

Lessons 1–2

Butterfly Survival

Prepare

Lesson 1 begins by eliciting student understanding of butterflies and their environment to lay the groundwork for exploring the Essential Question: **How do butterflies survive over time in a changing environment?** Students are introduced to various components of an environment where butterflies might be found today and develop an initial anchor model to record their current understanding of what butterflies need to survive. In Lesson 2, students observe a butterfly fossil and create a relative timeline that represents the elapsed time between Earth’s formation and the present day to better understand when the earliest butterflies appeared on Earth. Students then develop a driving question board based on their questions about butterflies. These questions guide student learning throughout the rest of the module.

Student Learning

Knowledge Statement

Butterflies have survived on Earth for millions of years.

Objectives

- Lesson 1: Develop a class anchor model to show how butterflies survive in their environment.
- Lesson 2: Create a relative timeline to understand how long butterflies have survived on Earth.

Concept 1: Fossil Evidence

Focus Question

What do fossils reveal about the past?

Phenomenon Question

How long have butterflies survived on Earth?

Texas Essential Knowledge and Skills 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)
- 3.9A **Observe and describe the physical characteristics of environments** and how they support populations and communities of plants and animals within an ecosystem. (Introduced)

English Language Proficiency Standards Addressed

- 3J Respond orally to information presented in a wide variety of print, electronic, audio, and visual media to build and reinforce concept and language attainment.
- 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

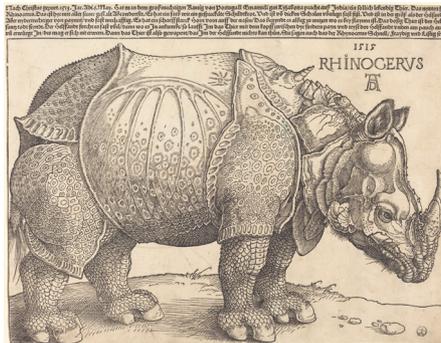
		Lesson 1	Lesson 2
Student	Science Logbook (Lesson 1 Activity Guide)	●	
	Organism Cards (1 set per group)	●	
	Science Logbook (Lesson 2 Activity Guide, Module Question Log)		●
	Event Cards (1 set per student pair)		●
Teacher	Rhinoceros Woodcut and Photograph (Lesson 1 Resource A)	●	
	<i>A Butterfly Is Patient</i> by Dianna Hutts Aston and Sylvia Long (2015)	●	
	Butterfly Fossil Photograph (Lesson 2 Resource B)		●
	Class Timeline: Timeline Instructions (Lesson 2 Resource A), 3 m piece of string, 10 index cards, 10 clothespins or tape, marker, tape measure		●
Preparation	Prepare Organism Cards (see Lesson 1 Resource B).	●	
	Prepare string for class timeline (see Lesson 2 Resource A).		●
	Prepare Event Cards (see Lesson 2 Resource C).		●

Lesson 1

Objective: Develop a class anchor model to show how butterflies survive in their environment.

Launch 10 minutes

Display *The Rhinoceros* by Albrecht Dürer (Lesson 1 Resource A).



- ▶ What do you notice about the animal in this picture?
 - It has a shell on its body and scales on its legs.
 - It looks like it has a unicorn horn on its back.
 - It looks kind of like a rhinoceros, but it looks different from the ones I have seen at the zoo.

Agenda

Launch (10 minutes)

Learn (30 minutes)

- Create a Butterfly Sketch (10 minutes)
- Define Organisms and Environments (12 minutes)
- Develop an Anchor Model (8 minutes)

Land (5 minutes)

Show students a photograph of a rhinoceros (Lesson 1 Resource A).



- ▶ **What does seeing this picture make you think about the first picture?**
 - *I think this picture looks more like a real rhinoceros than the first one.*
 - *There are a lot of details in the first picture, but they don't show what a rhinoceros actually looks like.*

Tell students that both pictures are meant to depict a rhinoceros, and ask them to compare the two pictures more closely.

- ▶ **What is similar about the two pictures? What is different?**
 - *Both pictures show a rhinoceros.*
 - *Both rhinoceroses have four legs and two ears.*
 - *Both pictures show a rhinoceros with two horns, but the horns are not in the same place.*
 - *The rhinoceros's skin looks more scaly and rougher in the first picture than it does in the second picture.*
- ▶ **What might explain the differences between the two pictures?**
 - *They might be different because one is a drawing and the other is a photograph.*
 - *Maybe they show two different kinds of rhinoceros.*
 - *Maybe the person drawing the picture wasn't looking at a real rhinoceros.*

Reveal to students that the first picture shows a woodcut created by an artist named Albrecht Dürer in 1515.  Explain to students that Dürer had never seen a rhinoceros, but that he created the woodcut based on a letter he received that included a description and a sketch of a rhinoceros (MacGregor 2014).

▶ **Why do you think the woodcut does not accurately show what a real rhinoceros looks like?**

- *I think it would be really hard to draw something without seeing it before.*
- *The details would be hard to draw without ever seeing a real rhinoceros.*

Tell students that for hundreds of years many people who had never seen a rhinoceros saw prints made by using Dürer's woodcut and thought that the prints showed an accurate representation of the animal.

▶ **What do you think is problematic about people believing that Dürer's woodcut showed an accurate representation of a rhinoceros?**

- *People thought this was what a rhinoceros looked like, but it wasn't.*
- *People didn't know what a rhinoceros actually looked like.*

Ask students to keep the importance of accurate representation in mind as they participate in the rest of the lesson.

Learn 30 minutes

Create a Butterfly Sketch 10 minutes

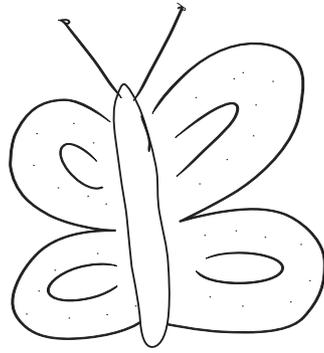
Ask students to use what they know about butterflies to sketch a butterfly in their Science Logbooks (Lesson 1 Activity Guide). If colored pencils are available, allow students to use them to create their butterfly sketches.



Teacher Note

A woodcut is made when an artist carves a picture into the surface of a block of wood. Ink is applied to the raised surface of the wood block and the surface is pressed against a piece of paper to create an image on the paper. Comparing a woodcut to a rubber stamp may help students understand its purpose.

Sample student response:



After students have finished their butterfly sketches, ask them to share their sketches with a partner. Students should discuss the similarities and differences between their sketches and make changes to their sketches to add any new details they would like to include. Ask students to share with the class the similarities and differences they discussed with their partner.

► **What did your butterfly sketches have in common?**

- *Both of our butterflies had wings.*
- *Our butterflies both had a body with two lines coming out of the top.*

► **How were your butterfly sketches different?**

- *Our butterflies were different colors.*
- *The shape of their wings was different.*
- *My partner included eyes on the butterfly, but I didn't.*

► **How did you know what to include on your sketch?**

- *I've seen butterflies fly, so I know they have wings.*
- *I know butterflies have two antennae because I've seen them in my mom's garden.*

Introduce students to the book *A Butterfly Is Patient* (Aston and Long 2015). Display pages 29–30, and ask students to compare the illustrations of the butterflies in the book with their butterfly sketches. 

► **How do the butterfly illustrations in the book differ from the butterfly sketch that you drew?**

- *The butterflies in the book are much more detailed.*
- *My butterfly doesn't have legs or lines coming out of its head like the ones in the book.*
- *There aren't any butterflies that look exactly like the one I drew.*

Inform students that **butterflies** are insects that have long, thin bodies and four wings that are often brightly colored. Ask students to look at their sketches and determine whether their butterflies have these structures.



English Language Development

The term *butterfly* is used repeatedly in this module. Introduce this term explicitly. After introducing this and other important terms, provide scaffolds for English learners as they use the words when speaking, writing, and investigating. For more information on language scaffolds, see the English Language Development section of the Implementation Guide.

Allow students time to make additional changes to their butterfly sketches to include more details and to make them a more accurate representation of the animal. 

► **Imagine that you are going to show your butterfly sketch to someone who has never seen a butterfly before. Would your sketch tell the person everything there is to know about butterflies? What kind of information would the person not be able to tell from your sketch?**

- *They wouldn't know anything about where a butterfly lives and what it eats.*
- *They wouldn't be able to tell how a butterfly moves.*
- *They wouldn't be able to tell how big a butterfly is.*

Agree that there is a lot about butterflies that a person would not be able to tell just from looking at a sketch of a butterfly. Highlight student responses related to where butterflies live or what butterflies need to survive.



Teacher Note

A Butterfly Is Patient does not include page numbers. Consider writing small page numbers in the text or using sticky tabs to mark pages to easily locate where readings should begin throughout the module. The illustrations shown during this lesson are on pages 29–30, which include multiple labeled butterfly illustrations.



Teacher Note

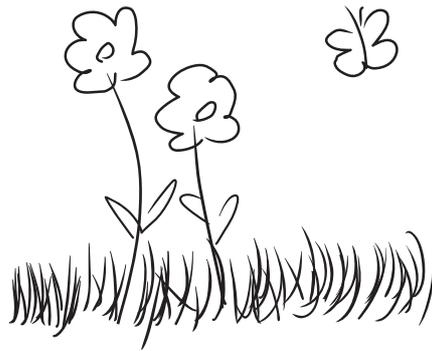
It is not necessary for students' butterfly sketches to have the same wing patterns or colors as the butterflies shown in the book. Students should instead focus on accurately representing details such as number of antennae, body shape, and number of wings.

Define Organisms and Environments 12 minutes

Ask students to draw another sketch to show what they know about where butterflies live (Lesson 1 Activity Guide).

- ▶ Draw a sketch that shows what you may find where a butterfly lives. Consider what a butterfly may need to survive. Include as many details as you can. 

Sample student response:



Ask students to share with the class the components they included in their sketches. 

Sample student response:

- *I included a butterfly with flowers and grass.*

Divide the class into small groups. Tell students that they will work with their group to observe photographs to learn more about where butterflies live.

Distribute a set of organism cards (Lesson 1 Resource B) to each group. Ask students to sort the cards into categories of their choice. Tell students that the cards in each category should be related and that they must be able to justify why they grouped the cards the way they did.  After providing students a few minutes to sort the cards, ask for volunteers from each group to share the categories they came up with.



English Language Development

The word *survive* is used frequently in this module. Sharing the Spanish cognate *sobrevivir* may be useful. Share the meaning of the word in alternate contexts by using guiding questions such as the ones below to scaffold conversations (4A).

- What do you need to survive?
- What does a plant need to survive?



Teacher Note

At this point in the lesson, students should record initial ideas about the environment of a butterfly and what a butterfly needs from its environment. It is acceptable for students to include only a few components of the environment in their sketch.



Differentiation

Some students may have trouble sorting the cards into categories. Consider prompting students with questions such as the following (3J):

- Do you notice any similarities among any of the cards?
- Do you notice any major differences among the cards that you can use to separate them into groups?

Sample student responses:

- We sorted the cards into plants and animals.
- We sorted the cards into things that can fly and things that can't fly.
- We sorted the cards based on where the plants and animals live. We have a land category and a water category.

Ask students in each group to put all their cards back into one pile. Challenge students to think of a single category that includes all the cards.

► What would you title this category? 🌱

- Things that are found outside
- Things that need water
- Things that are living

Tell students that scientists use the term **organism** to describe all living things, including all plants and animals. Suggest that students use this term as a title for a category that includes all the cards, and point out that each card shows at least one organism.

Remind students of the sketch they drew in their Science Logbooks (Lesson 1 Activity Guide) to show where a butterfly lives. Tell students that the organisms they observed in the card sort activity are all organisms that can be found where butterflies live. Allow students time to update their sketch with any new organisms they think may help butterflies survive.

Tell students that their sketches represent part of a butterfly's **environment**, or the area surrounding an organism that includes what the organism needs to survive. Explain that students' sketches include organisms that live around the butterfly and that these organisms provide some of what butterflies need.

► What else do you think butterflies need to survive? 📝

- I think butterflies also need water.
- Maybe butterflies need sunlight to stay warm.

Confirm that an organism's environment includes both the living and nonliving things that surround the organism and that organisms need both living and nonliving things to survive. Invite students to update their sketches with nonliving things (e.g., water, sunlight) they think butterflies might need.



Content Area Connection: English

This card categorization reinforces the writing skill of grouping related information. Deepen this connection by prompting students to explain their choices by using a question such as the following: Why does this card belong in this category?



Teacher Note

To review student learning from Levels 1 and 2, consider having students identify living and nonliving things in a butterfly's environment as students share the basic needs of a butterfly. Record student responses on a chart with columns labeled Living and Nonliving (1.9A, 2.9A).



English Language Development

The terms *organism* and *environment* are used repeatedly in this module. Introduce these terms explicitly. Sharing the Spanish cognate for *organism* (*organismo*) may be useful (4A).

Then ask students to Jot–Pair–Share in their Science Logbooks (Lesson 1 Activity Guide) in response to the following question.

► **What is the difference between an organism and an environment?**

- *An organism is a living thing. An organism can be a plant or an animal. An environment is where an organism lives. It is all of the living and nonliving things around the organism.*
- *An organism is just one living thing, but I think an environment has a lot of living things. I think organisms can be a part of an environment.*



Check for Understanding

As students sketch the environment of a butterfly, look for evidence of a beginning understanding of the components of a butterfly's environment.

Evidence

Look for evidence that all students correctly identify basic components of a butterfly's environment (e.g., flowering plants, grass, trees, water).

Next Steps

It is not necessary for students to fully identify or understand all the components of a butterfly's environment. If students have difficulty identifying any key components of a butterfly's environment, then consider displaying photographs of butterflies in their environment.

Develop an Anchor Model 8 minutes

Explain to students that they will now develop an anchor model to demonstrate an understanding of how butterflies survive in their environment.

Begin by asking students to review their sketches of a butterfly's environment in their Science Logbooks (Lesson 1 Activity Guide). Ask students what components of their sketches they believe should be included in the anchor model. As students share components, ask the rest of the class to use

nonverbal signals to indicate whether they agree that the component represents part of a butterfly's environment that helps it survive. If most students agree with adding a component and can justify its inclusion, then draw it on the anchor model.

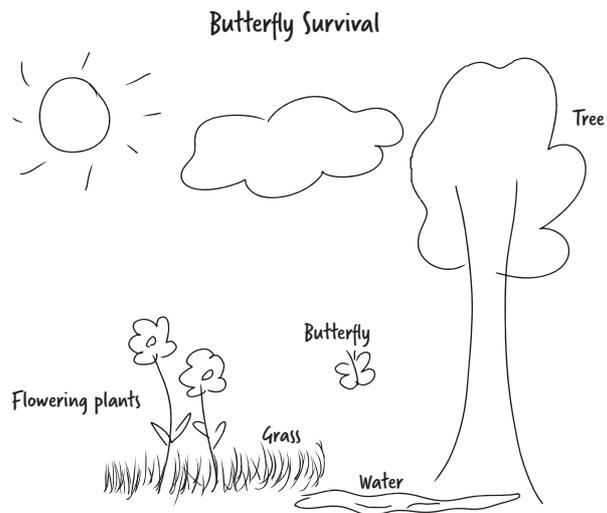
Anchor models will vary, but most should include the following components:

- Flowering plants
- Other plants (trees, grass)
- Water source

Depending on the class discussion, anchor models may also include additional components, such as other animals.

Include a title and an explanation on the anchor model.

Sample anchor model:



Butterflies live in environments that have water and plants such as flowering plants, grass, and trees. Butterflies get what they need to survive from their environment.

When the class anchor model is complete, use it to guide students' learning throughout the module.

Land

5 minutes

Draw students' attention to the anchor model, and ask them to consider what questions they have about butterflies and what they still want to know. Instruct students to record their questions in their Science Logbooks (Lesson 1 Activity Guide).

Sample student responses:

- *Do all butterflies look the same?*
- *Do butterflies always live in areas with flowers, grass, and water?*
- *Why don't butterflies live everywhere?*
- *What is the weather like where butterflies live?*

Next, ask students to share what they know about other organisms and what these organisms need to survive.

- ▶ **You have identified some of the living and nonliving things that butterflies need in their environment. What do you know about other organisms and what they need in their environments?**
 - *I have a pet horseshoe crab. It needs sand to live in and worms to eat.*
 - *Elephants need a lot of space because they are really big. Elephants I have seen at the zoo eat hay and grass and have water to drink.*
 - *My favorite animal is a dolphin. It needs water to live in and fish to eat.*

Add student responses to the bottom of the piece of chart paper that will be used for the driving question board. Label the section Related Phenomena. This student-generated list of phenomena should be referred to throughout the module and can be added to any time relevant, related phenomena are suggested.

Optional Homework

Students share what they learned about butterfly environments with a family member and consider whether the area around where they live has any of the things a butterfly might need to survive.