

Lesson Topic: Reconstructing Evolutionary History Using Fossils**Objective:**

Students will be able to:

1. Use fossils to decipher information about prehistoric organisms.
2. Dig up a fossil and use the fossil as a clue into the history of organisms of the past.
3. Reconstruct the evolutionary history of whales.

Time Required: 80 minutes**Materials Needed:**

- Teacher computer with internet access
- Projector/Smartboard
- 1 computer/laptop/iPad per student with internet access
- Reconstructing Evolutionary History Using Fossils handout (attached)
- Fossil Article: [Fossil of ancient four-legged whale with hooves discovered](#)
- Empty mason jar or bowl (1 per group)
- Paper plates (1 per group)
- Sand/dirt (enough to fill 1 jar/bowl per group)
- Plastic spoons (1 per group)
- Shells (Or other small objects that will not get ruined in sand: marbles, paperclips, etc).

Teacher Preparation:

- Assign a Legends of Learning Instructional [Quick Play](#) playlist for the day(s) you will be teaching the lesson.
 - Instructional - Middle School - Reconstructing Evolutionary History Using Fossils
- Make copies of Reconstructing Evolutionary History Using Fossils Worksheet (1 per student)
- Prepare the bowl or mason jars by filling them with sand and putting in small shells or other items throughout the container for students to find.
 - 1 jar/bowl per group

Engage (10 minutes):

1. Pass out the Reconstructing Evolutionary History Using Fossils handout.
2. Show students the image of the Fossil (attached).
 - a. Tell students “This is an image of a fossil or an organism that lived nearly 500 million years ago.”
3. Tell students “With a partner, I want you to use this fossil to answer the questions in Part 1 of the handout.”
4. When students finish, tell them that we will revisit this fossil later on in class.
5. Tell students “When scientists find fossils, the fossils do not come with all the answers. They have to use the fossils as clues to the history of past organisms. It’s kind of like a mystery.”

Explore (20 minutes):

1. Have your students [sign in to Legends of Learning](#). Instruct students to complete the Instructional playlist.
2. Assist students as needed during game play, pause playlist if you need to address content or questions to entire class.

Explain (15 minutes):

1. Put up the image of the fossil again, and discuss the questions from Part 1 of the handout together as a class.
 - a. Answers will vary because it is all speculation from the fossil. Students will probably mention the armor it appears to have, the many legs it has. Some may assume it lived in the water. It looks similar to a lobster or some kind of bug.
2. Tell students “This is a trilobite and it did live on earth over 500 million years ago. When scientists find fossils like this, they have to try and use it as clues to piece together the history of an organism that no longer exists. By learning about these fossils it can help us to understand more about what the Earth was like long ago.”
3. Here’s what scientists now know about the trilobite:
 - a. It is a water creature and the seas were full of trilobites ranging in size from teeny tiny to quite large.
 - b. They crawled along the ocean floor in search of food, but could also swim.
 - c. It is an arthropod like today’s crab or spider.
 - d. They became extinct 250 million years ago.
4. Paleontologists are scientists that dig up fossils. Paleontologists use fossils to help tell the story of past organisms and what roamed the Earth millions of years ago.”

Elaborate (20 minutes):

1. Put students into small groups (be sure you put in enough objects so that each person in the group can find at least one item (fossil)).
2. Tell students ‘In a moment you will be conducting your own fossil dig. You will be getting a container of sand/dirt and inside you will have to find a fossil. Use the spoons I give you to dig, do NOT just empty it out.
 - a. Place the uncovered fossils on the paper plate.
3. Once students find their fossils, tell them to answer the questions on their handout.

Evaluate (15 minutes):

1. Read the following [article](#) aloud to students.
 - a. Tell students they are free to take notes if they so choose.
2. After you finish reading, have the students answer the questions on their handout.

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.



Name: _____

Reconstructing Evolutionary History Using Fossils

Part 1:

Using the fossil on the board, try and answer the following questions.

1. How did the organism live?
2. How did it move?
3. Where did it live?
4. What type of present day organism do you think it is related to?
Why?

Part 2:

Pretend you are a paleontologist. The fossil is an unknown object that you truly found on a dig. Answer the questions based on the characteristics of your fossil.

1. Describe your fossil (Color, texture, shape etc).
2. Where would your organism live?
3. How would it move?
4. What type of present-day organism would it be related to? Why?

Part 3:

After hearing about the Peruvian Whale fossil answer the following questions:

1. What did the fossil tell scientists about the ancestry of whales?
2. What are some of the whale's features that the scientists learned from the fossil?
3. What can scientists learn from fossils?

Fossil Image - this organism lived 500 million years ago.



[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)



Part 3: KEY

After hearing about the Peruvian Whale fossil answer the following questions:

1. What did the fossil tell scientists about the ancestry of whales?

That whales once had legs and walked on land. They were able to spend time on land to mate and give birth.

2. What are some of the whale's features that the scientists learned from the fossil? **They had powerful tail, webbed feet, and hooves.**

3. What can scientists learn from fossils? **They are able to use the fossils to learn how the organisms moved, what they looked like, physical features they had, where they lived, what they ate, etc. They can learn about organisms that no longer live on Earth as well as how organisms have changed that still exist on Earth.**