

# Lessons 6–8

## Fossil Evidence

### Prepare

In this set of lessons, students continue to explore the Focus Question for Concept 1: **What do fossils reveal about the past?** In Lesson 6, students observe fossils and analyze and interpret data to describe the past environment of the Florissant area. In Lesson 7, students observe patterns in the kinds of organisms that live in the Florissant area today to recognize that the environment of this area has changed over time. In Lesson 8, students compare the past environment of the Florissant area with the present-day environment to better understand how the environment has changed over time. In a Conceptual Checkpoint, students use fossil evidence to construct explanations about what the environment of another area was like in the past.

### Student Learning

#### Knowledge Statement

Fossils provide evidence of the nature of organisms and environments from long ago.

#### Objectives

- Lesson 6: Observe fossils to learn about the past environment of the Florissant area.
- Lesson 7: Observe organisms that live in the Florissant area today to understand that the environment has changed over time.
- Lesson 8: Compare the past environment of the Florissant area with the present-day environment to explain how the environment has changed over time.

### Concept 1: Fossil Evidence

#### Focus Question

What do fossils reveal about the past?

#### Phenomenon Question

What do fossils found near the butterfly fossil reveal about the Florissant area?

## Texas Essential Knowledge and Skills Addressed

- 3.2D **Analyze and interpret patterns in data to construct reasonable explanations based on evidence from investigations.** (Addressed)
- 3.2F **Communicate valid conclusions supported by data in writing, by drawing pictures, and through verbal discussion.** (Addressed)
- 3.3A **Analyze, evaluate, and critique scientific explanations by using evidence, logical reasoning,** and experimental and observational testing. (Addressed)
- 3.3B **Represent the natural world using models** such as volcanoes or the Sun, Earth, and Moon system **and identify their limitations, including size, properties, and materials.** (Addressed)
- 3.3C **Connect grade-level appropriate science concepts with the history of science,** science careers, and contributions of scientists. (Addressed)
- 3.4 **Collect, record, and analyze information using tools, including** cameras, computers, hand lenses, metric rulers, Celsius thermometers, wind vanes, rain gauges, pan balances, graduated cylinders, beakers, spring scales, hot plates, meter sticks, magnets, collecting nets, **notebooks,** and Sun, Earth, and Moon system models; timing devices; and materials to support observation of habitats of organisms such as terrariums and aquariums. (Addressed)
- 3.9A **Observe and describe the physical characteristics of environments** and how they support populations and communities of plants and animals within an ecosystem. (Addressed)
- 3.9C **Describe environmental changes** such as floods and droughts **where some organisms** thrive and others **perish** or move to new locations. (Addressed)
- 3.10A **Explore how structures and functions of plants and animals allow them to survive in a particular environment.** (Introduced)

## English Language Proficiency Standards Addressed

- 3E Share information in cooperative learning interactions.
- 4A Learn relationships between sounds and letters of the English language and decode (sound out) words using a combination of skills such as recognizing sound-letter relationships and identifying cognates, affixes, roots, and base words.
- 4C Develop basic sight vocabulary, derive meaning of environmental print, and comprehend English vocabulary and language structures used routinely in written classroom materials.

## Materials

		Lesson 6	Lesson 7	Lesson 8
<b>Student</b>	Science Logbook (Lesson 6 Activity Guides A, B, and C)	●		
	Florissant Fossil Photographs (1 set per student pair)	●		
	Science Logbook (Lesson 7 Activity Guides A, B, and C)		●	
	Florissant Organism Photographs (1 set per group)		●	
	Science Logbook (Lesson 8 Activity Guide)			●
<b>Teacher</b>	Butterfly Fossil Photograph (Lesson 2 Resource B)	●		
	Map of the United States	●		
	Past Environment of the Florissant Area Illustration (Lesson 6 Resource B)	●	●	
	Present-Day Florissant Area Photograph (Lesson 7 Resource A)		●	
	Tooth Fossil Photograph (Lesson 8 Resource A)			●
	Mammoth Drawings (Lesson 8 Resource B)			●
	Mammoth Distribution Maps (Lesson 8 Resource C)			●
	Redwood Photographs and Distribution Map (Lesson 8 Resource D)			●
	California versus Colorado Temperature and Precipitation Graphs (Lesson 8 Resource E)			●
	Florissant Area Temperature and Precipitation Graphs (Lesson 8 Resource F)			●
	Anchor chart, anchor model, driving question board			●
	Conceptual Checkpoint Photographs (Lesson 8 Resource G)			●
<b>Preparation</b>	Print Florissant Fossil Photographs (see Lesson 6 Resource A); each student pair will need a set of photographs.	●		
	Print Florissant Organism Photographs (see Lesson 7 Resource B); each group will need a set of photographs.		●	

# Lesson 7

**Objective:** Observe organisms that live in the Florissant area today to understand that the environment has changed over time.

## Launch 8 minutes

Display the illustration of the past environment of the Florissant area (Lesson 6 Resource B).



- ▶ What does this illustration help us understand about butterflies?
  - *It helps us understand what the environment was like when butterflies lived there a long time ago.*
  - *It shows us that butterflies used to live where there was water and land.*

### Agenda

Launch (8 minutes)

Learn (32 minutes)

- Analyze Present-Day Florissant Organisms (20 minutes)
- Compare Past and Present-Day Florissant Organisms (12 minutes)

Land (5 minutes)

► **What information would help us better understand how butterflies have lived on Earth for so long?**

- *It would help to know what kind of environment butterflies live in now.*
- *Maybe it would help to know if the environment of the Florissant area has changed and if butterflies are still there.*

Show students the present-day photograph of the Florissant area (Lesson 7 Resource A).



Tell students that this is a photograph of the area near the Florissant fossil beds. Ask students what they wonder about the photograph.

*Sample questions:*

- *How big is that area?*
- *Why aren't there more trees?*
- *Is there water on the other side of the trees?*

Ask students to list the kinds of organisms they think live in the Florissant area today based on the patterns they observed in the Florissant fossils in the previous lesson and in the photograph.

Tell students to record their lists in their Science Logbooks (Lesson 7 Activity Guide A).

Sample student response:

Present-Day Organisms List
<ul style="list-style-type: none"><li>▪ <i>Trees</i></li><li>▪ <i>Flowering plants</i></li><li>▪ <i>Ferns</i></li><li>▪ <i>Butterflies</i></li><li>▪ <i>Fish</i></li><li>▪ <i>Snails</i></li><li>▪ <i>Birds</i></li></ul>

► How do you think the present-day environment of the Florissant area compares with the environment in the past?

- *The environment today is probably similar to the environment in the past. Both pictures show trees and grass.*
- *I can't tell from the picture, but there is probably land and water there today.*

Tell students they will learn more about the present-day environment to determine whether the environment has changed since the butterfly that formed the fossil was alive.

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## Learn 32 minutes

### Analyze Present-Day Florissant Organisms 20 minutes

Ask students to Think–Pair–Share in response to the following question.

► How can we find out more about the present-day environment of the Florissant area?

- *We can look for more pictures that show the plants and animals that live there.*
- *Maybe we can read about the organisms that people see there.*
- *We can find out more about the conditions of the environment there today. We can look at weather data.*

Divide the class into small groups, and explain that each group will observe photographs of animals and plants that live in the Florissant area today (Lesson 7 Resource B) to determine whether the lists of present-day organisms students created in the Launch are accurate. 

Ask students to work together in their groups to follow the instructions in their Science Logbooks (Lesson 7 Activity Guide A). Students should check whether the organism in each photograph is on their list. If it is, they should highlight or circle it. If not, they should add it. If an organism on their list is not in a photograph, they should draw a line through it. About halfway through the allotted time, signal to students to switch from observing animals to observing plants.

*Sample student response:*

Present-Day Organisms List
▪ <b>Trees</b>
▪ <b>Flowering plants</b>
▪ <b>Ferns</b>
▪ <b>Butterflies</b>
▪ Fish
▪ Snails
▪ <b>Birds</b>
▪ Beetles
▪ Squirrels
▪ Bears
▪ Deer

After all groups finish, ask for volunteers to share their group's responses to the questions about present-day organisms and what they reveal about the environment.

## Compare Past and Present-Day Florissant Organisms 12 minutes

Tell students to work individually to draw a model in their Science Logbooks (Lesson 7 Activity Guide B) of the environment of the Florissant area today. Remind students to include the kinds of organisms that live in the environment and to label key components of their models.

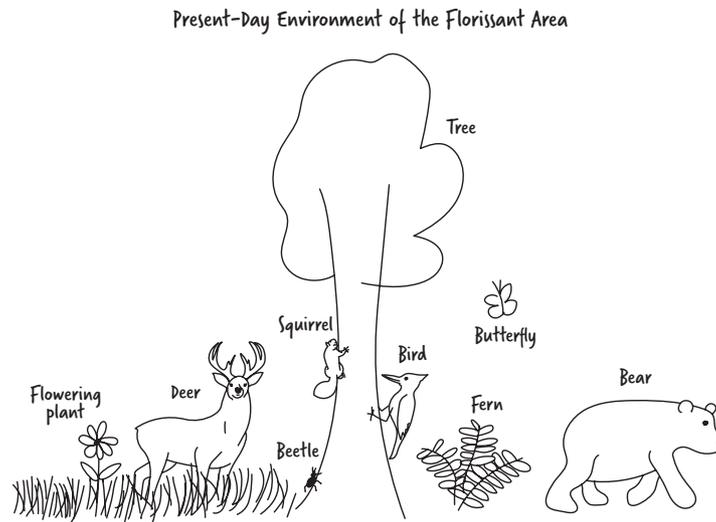


### Differentiation

Consider grouping students heterogeneously to provide striving learners additional support from strong learners in their group. If using this strategy, circulate between groups to assist students when needed.

Homogeneous grouping can also be advantageous to ensure equity in student contribution. If using this strategy, consider working closely with striving groups to offer additional support. It may be useful to give each group member a task or job to ensure equal participation (3E).

Sample model:



Many kinds of organisms live in the Florissant area today. These organisms include flowering plants, deer, beetles, squirrels, birds, ferns, butterflies, bears, and trees. All these organisms live on land, so there is probably not as much water in the area as there was in the past.

After students complete their models, ask them to compare their models of the present-day environment with the models of the past environment they created in Lesson 6 (Lesson 6 Activity Guide C).

- ▶ **What similarities do you notice between the kinds of organisms that lived in the Florissant area in the past and the kinds of organisms that live there now?**
  - *There were trees in the past and there are still trees in the present.*
  - *Butterflies and ferns lived there in the past, and they still live there today.*
  
- ▶ **What differences do you notice between the kinds of organisms that lived in the Florissant area in the past and the kinds of organisms that live there now?**
  - *There are no fish or snails in the Florissant area today.*
  - *Bears, squirrels, and deer all live in the Florissant area now. We didn't see any fossils of these organisms, so I don't think they lived there in the past.* 📖



### Teacher Note

Consider reminding students that the evidence fossils provide is limited to the organisms for which humans have found fossils. Other organisms likely lived at the same time and in the same area, but they may not have formed fossils, or the fossils may not have been uncovered yet.

# Land

5 minutes

Ask students to Jot–Pair–Share in response to the following question in their Science Logbooks (Lesson 7 Activity Guide C).

- ▶ **After comparing the past organisms of the Florissant area with today’s organisms, what do you understand about the environment of the Florissant area?**
  - *The organisms that live in the Florissant area today are different from those that lived there 34 million years ago. Some kinds of organisms are new to the area, but other kinds of organisms no longer live there. This makes me think that the environment might have changed.*
  - *We didn’t see any pictures of fish or snails in the present-day environment. Maybe there is not a lake or a river there anymore.*
  - *Some of the same kinds of organisms live in the area, so maybe the environment is similar today to what it was like in the past.*



## Check for Understanding

Use this question to assess students’ understanding of how changes in the kinds of organisms in an area over time might relate to changes in the area’s environment.

### Evidence

Look for evidence that all students

- identify that some kinds of organisms that lived in the area in the past still live there today,
- identify that some kinds of organisms that lived in the area in the past no longer live there today, and
- identify that some kinds of organisms that live in the area today did not live there in the past.

### Next Steps

As needed, review the kinds of organisms that lived in the Florissant area in the past, and compare them with the kinds of organisms that live there today. Help students identify which kinds of organisms still live in the area, which kinds of organisms no longer live in the area, and which kinds of organisms are new to the area.

► **What questions do you still have about the environment of the Florissant area and the organisms that live there?**

- *What happened to the fish?*
- *What caused the kinds of organisms to change?*
- *What was the weather like in the past, and what is it like now?*

Tell students that they will further explore how the environment of the Florissant area has changed over time in the next lesson.