superposition**. Remember it is used to determine the age of the rock layers. Younger rock lies closer the surface and older rock is found deeper into the layers. Let’s use the younger and older layers in the Earth to learn about how they form a **Fossil Record**. In the [Fossils: Rocking the Earth](#) video from PBS we can see how rules like the Law of Superposition and fossil discoveries can help us build a timeline back into Earth’s history to show when and how plants and animals evolved over time.

Day 3 – Explore [Life in Ancient Ohio](#)

Let’s dive deeper into fossils. [What is a fossil?](#) And [How does a once living thing become a fossil?](#) What are the different types of fossils? See *Fossil Types notes sheet* in the folder. Look at examples of each type. Sort picture or object examples into the different types if available. And [Where can we find fossils?](#) [Indiana](#) Other states are also available in this video series. Observe changes in the geologic record in Ohio using sedimentary rock layers, fossils, and landforms to reconstruct history. Use the Life in Ancient Ohio poster series to explore and map details about each time period’s plants, animals and environment. Pair the posters with the [Fossil Record Layers](#) diagram to show which time periods are represented in Ohio’s rock layers/fossil record.

Note: share samples of fossils seen in the posters, if available – maybe a guest speaker could bring some in to share a hands-on experience

Activity: Use the [Timeline Cards from the Indiana Geological and Water Survey](#) and the [Fossil Record Layers diagram](#) from [Ohio History Connection](#) (also available in the folder) to match up fossils with the time period they represent. Recap: to match fossil from Ohio to the fossil record timeline, use the [Life in Ancient Ohio Trading Cards](#) and/or [Ohio Fossil Pictures](#) to match to the [Fossil Record Layers](#) diagram.



Day 4 – Make Your Own Fossils or Fake Fossils

Materials: clean milk carton or Styrofoam cup, plaster or clay, shells, flowers, leaves, plastic sea life or prehistoric animals

Follow directions in video or use the screenshot directions in folder to make fossil casts. Let dry overnight.

Note: participation in fossil making for switch users can include the use of a PowerLink and electric tools for mixing (plaster), pouring (switch adapted pouring cups), a rock tumbler (to break up molded clay or plaster), etc. Get creative! 😊

Day 5 – Fossil Dig

Chip through “rock” to discover your models of the fossils that were created (e.g., shells, fern imprints) What type of fossil(s) did we make? See *Fossil Types notes sheet* in the folder.

Imagine that these “fossils” were found within rock layers. Have students infer whether the environment was once salt water (ocean), desert, plant rich land (forest), or freshwater (lake or swamp). Use icons representing the possible environments to use during voting and Q&A.

Note: participation in fossil extraction for switch users can include the use of a PowerLink and electric tools for chipping or a rock tumbler (to break up molded clay or plaster), etc. Get creative! 😊

Week Two – Fossil Record

Day 1 – Glacial Activity in Ohio

How the Ice Age Shaped Ohio, Glacier Groovy Ohio And The Ice Age In Ohio (watch from 1:10-8:36)

Save and print the Fossil Record Layers

Was the rock layering in Ohio disturbed or undisturbed?

Experiment/Simulation: Glacier Race

**The day before the experiment: Fill a small to medium size 4-6inch deep container with pebbles, sand, leaves, dirt and barely cover with water with blue food coloring – leave a few pebbles showing above the water line. Freeze overnight.

The day of the experiment:

1. Remove “glacier” from its container – set aside and let it begin to warm up
2. Set up a large sheet pan with raised sides or paint tray
3. Cover pan/tray in foil.



4. Spray foil with cooking spray.
5. Sprinkle a few cups of flour or dirt across the base of the pan.
6. Raise pan or paint tray up on one side to simulate the slope of a mountain range.
7. Place "glacier" at the top of the slope and push it into the flour/soil
8. Assign a job: have a student, peer or adult photograph the experiment at every stage
9. Gently and slowly apply pressure downward and forward – take picture
10. Pause and repeat Step 9 - taking pictures at every stage - until the "glacier" reaches the bottom of the tray (ocean, river, ravine, obstruction, mountain, rock outcropping, etc.)
11. Ask students the following questions:
 - a. What is happening to the land under the glacier's path?
 - b. What is happening to the land, rock and soil to both sides of the glacier?
 - c. What is happening to the land/rock, soil in front of the glacier?
 - d. What happens to the debris within the glacier as it moves and melts? Weathering and Erosion By Ice How might that effect rock layers, fossils and the fossil record? What might happen to plant and animal life as the glacier moves and melts?
 - e. What will happen to the glacier over time after it reaches its final landing place?
 - f. Based on the videos we watched before our experiment, did you see any evidence in Ohio that tell us a glacier has traveled over our state? What specifically?

Or

Build A Glacier Out of Ice Cream

Day 2 – As a class complete the *Fossil Record Timeline* located in the folder. Students will each have their own copy for notetaking with manipulative symbols representing each of the 4 time periods that have been pre-cut. At each stop on the timeline discuss that was happening on Earth at that time and add an icon to tell what time period it was and add a line from the time period to the event. Pair the timeline with the *Fossil Record Layers* diagram and use an arrow to track the movement up the rock layers toward our present day. Once complete use both the timeline and fossil record diagram as a reference for the lab stations on Day 3.

Note: Pages 6 and 7 in the *Timeline Cards* document provides a table matching the Fossil Record Timeline. Provide a printed or digital copy to students who would like to reference both.

Day 3 – Fossil Dig Timeline - Pictures and Artifacts

Station Rotations:



Given pictures and artifacts of prehistoric species found in the fossil record, determine their age using the historic geologic record provided in the [Fossil Record Layers](#) diagram.

1. Set up stations representing different time periods in history using simulated dig sites (large tubs, trays or pans). Stations are numbered and represent the top layers within the fossil record (youngest artifacts) to bottom of the fossil record (oldest artifacts).
2. Students work with a partner at one of the stations to dig in the sand and rock with a brush and other geology tools to unearth both laminated picture and artifact fossils. Students then record their findings about fossils and artifacts from their layer in their *Fossil Station Lab Sheet* found in the folder with accompanying baggie to hold found artifacts.
3. Based on the artifacts/fossils and rock clues determine the time period of each station's rock layer using the printed [Fossil Record Layers](#) diagram. (Cenozoic, Mesozoic or Paleozoic) Add your answer to the *Fossil Station Lab Sheet* found in the folder.

Day 4 – Imagine A Time

Write a short story about your fossil discoveries and the time period in Earth's history you identified using the fossil record and fossil samples found at your station. Use the *Time Period Story Template* provided in the folder, if needed. Use Unit vocabulary symbols and any pictures from the Fossil Dig Stations to fill in the story template if needed. Add words and text as able.

Task: As a station team, develop a simple story about how you imagine life on Earth during the discovered time period from your station lab. Select specific examples from the fossils your team found to tell the story. Tell the story from the perspective of a narrator who sees and reports all that is happening during the time period.

Day 5 – History In Ohio Rocks!

Visit [accessible hiking trails](#) in Ohio to explore rocky areas where students can explore the earth's surface and discuss the environment using newly learned vocabulary and possibly use geology tools "in the field". View the [Accessible Trails Guide](#) for more information on features to look for before you leave the classroom. Paired with the [Geologic Hiking Guide](#) your class can find a great location to see and explore geology right in your own backyard. The goal is to find an accessible trail with geologic features to explore. Want to see a specific geological feature (fossils, caves, glacial groves, etc.) check out the [Ohio Geology Publication Catalog](#) to locate a visit site.

Or

Field Trip to Ohio History Museum

See specific exhibits: The Nature of Ohio



Or

If an outing is not possible view videos featuring artifacts from within the Ohio History Center Museum.

[Ice Age Giants of Ohio](#)

[A guide to Mammal Teeth found in Ohio](#)

Or take a [Virtual Tour of the Ohio History Center](#)





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, EL 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• verbal and/or picture prompting to task	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• sensory chew toys T- <ul style="list-style-type: none">• 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"> • 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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