# BENEATH OUR FEET

### **TEACHER GUIDE**



### PLANNING

Here's a suggested schedule for this kit! The activities are designed to be completed in order, but you can decide when to do them over time. Required times are estimated.

	SECTION (S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY I: FASCINATING FOSSILS			
Propose an explanation for a perplexing fossil find.	□How'd Those Get There?	30 minutes	Day 1
Time required: 30 min			
ACTIVITY 2: DIG INTO HISTORY	□Fossil Secrets	30 minutes	Day 2
Dig up real fossils and learn how fossils	Dig It!	45 minutes	Day 3
Time required: 2 h	☐ Follow the Fossils	45 minutes	Day 4
ACTIVITY 3: LAYERS UPON LAYERS	Rock and Fossil Connection	45 minutes	Day 5
Model the rock cycle and Earth's internal structure.			

Time required: 1 h 30-

Full schedule available with purchase

# FASCINATING FOSSILS

The fossils hidden in the rock layers of Earth hold many secrets, including what happened while we were not around to observe it. These secrets can be surprising, as your student will see in this activity.

### HOW'D THOSE GET THERE?

#### CONTENT

• Your student will be introduced to a fossil type called Mesosaurus, which has been found on both sides of the Atlantic Ocean.

• In a later activity, this phenomenon will be explained by the concept of continental drift.

- Continental drift is the process by which tectonic plates, driven by mantle convection, slowly move.
- While not mentioned to the student, continental drift is thought to be the cause of supercontinent formation and breaking apart.
- The vocabulary term fossil is defined.

#### THINK ABOUT IT!

Question 1: Why do you think fossils from the same species have been found on two sides of an ocean?

Answer: Answers will vary.

#### How to Help:

• This is a speculative question.

• The student may propose answers including things like swimming, flying, or other animals moving them, despite the inability of these organisms to do those things. That is fine for this question; do not confirm or reject their answers at this point.

#### **Question 2: What questions do you have about these findings? Answer:** Answers will vary.

**How to Help:** *Encourage your student to ask questions about the ancient past and what may have happened in terms of both biology and geology.* 

### **Question 3:** What sort of fossils would you expect to be found on two sides of an ocean? Why?

**Answer:** Birds or fish would be likely candidates since they do not need continuous landmasses to travel.

# DIG INTO HISTORY

One of the things fossils can tell us about is the history of a local region. In this activity, your student will use the fossils found in an area to make conclusions about its past.

LEARNING GOALS:

I can use rock and fossil evidence to explain how landscapes have changed over time.

#### Answer

- The storyboard should show the area:
  - starting as dry land (the layer furthest down was the oldest and had only land fossils)
  - changing to partially covered with water (the middle layer is the next oldest and had both land and aquatic fossils)
  - changing to completely covered with water (the youngest, top layer has only marine fossils)

• changing to dry land relatively recently (since it is no longer covered in water) **How to Help** 

• The most difficult part of this is understanding that the oldest layer is the one on the bottom. Once that is established, the exercise should be easier.

• Additionally, make sure your student understands that the fossils show what the organisms were like when the rock formed.

LAYERS UPON LAYERS

Fossils are useful in understanding how an area changed over a long period of time. Fossils are often used to provide explanations for what happened when a particular rock layer was formed.

#### LEARNING GOALS:

I can use rock and fossil evidence to explain how landscapes have changed over time.

I can use evidence to show that the interior of the earth consists of multiple layers with different characteristics.

### ROCK AND FOSSIL CONNECTION

#### Fossils in the Rock Cycle

- This subsection details the relationship between fossils and rocks.
- The vocabulary term index fossil is defined.

#### THINK ABOUT IT!

### **Question 1:** Why do you think different fossils do not show up across all rock layers?

**Answer:** Certain organisms may only be alive for limited periods of time. In addition, once rock layers form, they tend to stay separate and not mix.

**How to Help:** This question requires that the student understand that fossils cannot move through rock layers after they are formed; the rock layers they are in may be eroded or uplifted, but a fossil cannot switch which layer it is in.

### **Question 2: Why do you think that only fossils with a large geographical area qualify as index fossils?**

**Answer:** Fossils can only be used as a reference if they are widely available. In other words, if they do not show up in very many places, they will not be reliable as a comparison.

**How to Help:** An index fossil must be present in many locations for it to be used as a comparison.

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