

Lessons 13–15

Animal Groups

Prepare

In Lesson 13, students model group behaviors to investigate how living in a group can benefit animals. In Lesson 14, students deepen their understanding of animal groups by obtaining and combining information from texts to learn about the different purposes of living in groups and differences between groups. Students then construct an argument from evidence to explain how living in a group can benefit individual members. In Lesson 15, students model how animal groups cope with changes to the systems in which they live. Students also synthesize their learning by updating the anchor chart and completing a Conceptual Checkpoint.

Student Learning

Knowledge Statement

Patterns in behavior reveal that living in groups helps animals survive.

Objectives

- Lesson 13: Use evidence from models to explain that animals can benefit from living in a group.
- Lesson 14: Obtain, evaluate, and communicate information about why different animals live in groups.
- Lesson 15: Apply prior knowledge of systems to understand how animal groups cope with change.

Concept 2: Suitability to Environment

Focus Question

How do organisms get what they need to survive?

Phenomenon Question

Why do some animals live in groups?

Texas Essential Knowledge and Skills Addressed

- 3.2A **Plan and implement descriptive investigations, including asking and answering questions, making inferences,** and selecting and using equipment or technology needed, to solve a specific problem in the natural world. (Addressed)
- 3.2B **Collect and record data by observing and measuring** using the metric system and recognize differences between observed and measured data. (Addressed)
- 3.2C **Construct** maps, graphic organizers, **simple tables, charts,** and bar graphs **using tools** and current technology **to organize, examine,** and evaluate measured **data.** (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)
- 3.4 **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.** (Addressed)

English Language Proficiency Standards Addressed

- 2F Listen to and derive meaning from a variety of media such as audio tape, video, DVD, and CD ROM to build and reinforce concept and language attainment.
- 3E Share information in cooperative learning interactions.
- 4F Use visual and contextual support and support from peers and teachers to read grade-appropriate content area text, enhance and confirm understanding, and develop vocabulary, grasp of language structures, and background knowledge needed to comprehend increasingly challenging language.

Materials

		Lesson 13	Lesson 14	Lesson 15
Student	Science Logbook (Lesson 13 Activity Guide)	●		
	Science Logbook (Lesson 14 Activity Guide)		●	
	Science Logbook (Lesson 15 Activity Guides A and B)			●
Teacher	Model Penguin Behavior: 8 test tubes, 8 cups of ice, 2 thermometers, clear plastic bin (13.5" × 8" × 4.5" or larger), rubber band, timer, Model Penguin Behavior Setup Instructions and Classroom Procedure (Lesson 13 Resource A)	●		
	Animal Group Photographs (Lesson 13 Resource C)	●		
	Leaf-Cutter Ant Station: 80 leaves, 1 pound of modeling clay, 2 scales, 4 desks, timer, craft sticks (1 per student in group), container for craft sticks, marker, scissors, station procedure sheet	●		
	Lions versus Wildebeests Station: 6-sided game die, Wildebeest Behavior Key, Lion Behavior Key, desk, craft sticks (1 per student in group), container for craft sticks, marker, scissors, station procedure sheet, masking tape (optional)	●		
	Musk Oxen versus Arctic Wolves Station: 27 adult musk oxen cutouts (per group), 9 baby musk oxen cutouts (per group), 3 sheets of notebook or printer paper (per group), 3 musk oxen scenario sheets, 3 glue sticks, desk, craft sticks (1 per student in group), container for craft sticks, marker, scissors, station procedure sheet	●		
	Driving question board	●		●
	Animal Groups Text Assignments (Lesson 14 Resource)		●	
	Anchor chart		●	●
	Anchor model		●	
	Classroom Change Scenarios (Lesson 15 Resource A)			●
	Meerkat Group Photograph (Lesson 15 Resource B)			●
	Model Meerkat Behavior: 5 plastic cones or paper plates, hand tissues (1 per student acting as forager), several small pieces of paper (or other small objects), timer, Model Meerkat Behavior Setup Instructions and Classroom Procedure (Lesson 15 Resource C)			●
	Coping with Change Scenarios (Lesson 15 Resource D)			●
Conceptual Checkpoint Photograph (Lesson 15 Resource E)			●	

		Lesson 13	Lesson 14	Lesson 15
Preparation	1 Day Before: Collect leaves for Leaf-Cutter Ant Station.	●		
	Prepare materials to model penguin behavior (see Lesson 13 Resource A).	●		
	Set up group behavior stations (see Lesson 13 Resource B).	●		
	Print a copy of Animal Group Photographs (Lesson 13 Resource C).	●		
	Cue penguin video: http://phdsci.link/1215 .	●		
	Print a copy of each animal groups text (see Lesson 14 Resource).		●	
	Cue leaf-cutter ant video, lion and wildebeest video, musk ox and Arctic wolf video (VID NOW 2017), and butterfly video: http://phdsci.link/1216 , http://phdsci.link/1217 , http://phdsci.link/1218 , and http://phdsci.link/1219 .		●	
	Prepare materials to model meerkat behavior (see Lesson 15 Resource C).			●
	Cue meerkat video, elephant video, and butterfly video from Lesson 14: http://phdsci.link/1220 , http://phdsci.link/1221 , and http://phdsci.link/1219 .			●

Lesson 15

Objective: Apply prior knowledge of systems to understand how animal groups cope with change.

Launch 7 minutes

Begin the lesson by asking the following question.

► **How is our classroom a system?**

- *Our classroom is a system because there are a lot of parts that work together.*
- *If one part of our classroom changes, the other parts will be affected.*

If needed, remind students that a system is made up of different components that interact and depend on one another.

Read aloud one of the classroom change scenarios from Lesson 15 Resource A. Then ask students to think about the scenario as they participate in a collaborative conversation routine, such as Mix and Mingle, to respond to the following questions.

► **What is the change in the classroom system?**

- *All the supplies are gone.*
- *The supplies in the classroom are ruined.*

► **How will the change affect the class?**

- *We won't have any supplies to use.*
- *We won't be able to do our assignments.*

Agenda

Launch (7 minutes)

Learn (33 minutes)

- **Model Meerkat Behavior**
(10 minutes)
- **Determine How Other Animal Groups Cope with Change**
(10 minutes)
- **Revise Anchor Chart** (3 minutes)
- **Conceptual Checkpoint**
(10 minutes)

Land (5 minutes)

► **What could you do as a group to deal with the change?**

- *Maybe we could share supplies with another class.*
- *We could all bring supplies from home.*

After students respond to all three questions, read aloud at least one additional scenario, and ask students to repeat the routine.

After the routine is complete, ask students to share with the class what they talked about with their partners.

► **How could working as a group help us deal with a change in our classroom system?**

- *We could work together to gather more supplies for our classroom.*
- *If there are more students, we could move our desks to a bigger space and share our supplies.*
- *We could work together to move our supplies outside so that we don't have to work in the dark.*
- *We could work together to move the animals and then have our lesson outside.*

Explain to students that they identified ways they would cope with a change in the classroom system. Tell students that **cope** means to deal successfully with a difficult situation. Remind students of an example they came up with to cope with one of the classroom change scenarios (e.g., moving the class to the cafeteria and sharing supplies to accommodate 30 additional students), and emphasize how this strategy would help students deal with the situation successfully.



English Language Development

The term *cope* is used repeatedly in this module. Introduce this term explicitly.

Tell students that in this lesson they will investigate how animal groups work together to cope with change as they further explore the Phenomenon Question **Why do some animals live in groups?**

Learn

33 minutes

Model Meerkat Behavior

10 minutes

Tell students that there are animals called meerkats that live in groups on the southern tip of Africa. Display the meerkat group photograph (Lesson 15 Resource B), and explain that meerkat groups live in burrows under the ground. Tell students that meerkats must leave their burrows to find insects and plants to eat.



Explain to students that they will model meerkat behavior to help understand how meerkats cope with change.  Tell students that in the model, the meerkats' system will include the meerkats, the meerkats' burrows, the meerkats' food, and the area around the burrows where the meerkats forage for food.



Teacher Note

Consider moving to a larger space to accommodate this activity.



Safety Note

While participating in the model, students must exhibit appropriate behavior to ensure that no one gets hurt. Explain to students that they must not run or push other participants.

Divide the class in half. One half of the class should model the meerkats' behavior while the other half of the class observes. Direct the observers to consider the meerkats' system, the change that occurs in the system, and how the meerkats cope with the change. After the first half of the class models the

meerkats' behavior, switch the observers and the participants so that all students have an opportunity to both observe and participate. Follow the procedure in Lesson 15 Resource C to direct students on how to model the meerkats' behavior.

After all students have participated in the model, play the meerkat video (<http://phdsci.link/1220>).

▶ **What role do you think the meerkats in the video are playing in their group?**

- *I think the meerkat standing up looking around must be a sentinel.*
- *Maybe the other meerkats are foragers.*

Use student responses to conclude that the meerkat standing up in the video is acting as a sentinel and that the other meerkats are acting as foragers. Explain that meerkats in the wild switch roles throughout the day so that all meerkats have an opportunity to forage for food. Then ask students to think about how the video relates to their model of meerkat behavior.

▶ **What change occurred in the meerkat system that we modeled?**

- *A predator came into the system.*
- *There was a predator that tried to hunt down the foragers.*

▶ **How did the meerkats cope with the change?**

- *The sentinels made noise when they saw the predator.*
- *The foragers ran away from the predator and hid.*

Summarize for students that the meerkats coped with the change of a predator entering the system by warning one another and running away.

▶ **How do you think other animal groups cope with change?**

- *Maybe some animals work together to fight off predators.*
- *I think animals could huddle in a group if the weather got colder than normal.*

Determine How Other Animal Groups Cope with Change 10 minutes

Divide students into small groups. Display the coping with change scenarios (Lesson 15 Resource D), and ask students to read each scenario with their group. Students should then work with their group to complete the chart in their Science Logbooks (Lesson 15 Activity Guide A) by identifying the animal group described in the scenario, the change that occurred in the group's system, and how the group coped with the change. 🐛

Sample student responses:

Animal Group	Change in System	How did the group cope with the change?
Fire ants	The ants' mound was destroyed.	The ants worked together to rebuild the mound.
Chimpanzees	A female chimpanzee was killed.	Another chimpanzee adopted the chimpanzee's baby.
Dolphins	A dolphin was injured by a shark.	Other dolphins worked together to lift it up so that it could breathe.
Baboons	The baboons got ticks on them.	The baboons groomed one another to remove the ticks.

After all groups have completed their chart, bring students back together as a class.

- ▶ How does living in a group help animals cope with change?
 - Animals can help one another if something changes.
 - Living in a group means animals can work together if there is a difficult situation.



Extension

Consider having students act out one or more of the scenarios to help them identify the components of each system.

Revise Anchor Chart 3 minutes

Display the anchor chart. Ask students to share what they learned about how meerkats and other animals cope with change. Summarize key ideas and add them to the anchor chart.

Sample anchor chart:

Survival
<p>Fossil Evidence</p> <ul style="list-style-type: none">• Fossils provide evidence about the kinds of organisms that once lived and what their environments were like.• Some environments looked very different in the past from the way they look now.• The kinds of organisms that live in an area can change over time. Sometimes organisms live in new areas, and sometimes they no longer live anywhere on Earth.
<p>Suitability to Environment</p> <ul style="list-style-type: none">• A habitat contains everything a particular kind of organism needs to survive. Environments include multiple interconnected habitats.• For any particular environment, some kinds of organisms can survive well, some can survive less well, and some cannot survive at all.• Some animals live in groups that help members survive. Living in groups can help animals get food, defend themselves, and cope with change.

Conceptual Checkpoint 10 minutes

Tell students they will now participate in a Conceptual Checkpoint as they observe a different animal group and explain how these animals get what they need to survive. Display the elephant group photograph (Lesson 15 Resource E), and play the elephant video (<http://phdsci.link/1221>).

Play the video two times with a short pause between viewings for students to jot down what they notice. After the second viewing, ask students to talk with a partner about what they observe in the photograph and the video. 🧑🧑



Show the video to students one more time. Then ask students to respond to the following prompt in their Science Logbooks (Lesson 15 Activity Guide B). As needed, remind students to think about the characteristics of the elephants, the elephants' environment, and how they think elephants might interact with one another in a group.

▶ How do elephants get what they need to survive in their environment?

Sample student response:

- *Elephants are suited to their environment because of their characteristics. They use their trunks and mouths to get the food and water they need to survive. They also have tough skin that protects them in their environment. Elephants travel in groups for survival. Living in a group helps them protect their young from predators and find food more easily.*



Differentiation

Circulate while students discuss their observations. Make note of students who express misconceptions or lack understanding. Check in with these students during the written portion of the Conceptual Checkpoint (3E).



Conceptual Checkpoint

This Conceptual Checkpoint assesses student understanding of the Concept 2 Focus Question: **How do organisms get what they need to survive?** Students should demonstrate an understanding that organisms have characteristics that make them suited for certain environments and that living in a group benefits the individual members of the group.

Evidence

Look for evidence that all students

- describe characteristics of elephants that make them suited to their environment (e.g., trunks and mouths for getting food and water, tough skin to protect themselves), and
- describe how elephants benefit from living in groups (e.g., protecting their young).

Next Steps

If students cannot describe characteristics that make elephants suited to their environment, then consider rereading *Amos & Boris* (Steig 2009) to remind students that an organism's characteristics determine its suitability to a particular environment. If students struggle to describe the benefits of living in groups, then revisit the modeling activities from Lesson 13. Prompt students to explain what they did at each station and to reflect on how that behavior benefited each individual member of the group.

Land 5 minutes

Display the driving question board, and discuss with the class whether what they have learned helps answer the questions under the Concept 2 Focus Question: **How do organisms get what they need to survive?**

Then replay the video of clustering butterflies from Lesson 14 (<http://phdsci.link/1219>). Ask students to discuss with a partner what they think would happen to the butterflies if the temperature suddenly became very cold such as during a snowy winter.

Sample student responses:

- *I think the butterflies would die because it would be too cold. They couldn't flap their wings in the snow.*
- *I think the butterflies might go somewhere warm like birds do.*
- *Maybe butterflies can survive in the cold if they work together like penguins.*

Distribute one or two sticky notes to each student, and ask them to respond to the following question.

- **What questions do you still have about how butterflies survive in their environment?**
 - *What do butterflies do if it gets really cold?*
 - *Is a butterfly strong enough to migrate like a bird?*
 - *Do butterflies work as a group to survive in cold weather?*

Add relevant questions to the driving question board.  Tell students that they will investigate how butterflies survive changes in their environment in the next lesson as they begin to answer the Concept 3 Focus Question: **What happens to organisms when the environment changes?**

Optional Homework

Students ask a family member to help them find a realistic image of a monarch butterfly in a book or on the internet. Students use the image to record observations about monarch butterflies.



Teacher Note

If the driving question board was not fully developed in Lesson 2, use these student questions to develop Concept 3 and reveal the Concept 3 Focus Question: **What happens to organisms when the environment changes?**

Consider collecting the sticky notes and evaluating student questions as a formative assessment opportunity. Consider how students are applying new concepts, whether students have misconceptions about butterflies, and what prior knowledge students have about environmental change.