

## Lesson 10. What Can Fossils Tell Us About the History of Present-Day Organisms?

### Plan Lesson 10

In the last lesson, students began to explore evidence about how organisms change. In addition to the evidence in the miroungas story, students looked at the evidence provided by fossils. They reviewed how fossils were formed, how the layer in which a fossil lies tells us about when the fossil organism lived, and considered how a fossil pilosa fit into the story told in the mirounga animation.

Today, they address the investigation question

[What can fossils tell us about the history of present-day organisms?](#)

The students examine and describe the features of 4 types of fossils (3 physical and 1 photo): turritella snails, ammonites, trilobites, and archaeopteryx. They consider these alongside reconstructions of what scientists think the fossilized animals looked like, pictures of present-day relatives, and the layers drawing previewed in Lesson 9. Using this information, they infer information about the fossil organisms, their environments, and how much they have changed over time.

By the end of this lesson, students will be able to identify and use the evidence fossils provide of organisms that lived long ago to describe how organisms have changed over time, and the extent to which different organisms have changed.

### Learning Targets in this Lesson

- Fossils provide evidence of how organisms have changed over time.
- Present-day animals and their present-day environments can help us interpret fossil evidence.

Sequence of Experiences		
<b>1. Introduction</b>	 All class	 5 Minutes
<b>2. Investigate Fossils Activity</b>	 Small groups	 25 Minutes
<b>3. Make Meaning</b>	 All class	 10 Minutes
<b>4. Wrap Up</b>	 All class	 5 Minutes

## Materials

### For the class

Investigation questions  
Slide deck for this lesson

### For the fossil stations

**Note – you can pull layers images from L9 to use in this lesson.**

#### Ammonite station

- Reconstruction/Present Day Relative sheet
- Ammonite fossils
- Layers image

#### Trilobite station

- Reconstruction/Present Day Relative sheet
- Trilobite fossils
- Layers image

#### Turritella station

- Reconstruction/Present Day Relative Sheet
- Turritella fossils

#### Archaeopteryx station

- Reconstruction/Present Day Relative Sheet
- Photo of Archaeopteryx fossil
- Layers image

### For each student

Notebook pages 20-23

## Preparation

- Set up fossil stations around the classroom
- Make sure that you recognize each fossil type
- Review the picture cards of present-day organisms, fossil reconstructions, and the fossil layer illustration

## The Lesson

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### 1. Introduction

 All class  5 Minutes

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Remind students that in the last lesson, they began to think about fossils. They explored what other evidence — in addition to the miroungas storybook — there might be about the history of how organisms change and how new species emerge. Remind students that “species” refers

to populations that are so different they can't have babies with each other. They reviewed how fossils were formed and considered how a fossil pilosa found on Mirounga Island fit into the story.

Today, they will continue to look at fossil evidence that scientists use to put together natural selection histories just like the one that described how miroungas evolved from piloses. These are real fossils that collectors have found, and each *is thousands and thousands of years old*.

Today's investigation question is:

- *What can fossils tell us about the history of present-day organisms?*

Project the fossil layers drawing.

Remind students that fossils are found in layers of rock. Project the image of the rock layers and ask students the following questions to check their understanding:

- *Which is the oldest layer?*
- *Which is the most recent layer?*
- *Can you find two kinds of plants or animals that lived at the same time?*
- *What do you think the environment was like when the living things in this layer were alive?*

Explain that scientists use fossils and the other remains of dead organisms found in the same rock layers to find clues about the history of present-day organisms. Tell students that they will use fossils and a picture of fossil layers, as well as their knowledge of present-day animals, to figure out:

1. What environment the fossil animal might have lived in many thousands of years ago
2. Which parts of the animal fossilized
3. How the fossil organism may have changed over many thousands of years

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## 2. Investigate Fossils

 Small groups and  All class  25 Minutes

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Explain to students that there are 4 stations in the classroom. At each station there is:

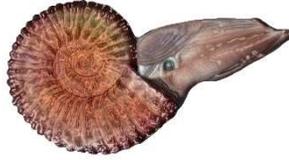
1. Examples of a fossilized organism (or picture of one).



[Left to Right: Turritella, Ammonite, Trilobite, Archaeopteryx]

2. A sheet with pictures of what scientists think the animal looked like and present-day relatives of those animals (example below):

**Ammonite**  
What Scientists Think It Looked Like



Present Day Relative



3. A picture that shows the fossil layers that scientists have discovered that may give them some evidence about the long-ago environment that the fossilized organism lived in (as shown in L9. This sheet is not needed for the turritlella station)

Tell students they will have time to visit each station. They should bring their notebooks with them and answer the questions on pages 20-23.

Lesson 10: What are fossils and what do they tell us about the history of present-day organisms?

**Turritlella Station!**

Look at the fossil. What part fossilized?

The \_\_\_\_\_

How much have turritlellas changed over thousands and thousands of years?  
(Circle your answer)

Not at all    Not much    A little bit    Some    A lot

What does the environment of the present-day turritlella tell us about the fossil's environment? Long ago? How do you know?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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Lesson 10: What are fossils and what do they tell us about the history of present-day organisms?

**Ammonite Station!**

Look at the fossil. What part fossilized?

The \_\_\_\_\_

Look for ammonite fossils in the fossil layer shown. What environment did ammonites live in? How do you know?

\_\_\_\_\_

\_\_\_\_\_

Do you think the present-day organism is different enough to be called a new species?

Yes    No

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Lesson 10: What are fossils and what do they tell us about the history of present-day organisms?

**Tribble Station!**

Look at the fossil. What part fossilized?

The \_\_\_\_\_

Look for tribble fossils in the fossil layer shown. What environment did tribbles live in? How do you know?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

There are no tribble fossils in the upper layers. Why do you think that is?

\_\_\_\_\_

Lesson 10: What are fossils and what do they tell us about the history of present-day organisms?

**Archaeopteryx Station!**

Look at the fossil. What part fossilized?

The \_\_\_\_\_

Look for an archaeopteryx fossil in the fossil layer shown. What environment did it live in? How do you know?

\_\_\_\_\_

\_\_\_\_\_

Do you think the knowledge we have is different enough to be called a new species?

Yes    No

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Explain that first you will model how they will observe the fossils, using a fern as the example. Show the following slide:

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How does this fossil plant compare to present-day plants?



What part fossilized?

Where do ferns live today? Where do you think they lived long ago?

How much have ferns changed over thousands and thousands of years?

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Ask students:

- *What part fossilized?*  
(Fern leaf)
- *Where do ferns live today? Where do you think ferns lived long ago?*  
(They live in forests now. They probably lived in forests long ago. I think so because the present-day fern looks just like the fossil fern. This means that ferns have not changed at all, and I know from the 6 key steps that species change when the environment changes [or die out])
- *How much have ferns changed over thousands and thousands of years?*  
(Not very much)

Give students 25 minutes (about 6 minutes at each station) to examine and discuss the fossils and pictures in their small groups. Circulate to answer questions and see that students are on track.

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### 3. Make Meaning



All class



10 minutes

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Purpose of the discussion: to pull together students' observations and ideas to infer — just as scientists do — what organisms existed on Earth long, long ago when there were no humans around to observe them, what the environment was like then, and what relationships some of them have to present-day organisms. Students will do this by answering questions about key concepts for each of the fossils they observed. Each question appears on its own slide – make sure to project these, as students will need materials on the final slide to answer questions about the Archaeopteryx.

**Ammonite:**

- *Do you think the present-day organism is different enough to be a new species? What's the evidence?*

**Trilobite:**

- *There are no trilobite fossils in the upper rock layers. Why do you think that is?*

**Turritella:**

- *How much have turritellas changed over thousands and thousands of years? (not at all, not much, a little bit, some, a lot)*

**Archaeopteryx:**

- *Look at the archaeopteryx fossil in the rock layers. What was its environment like?*

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**4. Wrap Up**

All class

5 Minutes

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Ask students what ideas and information they will “take away” from today’s lesson to decide what they should record on the Takeaways Chart.

Listen for these ideas. Use student language as much as possible when you write them on the Takeaways Chart:

- Fossils can tell us about what organisms used to be like.
- The rock layers where fossils are found can tell us about the environment where the organism lived long ago.
- Some animals changed a lot and are now new species. Other animals did not change very much.
- Some animals that lived long ago no longer live on Earth (they are extinct).

Our question for next time is:

*How do scientists use fossils to tell the story of evolution?*