

Grade 3 Science

Unit 2: Life Cycles, Traits, and Variations

15 lessons and a unit quiz. Use this pack with the **Life Cycles, Traits, and Variations Student Reader** (print it, or download it once from the course) to teach the whole unit without the internet.

What is in this pack

- A lesson plan for each chapter: the Big Question, words to know, which pages to read, questions to talk over and the activity pages.
- The unit quiz, ready to print.
- Answers for the teacher at the back: every discussion question and the quiz key.

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Lesson schedule

Two or three lessons a week, about 30 minutes each. Tick each one off as you go.

	Lesson	Reader pages	Activity pages
☐	Lesson 1: The Beginning of Life for a Plant	—	AP 1.1
☐	Lesson 2: Animals Have Life Cycles	PDF pages 7–12	AP 2.1
☐	Lesson 3: Plants Have Life Cycles	PDF pages 13–18	AP 3.1
☐	Lesson 4: Modeling a Life Cycle	—	AP 4.1, AP 4.2, AP 4.3
☐	Lesson 5: Noticing Different Traits	—	AP 5.1
☐	Lesson 6: Traits of Parents, Offspring, and Siblings	PDF pages 19–26	AP 6.1
☐	Lesson 7: Studying Family Traits	—	AP 7.1
☐	Lesson 8: Traits Vary Within Populations and Species	PDF pages 27–32	AP 8.1, AP 8.2
☐	Lesson 9: Investigating Plant Growth	—	AP 9.1
☐	Lesson 10: Environments and Traits	PDF pages 33–38	AP 10.1
☐	Lesson 11: Environments and Traits—Investigation Results	—	AP 11.1
☐	Lesson 12: Helpful Traits	PDF pages 39–44	AP 12.1
☐	Lesson 13: Traits, Survival, and Differing Environments	PDF pages 45–50	AP 13.1
☐	Lesson 14: Traits and Advantage	—	AP 14.1
☐	Lesson 15: Science Categories Review Game	—	—
☐	Unit review and assessment	—	AP UR.1, AP UR.2, AP UR.3
☐	Words quiz	—	—

Page numbers are the PDF page numbers of the Student Reader file, so they match what your PDF reader shows.

Lesson 1: The Beginning of Life for a Plant

THE BIG QUESTION

How does a planted seed change?

Words to know

- **life cycle** — a series of stages in an organism's life
- **organism** — any living thing
- **flowering plant** — a plant that produces flowers during its life cycle
- **germination** — the beginning of the growth process when a plant sprout comes out of a seed
- **seed** — the part of a plant that protects the material that will sprout into a new plant
- **growth** — the process of a living organism maturing or becoming larger
- **pattern** — the predictable stages of growth or any predictable repetition
- **plant** — a living thing which often grows in soil and has structures such as roots, leaves, and stems

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 25–31: the steps, materials and timing for this lesson.

Check for understanding

- Answer the Big Question in a sentence or two: How does a planted seed change?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 1.1: The Life of a Plant — Teacher Guide PDF pages 131–132

Lesson 2: Animals Have Life Cycles

THE BIG QUESTION

How do different types of animals change throughout their lives?

Words to know

- **life cycle** — a series of stages in an organism's life
- **organism** — any living thing
- **adolescence** — a stage of the life cycle when a young animal is developing into an adult
- **reproduction** — the process of making new organisms
- **metamorphosis** — a change of form during the life cycle of some animals
- **animal** — a living organism that eats and responds to senses
- **birth** — the first stage of an animal's life cycle
- **death** — the final stage of an animal's life cycle
- **pattern** — the predictable stages of growth or any predictable repetition

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 32–38: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 1: "Animals Have Life Cycles": PDF pages 7–12. Look at the pictures and maps together.

Talk it over

1. What animals, other than birds, are born from hard-shelled eggs?
2. What changes do mosquitos go through during their lifetimes?
3. Which one(s)?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How do different types of animals change throughout their lives?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 2.1: Modeling a Life Cycle — Teacher Guide PDF page 133

Lesson 3: Plants Have Life Cycles

THE BIG QUESTION

How do different types of plants change over their lifetimes?

Words to know

- **life cycle** — a series of stages in an organism's life
- **organism** — any living thing
- **reproduction** — the process of making new organisms
- **flowering plant** — a plant that produces flowers during its life cycle
- **germination** — the beginning of the growth process when a plant sprout comes out of a seed
- **pollination** — the transfer of pollen that causes flowering plants to reproduce
- **seed** — the part of a plant that protects the material that will sprout into a new plant
- **death** — the final stage of an animal's life cycle
- **growth** — the process of a living organism maturing or becoming larger

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 39–44: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 2: "Plants Have Life Cycles": PDF pages 13–18. Look at the pictures and maps together.

Talk it over

1. How does the fruit help protect the seed?
2. Do the plants you have observed look different at different times of year?
3. Do plants have life cycles?
4. Do all fruits have seeds associated with them?
5. How are the life cycles of flowering plants and ferns similar?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How do different types of plants change over their lifetimes?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 3.1: Modeling Plant Life Cycles — Teacher Guide PDF page 134

Lesson 4: Modeling a Life Cycle

THE BIG QUESTION

How can I model the common stages of a life cycle?

Words to know

- **life cycle** — a series of stages in an organism's life
- **birth** — the first stage of an animal's life cycle
- **death** — the final stage of an animal's life cycle
- **growth** — the process of a living organism maturing or becoming larger
- **pattern** — the predictable stages of growth or any predictable repetition

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 45–52: the steps, materials and timing for this lesson.

Talk it over

1. What is a difference between the life cycles of flowering and nonflowering plants?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How can I model the common stages of a life cycle?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 4.1: Model Checklist — Teacher Guide PDF page 135
- Activity Page 4.2: Comparing Life Cycles — Teacher Guide PDF page 136
- Activity Page 4.3: Take-Home Modeling Activity — Teacher Guide PDF pages 137–138

Lesson 5: Noticing Different Traits

THE BIG QUESTION

What are examples of physical traits in plants and animals?

Words to know

- **individual** — a single living organism
- **physical trait** — a feature of a living thing's body
- **siblings** — organisms that come from the same va parents

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 55–60: the steps, materials and timing for this lesson.

Talk it over

1. What can you tell about the organism's size?
2. Does the organism have a certain shape?
3. What color is the animal?
4. Where do those traits come from?
5. Are there more examples of physical traits that you would add to your chart?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: What are examples of physical traits in plants and animals?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 5.1: Plant and Animal Traits — Teacher Guide PDF page 139

Lesson 6: Traits of Parents, Offspring, and Siblings

THE BIG QUESTION

How are traits similar and different within families?

Words to know

- **individual** — a single living organism
- **physical trait** — a feature of a living thing's body
- **inherit** — to receive from parents
- **offspring** — a young organism produced by parents
- **siblings** — organisms that come from the same va parents
- **identical** — exactly the same
- **multiples** — the birth of more than one offspring at the same time

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 61–68: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 3: “Traits of Parents, Offspring, and Siblings”: PDF pages 19–26. Look at the pictures and maps together.

Talk it over

1. What physical features, or traits, do the puppies have in common?
2. How are their traits different?
3. How do the feather patterns of the individual chickens differ?
4. What traits are the same for all of the chickens?
5. Which individual is the parent?
6. How are their physical traits different?
7. Which physical traits did the baby inherit from its parent?
8. What traits could the offspring likely inherit from the parents?
9. Where did the puppies get their traits?
10. The video shows the mother dog but not the father. Ask: Based on how the offspring look, can you predict how their father looked?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How are traits similar and different within families?

- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 6.1: Box and T-Chart — Teacher Guide PDF page 140

Lesson 7: Studying Family Traits

THE BIG QUESTION

How do the traits of an individual compare to those of its parents and siblings?

Words to know

- **individual** — a single living organism
- **physical trait** — a feature of a living thing's body
- **inherit** — to receive from parents
- **offspring** — a young organism produced by parents
- **siblings** — organisms that come from the same va parents
- **identical** — exactly the same
- **family** — a group of animals that have the same ancestry and share similar traits

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 69–74: the steps, materials and timing for this lesson.

Talk it over

1. What traits did the parent pass down to its offspring?
2. What is different between the parent and the offspring?
3. What traits do the sibling kittens have in common?
4. What traits are different among the siblings?
5. What pattern did you find in this family of cheetahs?
6. What could you tell about the siblings' traits?
7. Did the siblings have the same traits as their parents?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How do the traits of an individual compare to those of its parents and siblings?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 7.1: Cheetah Traits — Teacher Guide PDF pages 141–144

Lesson 8: Traits Vary Within Populations and Species

THE BIG QUESTION

How do traits vary within groups of the same type of organism?

Words to know

- **population** — a group of a single type of organism living in the same place at the same time
- **ecosystem** — all the living and nonliving things that interact in the same place

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 75–82: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 4: “Traits Vary Within Populations and Species”: PDF pages 27–32. Look at the pictures and maps together.

Talk it over

1. How do traits vary among these leaves from the same population?
2. Which trait is helping one katydid survive better than the other?
3. What do you think will happen to the pink katydid?
4. What would happen if a new bird came into the meadow that could not see the color pink and yet loved to eat katydids?
5. What would happen if a giraffe has a longer neck than another giraffe?
6. What would happen if a zebra is born with more muscular legs and can therefore run faster than other zebras?
7. Are these frogs part of the same species?
8. How can you tell which marbles belong to which family?
9. Are there variations among the families in this population of marbles?
10. What do all the marbles in this population have in common?
11. Are these horses all part of the same population?
12. Can you notice any trait variations in the horses?
13. What traits are different?
14. What traits are similar?
15. What are some of the ways that individual plants or animals vary within a population?

16. Did you identify any variations or similarities among individuals of the same population in the leaf activity?
17. What traits within this population are similar?
18. What traits within this population are different?
19. What did the population of cheetahs have in common?
20. How did the population of cheetahs differ?
21. Why is there variation among populations?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How do traits vary within groups of the same type of organism?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 8.1: Looking at Leaves — Teacher Guide PDF page 145
- Activity Page 8.2: Traits in a Population — Teacher Guide PDF pages 146–147

Lesson 9: Investigating Plant Growth

THE BIG QUESTION

How does the environment affect some traits of plants?

Words to know

- **life cycle** — a series of stages in an organism's life
- **individual** — a single living organism
- **environment** — a surrounding area that contains living and nonliving things
- **change** — to make an object, a living thing, or an environment different from what it was previously

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 84–88: the steps, materials and timing for this lesson.

Talk it over

1. What do you think will happen to the plants that do not get any or enough light?
2. What do you think will happen to the plants that do not get any or enough water?
3. Which plants do you think will be stronger? Weaker?
4. What do you think will happen to specific plant traits? For example, what will happen to the leaves, stems, and possibly even the roots?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How does the environment affect some traits of plants?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 9.1: Environmental Changes — Teacher Guide PDF pages 148–149

Lesson 10: Environments and Traits

THE BIG QUESTION

How does the environment affect the traits of living things?

Words to know

- **environment** — a surrounding area that contains living and nonliving things

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 89–95: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 5: “Environments and Traits”: PDF pages 33–38. Look at the pictures and maps together.

Talk it over

1. An example of a change to the environment could be getting rid of all the water at the lake. What would happen if all of the water in the lake disappeared?
2. Another example of a change to the environment could be cutting down the trees at school to make more room for playground equipment. What would happen if the trees were cut down at school?
3. Changing amounts of rain or sunlight can also be an example. What would happen if an area got too much sunlight and not enough rain or got too much rain and not enough sunlight?
4. Pages 28–29 What are some physical traits that do not change based on a flamingo's environment?
5. Do you think these plants will survive the flood?
6. What kinds of changes to the plants' physical traits might the flood cause?
7. If these things happen, what will be the cause?
8. What are the monkeys doing?
9. What are the monkeys eating?
10. What do you think will happen to the monkeys after eating too much people food?
11. What are some of the ways that plants or animals are influenced by their environment?
12. What happens when environments change?
13. How often does your animal get exercise?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How does the environment affect the traits of living things?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 10.1: What Is All Around Me? — Teacher Guide PDF pages 150–151

Lesson 11: Environments and Traits— Investigation Results

THE BIG QUESTION

How did the environment affect the traits of the plant in my investigation?

Words to know

- **life cycle** — a series of stages in an organism's life
- **individual** — a single living organism
- **physical trait** — a feature of a living thing's body
- **environment** — a surrounding area that contains living and nonliving things
- **change** — to make an object, a living thing, or an environment different from what it was previously

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 96–100: the steps, materials and timing for this lesson.

Talk it over

1. What parts of the plants did you observe when you studied them in Groups A and B?
2. What are these physical features of each plant examples of?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How did the environment affect the traits of the plant in my investigation?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 11.1: Evidence of Changes — Teacher Guide PDF pages 152–153

Lesson 12: Helpful Traits

THE BIG QUESTION

Which traits are helpful to organisms, and which traits are not?

Words to know

- **individual** — a single living organism
- **population** — a group of a single type of organism living in the same place at the same time
- **advantage** — a factor that helps an organism
- **change** — to make an object, a living thing, or an environment different from what it was previously
- **disadvantage** — a trait that makes an organism less likely to survive or succeed

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 102–109: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 6: “Helpful Traits”: PDF pages 39–44. Look at the pictures and maps together.

Talk it over

1. Are the polar bear's skin and fur helpful or harmful traits?
2. How are the polar bear's skin and fur helpful?
3. Which physical traits help the polar bear be an excellent swimmer?
4. How is being an excellent swimmer a helpful trait for a polar bear?
5. How is being large in size an advantage to the polar bear?
6. What is an example of a harmful trait?
7. Could the trait that is harmful to this organism be helpful to another of the same species?
8. How will the number of legs help the animal survive?
9. Should it have stripes or spots or be able to change colors?
10. If so, how?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Which traits are helpful to organisms, and which traits are not?

- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 12.1: Helpful Traits Scavenger Hunt — Teacher Guide PDF page 154

Lesson 13: Traits, Survival, and Differing Environments

THE BIG QUESTION

Why are traits important when environments change?

Words to know

- **camouflage** — a color or pattern that helps an organism blend in with its surroundings
- **rare** — not found in large numbers
- **extinct** — having no remaining living members
- **change** — to make an object, a living thing, or an environment different from what it was previously
- **seasonal** — the particular parts of a year that are related to temperature and weather conditions (summer, winter, fall, spring) V

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 110–116: the steps, materials and timing for this lesson.

Read

Read Student Reader, Chapter 7: “Traits, Survival, and Differing Environments”: PDF pages 45–50. Look at the pictures and maps together.

Talk it over

1. Which trait helps the giraffes survive in the grasslands?
2. Which trait would make it hard for giraffes to survive in a thick, tropical forest?
3. How can the same trait be helpful and harmful at the same time?
4. How did the environment change for the peppered moths?
5. Why did this affect the moths' ability to survive?
6. Why did the white moths suddenly not survive as well as the black moths?
7. Which ears took longer to fan off the drop of water?
8. Which ears do you think are better for helping the elephant survive in hot environments?
9. Does having larger ears help if the environment changes and becomes hotter?
10. Is the color-changing fur a helpful or harmful trait for the hare?
11. Which hare, brown or white, do you think would be able to better survive in areas that are very snowy?

12. If the environment is not snowy, how can this color-changing trait be helpful to the hare?
13. Why do some organisms survive better when environments change?
14. What did you read about in the reading selection that is similar to these activities?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: Why are traits important when environments change?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 13.1: Whales — Teacher Guide PDF page 155

Lesson 14: Traits and Advantage

THE BIG QUESTION

How can variation of a trait be an advantage or disadvantage?

Words to know

- **individual** — a single living organism
- **population** — a group of a single type of organism living in the same place at the same time
- **advantage** — a factor that helps an organism
- **change** — to make an object, a living thing, or an environment different from what it was previously
- **disadvantage** — a trait that makes an organism less likely to survive or succeed

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 117–121: the steps, materials and timing for this lesson.

Talk it over

1. What trait variation is described in the story?
2. What is the evidence that Daniel collects?
3. Why do you think there are more blackberry bushes with longer thorns?

Answers are at the back of this pack.

Check for understanding

- Answer the Big Question in a sentence or two: How can variation of a trait be an advantage or disadvantage?
- Use one of today's words in a sentence of your own.

Activity pages

- Activity Page 14.1: A Prickly Tale — Teacher Guide PDF page 156

Lesson 15: Science Categories Review Game

THE BIG QUESTION

What have I learned about life cycles, traits, and variations?

Words to know

- **life cycle** — a series of stages in an organism's life
- **organism** — any living thing
- **adolescence** — a stage of the life cycle when a young animal is developing into an adult
- **reproduction** — the process of making new organisms
- **metamorphosis** — a change of form during the life cycle of some animals
- **flowering plant** — a plant that produces flowers during its life cycle
- **germination** — the beginning of the growth process when a plant sprout comes out of a seed
- **pollination** — the transfer of pollen that causes flowering plants to reproduce
- **seed** — the part of a plant that protects the material that will sprout into a new plant
- **individual** — a single living organism
- **physical trait** — a feature of a living thing's body
- **inherit** — to receive from parents
- **offspring** — a young organism produced by parents
- **siblings** — organisms that come from the same two parents
- **identical** — exactly the same
- **population** — a group of a single type of organism living in the same place at the same time
- **environment** — a surrounding area that contains living and nonliving things
- **advantage** — a factor that helps an organism
- **camouflage** — a color or pattern that helps an organism blend in with its surroundings
- **rare** — not found in large numbers
- **extinct** — having no remaining living members
- **plant** — a living thing which often grows in soil and has structures such as roots, leaves, and stems

Teacher's lesson plan

Follow the Teacher Guide, PDF pages 122–128: the steps, materials and timing for this lesson.

Check for understanding

- Answer the Big Question in a sentence or two: What have I learned about life cycles, traits, and variations?
- Use one of today's words in a sentence of your own.

UNIT REVIEW

Unit review and assessment

- Unit Assessment (print for your student): Teacher Guide PDF pages 161–165
- How to mark it (for the teacher): Teacher Guide PDF pages 169–171
- Activity page answer key (for the teacher): Teacher Guide PDF pages 166–168
- Activity Page UR.1: Science Categories — Teacher Guide PDF page 157
- Activity Page UR.2: Vocabulary Crossword Puzzle — Teacher Guide PDF page 158
- Activity Page UR.3: Vocabulary Review — Teacher Guide PDF page 160

WORDS QUIZ

Life Cycles, Traits, and Variations

Name: _____ Date: _____

Circle the letter of the best answer.

1. Which word means “a stage of the life cycle when a young animal is developing into an adult”?
 - a) camouflage
 - b) adolescence
 - c) offspring
 - d) revive
2. Which word means “having no remaining living members”?
 - a) extinct
 - b) pollination
 - c) identical
 - d) revive
3. Which word means “a group of similar individuals that can reproduce together”?
 - a) reproduction
 - b) species
 - c) revive
 - d) organism
4. Which word means “the part of a plant that protects the material that will sprout into a new plant”?
 - a) organism
 - b) seed
 - c) identical
 - d) population
5. Which word means “the transfer of pollen that causes flowering plants to reproduce”?
 - a) pollination
 - b) adolescence
 - c) rare
 - d) offspring
6. Which word means “a plant that produces flowers during its life cycle”?
 - a) variation
 - b) advantage
 - c) flowering plant
 - d) metamorphosis

- 7.** Which word means “a color or pattern that helps an organism blend in with its surroundings”?
- a) physical trait
 - b) camouflage
 - c) ry
 - d) riation
- 8.** Which word means “exactly the same”?
- a) pollination
 - b) ecies
 - c) identical
 - d) physical trait
- 9.** Which word means “a factor that helps an organism”?
- a) advantage
 - b) inherit
 - c) offspring
 - d) rare
- 10.** Which word means “the beginning of the growth process when a plant sprout comes out of a seed”?
- a) adolescence
 - b) germination
 - c) ecies
 - d) pollination
- 11.** Which word means “a single living organism”?
- a) individual
 - b) organism
 - c) extinct
 - d) life cycle
- 12.** Which word means “a young organism produced by parents”?
- a) individual
 - b) offspring
 - c) identical
 - d) physical trait

Answers

Lesson 2: Animals Have Life Cycles

1. **What animals, other than birds, are born from hard-shelled eggs?**
Most reptiles, including crocodiles, turtles, and most snakes
2. **What changes do mosquitos go through during their lifetimes?**
How do you know?
3. **Which one(s)?**
Were any of the life cycle models different from what we read about in the Student Reader? Which example is the most different from the organisms that we read about?

Lesson 3: Plants Have Life Cycles

1. **How does the fruit help protect the seed?**
The fruit keeps the seed moist.
2. **Do the plants you have observed look different at different times of year?**
In the time that you have seen them, have they changed?
3. **Do plants have life cycles?**
Are plants born, do they grow and reproduce, and do they die?
4. **Do all fruits have seeds associated with them?**
What do you think the purpose of the fruit is?
5. **How are the life cycles of flowering plants and ferns similar?**
How are the life cycles of flowering plants and ferns different?

Lesson 4: Modeling a Life Cycle

1. **What is a difference between the life cycles of flowering and nonflowering plants?**
Nonflowering plants reproduce with spores, and flowering plants reproduce with seeds.

Lesson 5: Noticing Different Traits

1. **What can you tell about the organism's size?**
What is the organism's color?
2. **Does the organism have a certain shape?**
Does the organism have fur, scales, or something else covering its body?
3. **What color is the animal?**
What structures do you see?
4. **Where do those traits come from?**
Does this animal have parents? Do those parents have some of these traits, too?
5. **Are there more examples of physical traits that you would add to your chart?**
How are your examples of physical traits similar to the ones you saw from the

classroom pet or the video?

Lesson 6: Traits of Parents, Offspring, and Siblings

1. **What physical features, or traits, do the puppies have in common?**
Size, number of legs and ears, body shape, fur
2. **How are their traits different?**
Different colors of fur, different patterns in their fur, different heights
3. **How do the feather patterns of the individual chickens differ?**
Some have all white feathers; some have a mix of gray, brown, and white feathers; one has feathers that are mostly black.
4. **What traits are the same for all of the chickens?**
Red combs, yellow legs, gray beaks, similar sizes
5. **Which individual is the parent?**
The tall bird
6. **How are their physical traits different?**
The colors of their legs and feathers, their sizes, the lengths of their necks, the colors of their beaks
7. **Which physical traits did the baby inherit from its parent?**
Answers may include body shape, feathers, long legs, and long necks.
8. **What traits could the offspring likely inherit from the parents?**
Colors and shapes
9. **Where did the puppies get their traits?**
They inherited them from their parents.
10. **The video shows the mother dog but not the father. Ask: Based on how the offspring look, can you predict how their father looked?**
Answers will vary, but students should recognize that parents and offspring have similar traits.

Lesson 7: Studying Family Traits

1. **What traits did the parent pass down to its offspring?**
Two pointy ears; two eyes; four paws; fur color, stripes
2. **What is different between the parent and the offspring?**
Eye color
3. **What traits do the sibling kittens have in common?**
Fur color, dark stripes
4. **What traits are different among the siblings?**
Different stripe patterns
5. **What pattern did you find in this family of cheetahs?**
Example: Male cubs had more spots than female cubs. Each litter had more male cubs than female cubs.

6. **What could you tell about the siblings' traits?**

Some have similar traits, such as relative size, while others have different traits, such as different numbers of spots.

7. **Did the siblings have the same traits as their parents?**

Some do, and others do not, to varying degrees. For example, in Litter 1, the males had the same number of spots as the father [2,200], but in Litter 2, the males all had fewer spots [2,000].

Lesson 8: Traits Vary Within Populations and Species

1. **How do traits vary among these leaves from the same population?**

Size, shape, or color of the leaves

2. **Which trait is helping one katydid survive better than the other?**

Body color

3. **What do you think will happen to the pink katydid?**

It will not survive as long as the green katydid.

4. **What would happen if a new bird came into the meadow that could not see the color pink and yet loved to eat katydids?**

The bird might start eating the green katydids.

5. **What would happen if a giraffe has a longer neck than another giraffe?**

Giraffes with longer necks will be more appealing to other giraffes, which may better help them to find a mate.

6. **What would happen if a zebra is born with more muscular legs and can therefore run faster than other zebras?**

Zebras that can run faster because they have more muscular legs can outrun predators and stay safer than other zebras.

7. **Are these frogs part of the same species?**

Yes

8. **How can you tell which marbles belong to which family?**

Most of the marbles in a family are the same color.

9. **Are there variations among the families in this population of marbles?**

Yes

10. **What do all the marbles in this population have in common?**

Shape, size

11. **Are these horses all part of the same population?**

Yes

12. **Can you notice any trait variations in the horses?**

Yes

13. **What traits are different?**

Color, spots, size

14. **What traits are similar?**

Shape, type of horse, physical features

15. **What are some of the ways that individual plants or animals vary within a population?**

They can vary in size, color, or shape.

16. **Did you identify any variations or similarities among individuals of the same population in the leaf activity?**

Accept all correct answers.

17. **What traits within this population are similar?**

Size, shape, texture

18. **What traits within this population are different?**

Color, shape, patterns

19. **What did the population of cheetahs have in common?**

Families 1 and 4 had cheetahs with more light tan fur.

20. **How did the population of cheetahs differ?**

Size, coloring, spots

21. **Why is there variation among populations?**

Variations begin within families, and when many families make up a population, there are many different traits.

Lesson 9: Investigating Plant Growth

1. **What do you think will happen to the plants that do not get any or enough light?**

They will not grow as well and may die.

2. **What do you think will happen to the plants that do not get any or enough water?**

They will shrivel and likely die.

3. **Which plants do you think will be stronger? Weaker?**

The plants that get the same amount of light and water as before will be stronger; those that get less will be weaker; those that don't get any will die.

4. **What do you think will happen to specific plant traits? For example, what will happen to the leaves, stems, and possibly even the roots?**

The traits of the plants that get the same amount of light and water as before will be strong and green; the traits of the plants that get less will be weaker and less green, possibly even turn brown; the traits of the plants that get no light or water at all will be weakest and will turn brown and die.

Lesson 10: Environments and Traits

1. **An example of a change to the environment could be getting rid of all the water at the lake. What would happen if all of the water in the lake disappeared?**

It would affect all the fish and animals that live there.

2. **Another example of a change to the environment could be cutting down the trees at school to make more room for playground equipment. What would**

happen if the trees were cut down at school?

Students would no longer have shade outside.

3. **Changing amounts of rain or sunlight can also be an example. What would happen if an area got too much sunlight and not enough rain or got too much rain and not enough sunlight?**

How well plants grow may change, resulting in some plants turning brown or dying.

4. **Pages 28-29 What are some physical traits that do not change based on a flamingo's environment?**

Long legs, beak shape

5. **Do you think these plants will survive the flood?**

Yes, if the waters recede quickly; no, if the waters do not recede quickly

6. **What kinds of changes to the plants' physical traits might the flood cause?**

The leaves might fall off; the stems might bend over.

7. **If these things happen, what will be the cause?**

Too much water will have drowned the plants.

8. **What are the monkeys doing?**

Stealing people food and eating it

9. **What are the monkeys eating?**

Bananas, peanuts

10. **What do you think will happen to the monkeys after eating too much people food?**

They will become overweight.

11. **What are some of the ways that plants or animals are influenced by their environment?**

Environments can cause animals to become overweight. Diet may change the color of an animal's fur or feathers.

12. **What happens when environments change?**

The living things in the environment, such as plants and animals, can undergo trait changes, too.

13. **How often does your animal get exercise?**

How many meals a day does your animal eat?

Lesson 11: Environments and Traits— Investigation Results

1. **What parts of the plants did you observe when you studied them in Groups A and B?**

Leaves, stems, color

2. **What are these physical features of each plant examples of?**

Physical traits

Lesson 12: Helpful Traits

1. **Are the polar bear's skin and fur helpful or harmful traits?**

Helpful

2. **How are the polar bear's skin and fur helpful?**
The skin is dark and can help the sun keep the polar bear warm. The fur is transparent to let the sun shine onto the skin.
3. **Which physical traits help the polar bear be an excellent swimmer?**
Large paws that act as paddles, shape of face and snout, layers of fat
4. **How is being an excellent swimmer a helpful trait for a polar bear?**
Swimming helps polar bears find food so they can eat and stay alive.
5. **How is being large in size an advantage to the polar bear?**
It can hunt other large animals, such as walruses, for food.
6. **What is an example of a harmful trait?**
A plant that has soft stems and leaves may be more likely to be eaten than plants with thorns.
7. **Could the trait that is harmful to this organism be helpful to another of the same species?**
How do you think the trait fits the environment in which the organism lives?
8. **How will the number of legs help the animal survive?**
Think about what the animal eats in this environment. Based on what it eats, what kind of teeth should the animal have?
9. **Should it have stripes or spots or be able to change colors?**
How large should the ears of the animal be? Does it need to be able to hear danger coming from far away?
10. **If so, how?**
Can this trait harm the organism? If so, how?

Lesson 13: Traits, Survival, and Differing Environments

1. **Which trait helps the giraffes survive in the grasslands?**
Long necks
2. **Which trait would make it hard for giraffes to survive in a thick, tropical forest?**
Long necks
3. **How can the same trait be helpful and harmful at the same time?**
The trait helps giraffes in one environment but harms them in another.
4. **How did the environment change for the peppered moths?**
Soot covered the trees.
5. **Why did this affect the moths' ability to survive?**
It changed which moths could blend in with the trees.
6. **Why did the white moths suddenly not survive as well as the black moths?**
They could not blend in as well as the black moths against the soot-covered trees.
7. **Which ears took longer to fan off the drop of water?**
Smaller ears/sticky notes

8. **Which ears do you think are better for helping the elephant survive in hot environments?**
Larger ears
9. **Does having larger ears help if the environment changes and becomes hotter?**
Yes
10. **Is the color-changing fur a helpful or harmful trait for the hare?**
Helpful
11. **Which hare, brown or white, do you think would be able to better survive in areas that are very snowy?**
White
12. **If the environment is not snowy, how can this color-changing trait be helpful to the hare?**
The hare does not have to turn white; it stays brown because its fur color is a genetically inherited trait.
13. **Why do some organisms survive better when environments change?**
Organisms survive better when they have traits that enable them to survive changed conditions of the environment.
14. **What did you read about in the reading selection that is similar to these activities?**
The peppered moths are similar to the snowshoe hares because they both have traits to help them blend into the environment.

Lesson 14: Traits and Advantage

1. **What trait variation is described in the story?**
The length of the blackberry thorns
2. **What is the evidence that Daniel collects?**
There are more and more blackberry bushes with longer thorns and fewer blackberry bushes with short thorns.
3. **Why do you think there are more blackberry bushes with longer thorns?**
The bushes with longer thorns survive better than the bushes with shorter thorns.
Since this trait helps them survive, it is passed down so that more plants have longer thorns.

Unit quiz key

1. b 2. a 3. b 4. b 5. a 6. c 7. b 8. c 9. a 10. b 11. a 12. b