

ENVIRONMENT

GRADE

3

SURVIVAL & FOSSIL EVIDENCE



Linda Kamp



In this unit, students explore several topics. They learn ways organisms adapt to their environment in order to survive. They construct arguments with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

Students learn about animals that form groups for survival and how the variations in characteristics among individuals of the same species may provide advantages for surviving, finding mates, and reproducing. They discuss cause and effect relationships with groups that live together and animals that live alone.

Students learn how some organisms respond to changes in their environment by hibernating, migrating, molting and through other unique adaptations. Students read nonfiction material about how cliff swallows adapt when dramatic changes to their habitat occur. They analyze graphs depicting how many cliff swallows thrive in the new environment and how many do not. Students use evidence to construct an explanation for how the variations in characteristics of cliff swallows provides advantages for surviving. Students learn how adaptive traits can become non-adaptive traits when an environment changes.

Through hands-on investigations and station activities students explore organisms and environments that existed long ago. Students analyze and interpret fossil data, define major fossil types, and explain the process of fossilization. They define extinction and identify some animals and plants that have gone extinct. Students explore and measure fossil examples and chart their measurements.

During the unit, students meet an animal behavioralist whose job it is to study specific birds adapt to changes in their surroundings. Students read an article and use their knowledge about adaptations to write a scientific explanation for the adaptive traits of these birds.

Students also learn about the influence environment has on organisms. Students learn environmental factors that affect the physical traits and learned behaviors of different living things. Students build on this knowledge as they learn about ways environmental changes, diet, sunlight, and temperature, can affect the traits of plants and animals.

TEACHING POWERPOINT



10 INDEPTH TOPICS

- Survival of Individuals
- Behavioral Adaptations
- Trait Variation
- Survival of Groups
- Surviving in a Changed Environment
- Hibernation & Migration
- Fossil Evidence
- Types of Fossils
- The Fossil Record
- The Geologic Time Scale



EACH LESSON INCLUDES:

- Detailed, scripted lesson plan
- Interactive lesson slides
- Science journal activity
- Lab investigations
- Lesson quizzes in 2 formats
- Vocabulary posters
- Objectives display cards
- Turn & talk partner questions
- Embedded videos
- Science center activity

environment migrate hibernating
Natural events like changing _____ can _____ an environment. Some animals survive by _____

Lesson 2: Survival of Groups
Why do some animals live in groups?
Write some of the benefits of each way of life

Lesson 3: Investigation 3: How Did the Swallows Survive?
TEACHER GUIDE
QUESTION: Why has the cliff swallow population grown despite changes to its environment?
OBJECTIVES: 1. Students will construct a scientific explanation for how a cliff swallow population adapted to a changed environment. 2. Students will analyze graphs and use the data as evidence to support claims they make in their explanation.
MATERIALS: Prep per student: -copy of article -wingspan data graph -migration 3 recording sheets
NOTE: Part three parts and will take two, 40 to 45-minute class sessions to complete. Reading a non-fiction article. Part 2: Analyzing graphs depicting how many of an lives in an environment. Part 3: Using evidence to construct an explanation. You

Lesson 3: Videos
Lesson 3: Living Things Change
Lesson 3: Why each group of animals works together to increase chances of survival. Write the number in the box next to the group.

1. Care for each other's young
2. Warn danger
3. Keep other animals out

Watch a Video: Why Do Some Animals Form Groups?

Forming Groups
Why Do Animals Form Groups? | NG Science (5:13)

What causes an environment to change?
Some changes are fast, like forest fires and storms. Other changes happen slowly, over thousands of years.

Cause & Effect
1. Read about Leafcutter ants on the next slide.
2. Think about causes and effects as you read.
3. Write the missing cause and effect.

Environments can change
Living things depend on their environment for food, shelter and protection. Changes to an environment can affect the survival of organisms that live there.

Solitary Animals
Some animals are solitary and prefer to live alone. Polar bears, bobcats, and leopards are solitary animals. They prefer to have their own territory rather than sharing an area with another animal. Some animals live alone.

Why do animals form groups?
Some animals form groups to help them survive in their environment. When animals form groups, they can protect each other, share food, and help each other raise their young.

Vocabulary
fossil record geologic time scale data

ESSENTIAL QUESTION
What happens to living things when their environments change?

Raising young
Living in a group, there are more adults to care for and protect the young ones. Elephants, penguins, and baboons not only rely on group living for survival, but they help raise and protect each other's young.

Lesson 2: TALK ABOUT IT: Forming Groups
Talk with your partner about animals that live in groups.
What might be a disadvantage for these animals living in a group?

Lesson 2: INVESTIGATE: Make a Diagram Model
What traits give animals an advantage for survival?
Choose an animal. Draw a diagram model showing the traits and adaptations the animal has that make it more likely to survive than other organisms in its habitat.
Horns Used for protection when fighting
Long Neck Used to reach leaves on acacia tree
Long Tongue Helps tear leaves off trees
Camouflage Helps keep it more hidden in the savanna
Tough Lips Used to protect lips from thorns of trees

Lesson 2: JOURNAL: Write About It
Complete Lesson 2 in your science journal.

Lesson 2: I can explain reasons why animals live in groups or alone.
Lesson 2: I can discuss cause and effect relationships between groups that live together.

Lesson 2: Survival of Groups

SAMPLE LESSON



ESSENTIAL QUESTION

What happens to living things when their environments change?

Lessons 1-3



ESSENTIAL QUESTION

How have living things and

Stack of cards:

- Top card: **GUIDING QUESTION**
What makes organisms more likely or less likely to survive?
- Bottom card: **Lesson 1** Environment & Survival
I can make connections between the traits of an organism and how well it can survive.



Aligned to
Next Generation
Science Standards
for 3rd Grade

STANDARDS-ALIGNED

HIGH-ENGAGEMENT ACTIVITIES

Students work with partners to discuss, write and investigate.

Meet An Animal Behaviorist



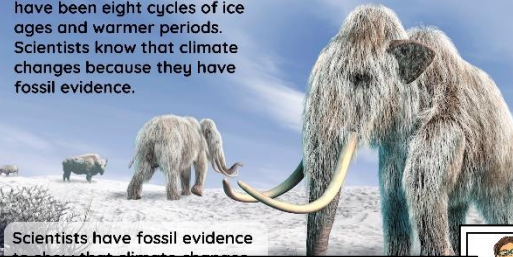
Hello! My name is Paolo, and I am an animal behaviorist. While studying behaviors of cliff swallows, my team and I discovered some interesting adaptations in the swallow population. I wrote an article about it for you to read.

After reading my article, can you write a scientific explanation for the cliff swallow's adaptive traits?

Over millions of years, Earth's climate has warmed up and cooled down many times. Just in the last 800,000 years, there have been eight cycles of ice ages and warmer periods. Scientists know that climate changes because they have fossil evidence.

Climate Cycles

Woolly mammoths and prehistoric bison are among the prehistoric creatures found trapped in frozen areas of Siberia.



Scientists have fossil evidence

LESSON 4 INVESTIGATE Sponge Fossils: Mineral Replacement

QUESTION:
How do minerals help fossils form?



Develop a model to simulate the process of

LESSON 1 TALK ABOUT IT Characteristics for Survival

Talk with your partner about adaptations.



What characteristics

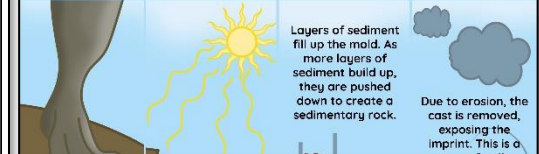
LESSON 3 EXTENSION RESEARCH The Great Monarch Migration

Choose a research project

- Research the migration of the Monarch butterfly and create a guide that explains why their breeding grounds are dwindling and ways people can help protect them.
- Create an informative writing piece about the adaptive traits of Monarch butterflies.



Trace Fossil Formation



What is a scientific explanation?

- It answers a question about how or why something happens.
- It is based on the ideas you have learned from investigations, videos, and reading about the topic.
- It uses scientific language and vocabulary.



Cause & Effect

Activity 2.1

- Read about Leafcutter ants on the next slide.
- Think about causes and effects as you read.
- Write the missing causes and effects in the chart in your journal.



Causes	Effects

LESSON 5 INVESTIGATE Geologic Time Scale

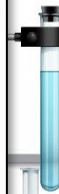
QUESTION:
How is the fossil record related to the geologic time scale?

Use your materials to model rock layers and fossils in the geologic time



LESSON 3 PART 2 INVESTIGATE Use Evidence To Support A Claim

- Use the wingspan data as evidence.
- Think about what makes an organism more likely to survive.
- Use the data and what you know to explain why the cliff swallow population has grown in the last 30 years.



LESSON 3 PART 1 INVESTIGATE Adapting to a Changed Environment

How has the cliff swallow population adapted to a changed environment?

Read the article about swallows. Write a scientific explanation for why the swallow population has grown and is thriving.



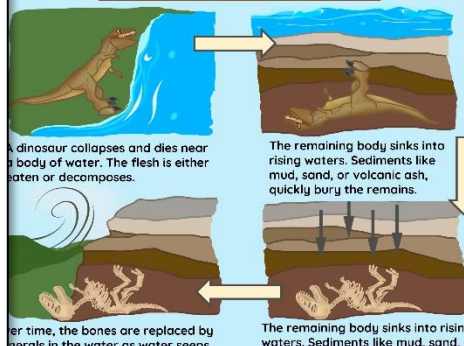
LESSON 2 INVESTIGATE Make a Diagram Model

What traits give animals an advantage for survival?

Use an animal. Draw a diagram model showing traits and adaptations an animal has that make it more likely to survive than other organisms in its habitat.



Dinosaur Bones Fossilization



LESSON 1 INVESTIGATE Which Beak Is Best?

QUESTION:
What determines the shape of a bird's beak?

Investigate how beak shapes are adapted to eating certain types of food.



5 HANDS-ON INVESTIGATIONS

STUDENTS ENGAGE IN:

- Testing the functions of adaptations
- Simulating fossilization
- Making models of cast and trace fossils
- Analyzing fossil data
- Drawing diagrams
- Making models of the geographic time scale
- Reading nonfiction articles and analyzing data tables

Investigation 4
Sponge Fossils
Guided Lab Directions

Place students in small groups. Use plastic containers or aluminum ones if you plan to put them in the oven. Optional: students can use a marker to draw a fossil on their sponge, then cut it out. Put 1/2 inches of sand in the bottom of the container.

Mix the salt water. For each group start with 2 parts salt to 5 parts warm water in a large cup or pitcher. The water should be

Investigation 5
GEOGRAPHIC TIME SCALE MODELS
Guided Lab Directions

Give each student a small clear cup or container.

TEACHER GUIDE
Investigation 5
Geologic Time Scale Models

QUESTION: How is the fossil record related to the geologic time scale?
OBJECTIVE: Students will model the geologic time scale and explain its relation to the fossil record.

Materials: group of 4 students: 1. 1/2 cup of water, 2. 1/2 cup of salt, 3. 1/2 cup of sand, 4. 1/2 cup of beads, 5. 1/2 cup of water, 6. 1/2 cup of salt, 7. 1/2 cup of sand, 8. 1/2 cup of beads, 9. 1/2 cup of water, 10. 1/2 cup of salt, 11. 1/2 cup of sand, 12. 1/2 cup of beads.

Investigation 4
Sponge Fossils
TEACHER GUIDE

QUESTION: How do bones become hardened fossils?
OBJECTIVE: Students will develop a model that represents mineral replacement.

MATERIALS: Per student: 1 sponge piece

LEARN FROM A FOSSIL?
Activity 4.1
3-LS4-1, SEP.2

Make a model of a fossil and how to identify it.

How Did Swallows Evolve Around Highways?

Crossing the road has gotten easier for cliff swallows. Over generations, the threat of speeding cars may have shortened their wings. Over the last 30 years, the number of cliff swallows killed along roads in southwestern Nebraska has declined, and the birds' average wing length has increased.

The data suggests that cliff swallows forced to cross highways have evolved shorter wings. Cliff swallows usually live in mud nests. But in the last few years, thousands of birds have been killed by highway bridges.

Investigation 3
How Did the Swallows Survive?
TEACHER GUIDE

QUESTION: Why has the cliff swallow population grown despite changes to its environment?
OBJECTIVES: 1. Students will construct a scientific explanation for how a cliff swallow population adapted to a changed environment. 2. Students will analyze graphs and use the data as evidence to support claims they make in their explanation.

MATERIALS: Prep per student: -copy of article

Investigation 1
Which Beak Is Best?
Guided Lab Directions

QUESTION: What determines the shape of a bird's beak?
OBJECTIVE: Students will model and test different beak shapes to learn how different beaks are adapted to eat certain foods.

MATERIALS FOR EACH GROUP
For beaks: straw, tweezers, pliers, scissors, chopsticks (or replace with things you have available to simulate different types of beaks)
For food: yam, marshmallows, rice, water, paper bowls or cupcake liners or any small containers to hold the food, small cup for water, lab sheet for each student

PROCEDURE:
1. Explain to students that in this lab they will investigate how bird beaks are adapted to eating different kinds of food. "In this lab you will use your materials as models of different beaks to investigate how birds eat and how the shape of a bird's beak shape gives you clues to the type of food it eats."
2. Place students in groups of 2-4 and provide them with the materials listed.

Investigation 2
Make a Diagram Model
TEACHER GUIDE

QUESTION: What traits give organisms an advantage for survival?
OBJECTIVE: Students will draw a diagram of an animal, label the traits that help it survive, and how the traits give it an advantage.

MATERIALS: -white paper -markers, colored pencils, or crayons -or magazine pictures of animals

INVESTIGATION:
1. Ask students, "What are some advantages or benefits to living in a group?" (Answer: protection, sharing work, hunting/finding food, helping to raise the young.) Tell students, "An animal's traits, or characteristics, can also give it an advantage for survival."
2. Project the Lesson 2 Investigate slide. Explain to students, "In this lab you will make a diagram. A diagram is a type of model." "It is a drawing or a picture that shows the parts of something, and tells the purpose of each part, or how they work." Explain to students that in this lab they will draw and label a diagram.
3. Students choose an animal to draw. *Students can also use magazine pictures

EACH LAB INCLUDES:

- Guiding questions
- Objective
- Materials list
- Scripted introduction
- Step by Step procedures
- Standards



Lesson 1

Investigation 1 Which Beak Is Best?

TEACHER GUIDE

3-LS4-2, SEP.6

QUESTION: What determines the shape of a bird's beak?

OBJECTIVE: Students will model and test beak shapes to learn how birds are adapted to eat certain foods.

MATERIALS FOR EACH GROUP

For beaks
straw, tweezers, pliers, scissors, chopsticks (or replace with things you have available to simulate different types of beaks)

For food
yarn, marshmallows, rice, -water
-paper bowls or cupcake liners or any small containers to hold the food
-small cup for water
-lab sheet for each student



PROCEDURE:

1. Explain to students that in this lab they will investigate how bird beaks are adapted to eating different kinds of food. **"In this lab you will use your materials as models of different beaks to investigate how birds eat and how the shape of a birds' beak shape gives you clues to the type of food it eats."**
2. Place students in groups of 2-4 and provide them with the materials listed.
3. Students follow the steps on their lab sheet. Allow students time to test the beaks' abilities to get the different foods.
4. Students write their observations on their lab sheet. Ask students to consider what bird has a beak like the one they are modeling and what the bird eats. guide students to understand that different beak shapes are better at picking up different kinds of bird foods.

SEP.2 Developing and using models to understand how animal characteristics help them survive

3-LS4-2: Use evidence to construct an explanation for how the variations in characteristics (beak shapes) among individuals of the same species may provide advantages for surviving, finding mates, and reproducing.

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- Student lab sheet

Name _____ Investigation 1





What determines the shape of a bird's beak?

PLAN Look at the birds in the chart. What tool does each beak look like?

MODEL Use the beak materials to model the different beaks

TEST Pick up different types of food with your model beaks to determine which beak works best for which type of food.

COLLECT DATA


Beak	Observations
	
	
	
	

Beak Materials Used


Food Materials Used

Investigation 1

Which Beak Is Best?



Gather materials for each group of 3 or 4 students. Replace any of the beak tools, if necessary, with things you have available to simulate different types of beaks.



Guide students to understand that birds' beaks are very specialized tools that determine what a bird can eat. Some beaks are good for probing and grabbing insects out of the ground while others are perfect for cracking open seeds and nuts. The sharp, curved beak of an eagle easily tears the flesh of fish. The long thin, straw-like beak of the hummingbird allows it to drink nectar deep within a flower.

Guided Lab Directions

Students take turns testing the "beak" tools to find and pick up the "food" to determine which type of beak is best for eating each of the foods.

As students test their "beaks", they record their observations on their lab sheet.

Guided directions
& possible results

LESSON RESPONSE JOURNAL

WORKBOOK INCLUDES:

- Applying vocabulary
- Writing to explain
- Labeling diagrams
- Comparing adaptations
- Interpreting data

The collage displays several pages from the 'ENVIRONMENTS & SURVIVAL SCIENCE JOURNAL'. Key pages include:

- Lesson 1: Adapting to Survive** - Contains questions about adaptations, a multiple-choice question about a Spicebush Swallow caterpillar, and a matching activity for physical adaptations.
- Lesson 2: Survival of Groups** - Discusses why animals live in groups and includes a table for 'Living Alone' vs 'Living in a Group'.
- Lesson 3: Surviving in a Changed Environment** - Explores how people, other organisms, and natural events can change an environment.
- Lesson 4: Fossil Evidence** - Focuses on what a fossil is and how to identify materials that can trap and preserve organisms.
- Lesson 5: The Fossil Record** - Explains the fossil record and includes a diagram of rock layers.

Other pages show activities like 'COLLECT DATA' for a cat, 'CAUSE & EFFECT' for penguins, and various word banks and diagrams related to fossils and adaptations.

LITERACY-BASED SCIENCE CENTERS

ENVIRONMENT Survival & Fossil Evidence SCIENCE CENTERS



Organisms develop _____
to survive in their habitats.

- A. mimicry
- B. adaptations
- C. migration
- D. patterns

ENVIRONMENT & SURVIVAL VOCABULARY

Directions

- 1 Read
- 2 Circle
- 3 Write

ENVIRONMENT & SURVIVAL VOCABULARY

1. Choose the correct word to complete the sentence.
2. Write the letter in the matching box.

1	2	3	4
5			
9			
13			

A trait that helps an animal survive in its habitat is called an _____.

- A. inherited trait
- B. trait variation
- C. adaptive trait

ENVIRONMENT Survival & Fossil Evidence SCIENCE CENTERS



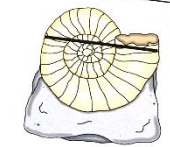
MEASURING FOSSILS



MEASURING FOSSILS

1. Use a ruler to measure the length of the fossil to the nearest inch, half inch.
2. Write the measurements in the boxes.

1	2	3
4		
7		



ENVIRONMENT Survival & Fossil Evidence SCIENCE CENTERS



ANIMAL GROUPS MATCH

1	2
4	5
7	8
11	12

NAME THAT GROUP MATCH

- Directions:
- 1 Lay the picture cards and word cards on the table.
 - 2 Match the picture cards to the word cards.
 - 3 Write the name of the animal group in the box.



Reinforce
SCIENCE
CONTENT

Practice
MATH &
LITERACY SKILLS

LESSON SUPPORT & FOCUS WALL



ESSENTIAL QUESTION

What happens to living things when their environments change?

fossil record

species

adaptive trait

characteristics that help an organism survive in its environment

Lesson 3

Vocabulary cards

GUIDING QUESTION

What makes organisms more likely or less likely to survive?

I can make connections between the traits of an organism and how well it can survive.

Guiding Questions

Objectives Cards

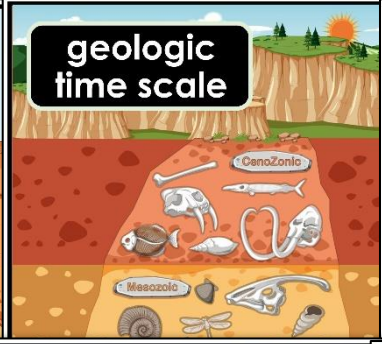
amber



fossil record



geologic time scale



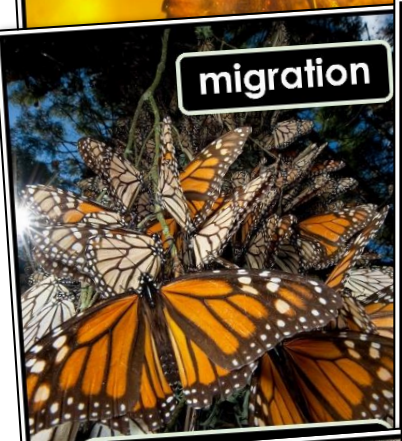
trace



fossil



migration



adaptive



colony



advanta



solitary



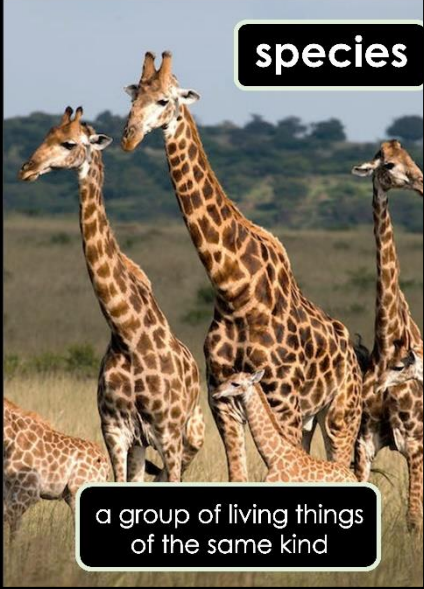
hibernate



mimicry



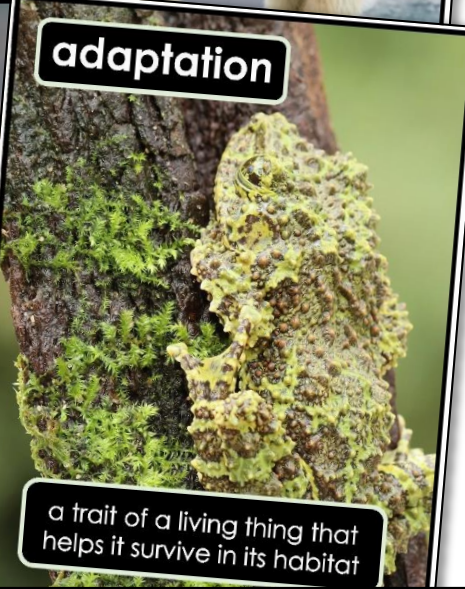
species



survive



adaptation



to go into a deep sleep during the winter months

to copy, imitate, or resemble

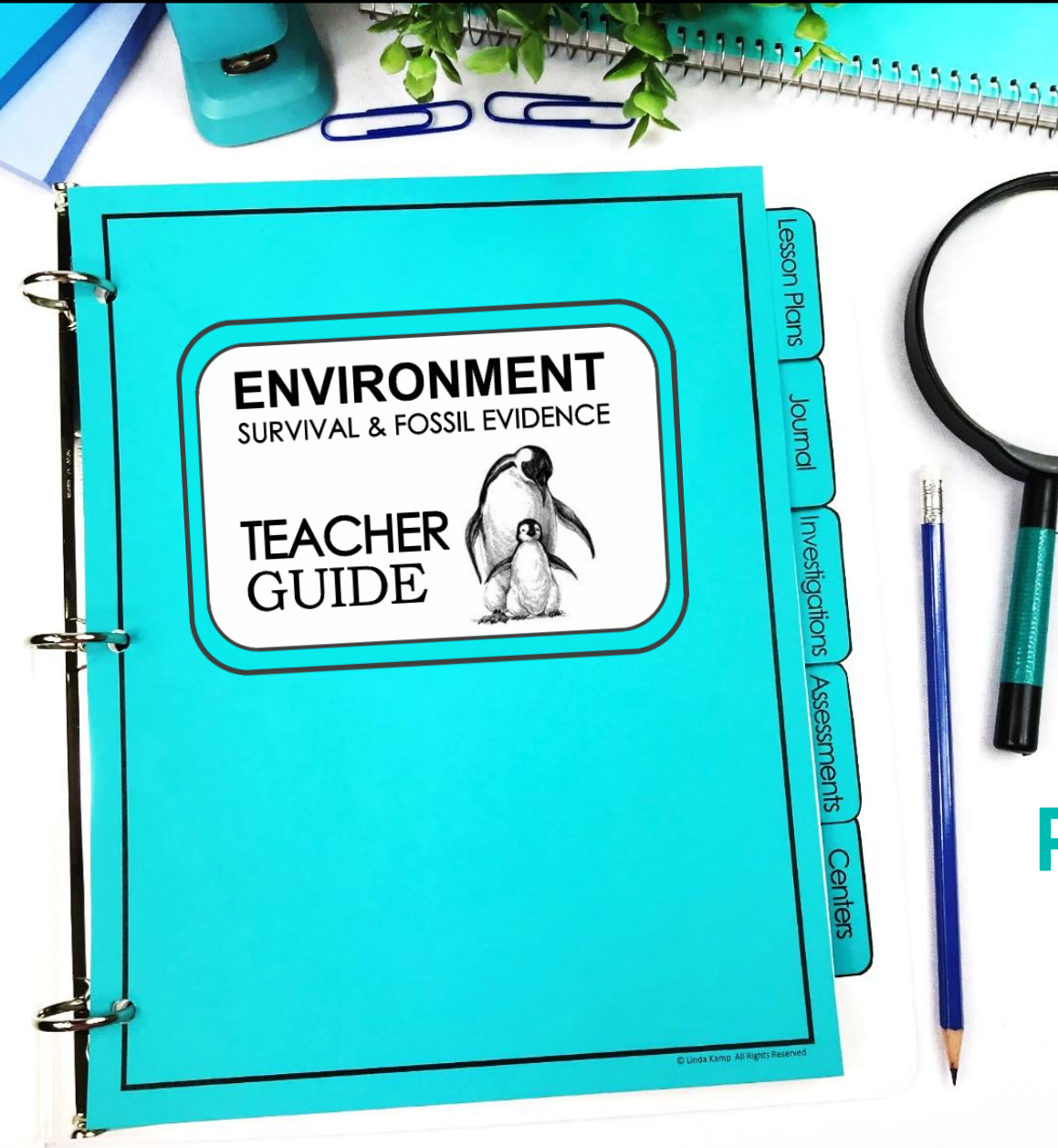
a group of living things of the same kind

to remain alive

a trait of a living thing that helps it survive in its habitat

Full Page Vocabulary Posters

UNIT PLANNING BINDER



Organize your unit
in a handy
planning binder

Binder includes:

- cover & spines
- section dividers
- divider tabs

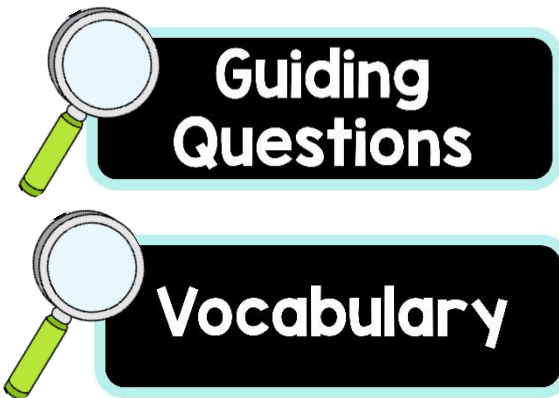
PLAN-TEACH-ASSESS

a rigorous and
highly engaging unit

BONUS Bulletin Board Elements



ENVIRONMENTS Survival & Fossils



CREATE A SCIENCE FOCUS WALL

Display your learning targets, guiding questions, and vocabulary posters with the included bulletin board set.

ENVIRONMENT

Survival & Fossil Evidence

GRADE
3



STUDENTS GAIN AN UNDERSTANDING OF:

- Ways organisms adapt to their environment in order to survive
- Survival of individuals & groups
- Variations in a species that provide advantages for survival
- Types of fossils & how they formed
- The fossil record
- Analyzing fossil data
- The geologic time scale
- Organizing data in tables
- Carrying out investigations
- Making models & diagrams
- Writing a scientific explanation

THIRD GRADE SCIENCE CURRICULUM

[CLICK HERE](#) to see additional units & the yearlong money-saving bundle.

