

Lesson Topic: The Fossil Record

Objective:

Students will be able to:

1. Identify the relative age of rock layers.
2. Define the fossil record.
3. Explain information that the fossil record can tell us about the history of life on Earth.

Time Required: 85 minutes

Materials Needed:

- 5-6 colors or types of sand (available at Walmart and craft stores)
- Glass graduated cylinder
- Spoon
- Water
- Funnel
- Teacher computer with internet access
- Projector/Smartboard
- 1 computer/laptop/iPad per student with internet access
- The Fossil Record handout (attached)

Teacher Preparation:

- Assign a Legends of Learning Instructional [Quick Play](#) playlist for the day(s) you will be teaching the lesson.
 - Instructional - Middle School - The Fossil Record
- Assign a Legends of Learning Content Review [Quick Play](#) playlist for the day(s) you will be teaching the lesson.
 - Content Review - Middle School - The Fossil Record
- Make copies of The Fossil Record Handout (1 per student)
- Gather materials for the layers of sedimentary rock demonstration

Engage (20 minutes):

1. Tell students that sedimentary rocks form in horizontal layers. Often, these rocks begin as sediment that are carried by rivers to oceans and lakes. Then, once these sediments reach the bottom of the ocean or lake, they become cemented into rock over time.
2. Tell students you are going to demonstrate the relative ages of rock that form in water.
3. At the front of the class, have a student volunteer fill the graduated cylinder about halfway with water. Tell students that this represents a lake or ocean.
4. Ask another student volunteer to pour a spoonful or two of one color of sand.
5. Tell all students to record their observations in their notebook.
6. Repeat steps 4 and 5, using a different color/type of sand each time until you have used each type.
7. Ask students "Which color of sand represents the oldest layer?" (the bottom)
8. Ask students "Which color of sand represents the youngest layer?" (the top)
9. Ask students "How old are the middle layers compared to the top layer?" (the middle)

layers are older than the top layer”

10. Ask students “How old are the middle layers compared to the bottom layer?” (the middle layers are younger than the bottom layer.”
11. Ask students “What happened to the sand when it was poured into the cylinder?” (it fell through the water and settled at the bottom)
12. Tell students that these layers of sand represent the *relative* age of rock, which is the age of the rocks compared to other rocks. Scientists can determine the relative age of fossilized organisms based on the relative age of the layer of rock it was formed in.
13. Show students [this](#) image of the Grand Canyon, which shows several different layers of sedimentary rock. Ask the questions again “Which layers do you think are the oldest, and which are the youngest?”

Explore (30 minutes):

1. Have your students [sign in to Legends of Learning](#). Instruct students to complete the Instructional playlist.
2. As students complete the assigned game, students should fill out the The Fossil Record Handout.
3. Assist students as needed during game play, pause playlist if you need to address content or questions to the entire class.

Explain (10 minutes):

1. Review answers to The Fossil Record Handout by writing the answers on the SmartBoard.

Elaborate (15 minutes):

1. Tell students conditions have to be just right in order for an organism to become fossilized.
2. Show [this](#) video on becoming a fossil (2:34 minutes).
3. Tell students to take notes on the processes that took place in order for Lucy to become a fossil as they watch the video.
4. After the video, discuss the process with students.
 - a. Lucy’s body settled in a body of water, and was not consumed by a predator.
 - b. Her bones settled in the mud and her bones were buried by sediment over thousands of years.
 - c. The calcium in her bones were replaced by minerals in the sediment deposits, turning her bones into stone.
 - d. The movement of Earth’s crust over millions of years forced her body to the Earth’s surface. Weathering and erosion helped expose her fossil.

Evaluate (10 minutes):

1. Have your students [sign in to Legends of Learning](#). Instruct students to complete the Content Review playlist.
2. [Analyze student results](#) to determine what concepts need to be a focus for reteaching.

Additional Lesson Strategies:



- To use Legends for additional instruction, create a [custom playlist](#) with an [instructional game](#) and pre and post [assessment](#).
- To use Legends for a quick formative assessment, create a 5-question [assessment](#) in a [playlist](#).
- To use Legends for a student-directed experience, create a [targeted freeplay](#) playlist.
- Encourage students to play on their own at home in [Legends of Learning: Awakening](#) for a student-driven experience including avatars, battling, and quests all centered around topics they are covering in class.



The Fossil Record

1. What is the fossil record?
2. Determining a rock's age by testing for radioactive isotopes in rock layers is called _____.
3. Determining the age of one fossil compared to another is called _____.
4. What information can the fossil record tell us?
5. What are some ways fossils form?



The Fossil Record

Teacher Key

1. What is the fossil record?
 - a. The collection of fossils and their placement in rock layers in chronological order.

2. Determining a rock's age by testing for radioactive isotopes in rock layers is called **absolute dating**.

3. Determining the age of one fossil compared to another is called **relative dating**.

4. What information can the fossil record tell us?
 - a. what type of species existed and when
 - b. how species changed over time (evolved)
 - c. how species are related

5. What are some ways fossils form?
 - a. mineralization, casting, carbonization, and molding