

Variations in Plants and Animals

Lesson 5c: What We've Learned about Variations in Traits

Grade 1	Length of lesson: 31 minutes	Placement of lesson in unit: 5c of 5 lessons on variations in plants and animals
Unit central question: How do differences (variations) in plants or animals of the same kind help them survive so they can produce young (babies or seeds)?		Lesson focus question: How do differences (variations) in plants or animals of the same kind help them survive so they can produce young (babies or seeds)?
Main learning goal: Variations in traits and the environment affect which plants or animals of the same kind survive long enough to produce young (seeds/babies), and thus which variations become more common in the next generation.		
Science content storyline: Plants or animals of the same kind have traits that can vary. Often, one variation in a trait, such as the smaller size of cottonwood-tree seeds, can help an individual plant or animal survive in its environment. Plants or animals with a particular trait variation are more likely to survive and live long enough to produce young (seeds or babies) if their environment provides what they need. The seeds or babies of those plants or animals are more likely to have the same trait variations as their parents; consequently, these variations become more common in the next generation of plants or animals. In other words, trait variations in plants or animals of the same kind that survive and produce young become more common over time.		
Ideal student response to the focus question: Many dandelions live in the grass. If someone mows the grass, the dandelions that have shorter stems are less likely to be mowed down. They have a better chance of surviving and producing seeds that will become new dandelion plants with short stems, just like their parents. Giraffes born with longer necks are more likely to survive in environments where the leaves they eat are in tall trees. Those giraffes can live long enough to have baby giraffes with long necks, too. These examples show how differences (variations) in plants or animals of the same kind help individual plants or animals survive in their environments and have babies.		

Preparation

<p>Materials Needed</p> <ul style="list-style-type: none"> • Student notebooks • Chart paper and markers • Colored pencils or crayons • Optional: class charts of traits and variations in plants and animals from previous lessons 	<p>Ahead of Time</p> <ul style="list-style-type: none"> • Review the content background document. • ELL support: Meet with ELL students in advance and introduce them to the lesson content, structure, materials, and activities so they know what's expected of them and can participate more fully in the lesson. Identify Tier 2 and 3 words in the lesson plan to review with students in advance, including <i>trait</i>, <i>variation</i>, <i>environment</i>, <i>survive</i>, and <i>survival</i>. Make sure all science words from the unit are displayed in a single place for students to refer to throughout the lesson.
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Lesson 5c General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
5 min	Link to previous lessons: The teacher engages students in reviewing what they learned about cottonwood-seed traits and variations in a previous investigation.	<ul style="list-style-type: none"> Plants or animals of the same kind have traits that can vary. Often, one trait variation, such as the smaller size of cottonwood-tree seeds, shorter stems in dandelions, or long necks in giraffes, can help those plants or animals survive in their environments.
1 min	Lesson focus question: The teacher introduces the focus question, which is also the unit central question: <i>How do differences (variations) in plants or animals of the same kind help them survive so they can produce young (babies or seeds)?</i>	
6 min	Setup for activity: The teacher engages students in reviewing what they learned about dandelion traits and variations in a previous investigation.	<ul style="list-style-type: none"> In a particular environment, some trait variations give certain plants or animals a better chance of surviving and producing young (seeds or babies). The seeds or babies of those plants or animals are more likely to have the same trait variations as their parents.
8 min	Activity: Students share what they learned about giraffe traits and variations in a previous investigation. They also construct explanations for how one trait variation in neck length gives giraffes a better chance of surviving and producing young in their environment.	<ul style="list-style-type: none"> Plants or animals of the same kind with a trait variation that helps them survive are more likely to produce young (seeds or babies). The seeds or babies of those plants or animals are more likely to have the same trait variations as their parents; consequently, these variations become more common in the next generation of plants or animals.
1 min	Follow-up to activity: The teacher reviews the focus question and unit central question.	
10 min	Synthesize/summarize today's lesson: To answer the unit central question, students summarize what they've learned about traits and variations in specific plants and animals and how variations and the environment determine which plants or animals of the same kind are more likely to survive and produce young (seeds or babies). Then the teacher reviews key science ideas from the unit.	<ul style="list-style-type: none"> Some trait variations, such as the smaller size of cottonwood-tree seeds, shorter stems in dandelions, or longer necks in giraffes, can help individual plants or animals of the same kind survive in their environment long enough to produce young (seeds/babies). The seeds or babies of these plants or animals are more likely to have the same trait variations as their parents; consequently, these variations become more common in the next generation.

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5 min	<p>Link to Previous Lessons</p> <p>Synopsis: The teacher engages students in reviewing what they learned about cottonwood-seed traits and variations in a previous investigation.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants or animals of the same kind have traits that can vary. Often, one trait variation, such as the smaller size of cottonwood-tree seeds, shorter stems in dandelions, or long necks in giraffes, can help those plants or animals survive in their environments. 	<p>Link science ideas to other science ideas.</p> <p>Summarize key science ideas.</p>	<p>Show slide 1.</p> <p>Who can name the plants and animals we learned about in this unit?</p> <p>ELL support: Make sure all science words from the unit are displayed for ELL students to refer to throughout this lesson. During the lesson preview, it might be beneficial to review the names of animals and plants that students investigated throughout the unit, as well as their traits and variations. You may also want to have students practice answering these questions so they can participate more fully in this review.</p> <p>NOTE TO TEACHER: <i>During this lesson, you may want to display class charts and teacher masters from previous lessons showing the traits and variations students identified in different plants and animals. Encourage students to refer to these resources if they need to refresh their memories.</i></p> <p>Show slide 2.</p> <p>What trait in cottonwood-tree seeds did we investigate?</p> <p>What variations did we observe in that trait?</p>	<p>Different kinds of birds like woodpeckers and ducks.</p> <p>Sunflowers.</p> <p>Snakes!</p> <p>Cottonwood-tree seeds.</p> <p>Dandelions.</p> <p>Giraffes.</p> <p>The size of the seeds.</p> <p>We investigated the trait of size in cottonwood seeds.</p> <p>Some seeds were big, and some were</p>	<p>Can you use the word <i>trait</i> in your answer?</p>

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			<p>Who remembers what happened to the cottonwood-tree seeds in our story?</p> <p>What happened to most of the bigger seeds? Where did they land?</p> <p>How about the smaller seeds? Where did most of them land?</p> <p>So did the variations in the size of the cottonwood seeds made a difference in where they landed?</p> <p>NOTE TO TEACHER: <i>Because students will apply what they've learned about traits and variations in this lesson, make sure they can connect these ideas to previous investigations and use the science vocabulary in context.</i></p> <p>You've learned a lot about trait variations in cottonwood seeds!</p> <p>In today's lesson, you'll have an opportunity to show what you know about trait variations in plants and</p>	<p>small.</p> <p>The variations we saw were big seeds and small seeds.</p> <p>The wind blew them away.</p> <p>They landed close to the trees in the parking lot.</p> <p>Most of the smaller seeds landed in the field, far away from the cottonwood trees.</p> <p>Yes!</p>	<p>Can you use the word <i>variations</i> in your answer?</p>

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			animals that we explored throughout this unit.		
1 min	<p>Lesson Focus Question</p> <p>Synopsis: The teacher introduces the focus question, which is also the unit central question: <i>How do differences (variations) in plants or animals of the same kind help them survive so they can produce young (babies or seeds)?</i></p>	Set the purpose with a <u>focus question</u> or goal statement.	<p>Show slide 3.</p> <p>Our focus question for today’s lesson is the same as our unit central question: <i>How do differences (variations) in plants or animals of the same kind help them survive so they can produce young (babies or seeds)?</i></p> <p>We’ve collected a lot of evidence about variations in different kinds of plants and animals, haven’t we?</p> <p>At the end of this lesson, you’ll use everything you’ve learned about traits, variations, survival, and the environment to answer our unit central question.</p>		
6 min	<p>Setup for Activity</p> <p>Synopsis: The teacher engages students in reviewing what they learned about dandelion traits and variations in a previous investigation.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> In a particular environment, some trait variations give certain plants or animals a better chance of surviving and producing young (seeds or babies). The seeds or 	Summarize key science ideas.	<p>Show slide 4.</p> <p>Who remembers the dandelions in the city park? Dandelions have traits and variations too, don’t they?</p> <p>What are some of the features or characteristics dandelions have in common? What traits do they share?</p> <p>ELL support: During the lesson preview, give ELL students time to practice answering these questions so they can participate more fully in this review.</p> <p>What trait did we investigate?</p> <p>What variations did we observe in that trait?</p>	<p>They all have flowers, stems, leaves, and seeds.</p> <p>The length of the stems.</p> <p>Some dandelions were tall, and some were short.</p>	Can you use our

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	babies of those plants or animals are more likely to have the same trait variations as their parents.		<p>Can someone explain why it made a difference that some dandelion stems were longer than others?</p> <p>Are taller or shorter dandelions more likely to survive and produce seeds? Why?</p> <p>So is it better to be a taller dandelion or a shorter dandelion in a city park? Why?</p>	<p>We saw long and short variations in the length of the dandelion stems.</p> <p>The lawn mower cut off the taller dandelions' flowers, so they couldn't make seeds.</p> <p>The shorter dandelions have a better chance of surviving and making seeds because they don't get cut down.</p> <p>It's better to be a shorter dandelion because they don't get mowed down, so they have a better chance of surviving and having babies!</p>	<p>science word <i>variations</i>?</p> <p>Why do you think that was important?</p>
8 min	Activity		Show slide 5.		

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	<p>Synopsis: Students share what they learned about giraffe traits and variations in a previous investigation. They also construct explanations for how on trait variation in neck length gives giraffes a better chance of surviving and producing young in their environment.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants or animals of the same kind with a trait variation that helps them survive are more likely to produce young (seeds or babies). The seeds or babies of those plants or animals are more likely to have the same trait variations as their parents; consequently, these variations become more common in the next generation of plants or animals. 	<p>Summarize key science ideas.</p> <p>Engage students in constructing explanations and arguments.</p> <p>Make explicit links between science ideas and activities during the activity.</p>	<p>Next, let's talk about one of the animals we investigated.</p> <p>What traits do all giraffes share?</p> <p>ELL support: During the lesson preview, give ELL students time to practice answering these questions so they can participate more fully in this review.</p> <p> Listen to students' ideas. What's visible about student thinking?</p> <p>What variations did we find in one giraffe trait?</p> <p>How do variations in the length of their necks help some giraffes survive better in their environment?</p> <p>What about the giraffes with shorter necks? Can they find enough leaves to eat if the trees are tall?</p>	<p>All giraffes have necks, spots, and long legs.</p> <p>Some giraffes have longer necks, and some have shorter necks.</p> <p>The giraffes with longer necks can reach higher in the trees to find more leaves to eat. So they can survive better and keep growing.</p> <p>They'll reach even more leaves!</p> <p>No. The giraffes</p>	<p>If they keep growing, what will happen?</p>

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			<p>Show slide 6.</p> <p>What do you think will happen to the giraffes with shorter necks?</p> <p>What if all of the trees were the same size? Which giraffes would have a better chance of surviving?</p> <p>So do we all agree that the giraffes with longer necks have a better chance of surviving in their environment because they can reach more leaves in the tall trees?</p> <p>Which giraffes are more likely to have babies—the ones with longer necks or the ones with shorter necks? Why?</p>	<p>with shorter necks can't reach the leaves at the top of tall trees, so they won't get enough to eat.</p> <p>They'll probably die.</p> <p>Because if they can't reach the leaves higher in the trees, they probably won't get enough to eat.</p> <p>If all the trees are short, both giraffes would be able to survive. But if all the trees are tall, only the giraffes with longer necks would survive.</p> <p>Yes!</p> <p>The giraffes with longer necks are</p>	<p>Why do you think they'll die?</p>

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		Summarize key science ideas.	<p>If the giraffes with longer necks have babies, what do you think their babies will look like? Why?</p> <p>So next year, do you think we'd see more giraffes with longer necks or shorter necks? Why?</p> <p>So just like dandelions and cottonwood-tree seeds, giraffes have traits and variations too. One important trait variation for giraffes is their neck length. Giraffes with longer necks have a better chance of surviving and having babies because they can eat more leaves from taller trees. That's the story we can tell about giraffes.</p>	<p>more likely to have babies because they'll live longer than the giraffes with shorter necks.</p> <p>The babies will probably have longer necks too?</p> <p>Because their parents have longer necks.</p> <p>I think we'd see more giraffes with longer necks because more of them will survive.</p>	<p>Why do you think the babies will have longer necks?</p> <p>Do you think the giraffes with longer necks could have babies with shorter necks? Why?</p>

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1 min	<p>Follow-Up to Activity</p> <p>Synopsis: The teacher reviews the focus question and unit central question.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants or animals of the same kind with a trait variation that helps them survive are more likely to produce young (seeds or babies). The seeds or babies of those plants or animals are more likely to have the same trait variations as their parents; consequently, these variations become more common in the next generation of plants or animals. 	Highlight key science ideas and focus question throughout.	<p>Show slide 7.</p> <p>Our focus question for today is the same as our unit central question: <i>How do differences (variations) in plants or animals of the same kind help them survive so they can produce young (babies or seeds)?</i></p> <p>Throughout this unit, we’ve been exploring different traits and variations in plants and animals and gathering evidence about how certain variations in a trait can help some plants or animals of the same kind survive in their environment so they can have babies.</p> <p>Now it’s time to show what you know about all of these science ideas. Are you ready?</p>		
10 min	<p>Synthesize/Summarize Today’s Lesson</p> <p>Synopsis: To answer the unit central question, students summarize what they’ve learned about traits and variations in specific plants and animals and how</p>	Engage students in making connections by synthesizing	<p> <i>Embedded Assessment Task</i></p> <p>To show what you know about traits, variations, survival, and the environment, you’re going to tell a story about a plant or animal and explain how a variation in one trait can help this plant or animal survive in its environment so it can have babies.</p>		

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	<p>variations and the environment determine which plants or animals of the same kind are more likely to survive and produce young (seeds or babies). Then the teacher reviews key science ideas from the unit.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Some trait variations, such as the smaller size of cottonwood-tree seeds, shorter stems in dandelions, or longer necks in giraffes, can help individual plants or animals of the same kind survive in their environment long enough to produce young (seeds/babies). The seeds or babies of these plants or animals are more likely to have the same trait variations as their parents; consequently, these variations become more common in the next generation. 	<p>and summarizing key science ideas.</p> <p>Engage students in using and applying new science ideas in a variety of ways and contexts.</p>	<p>Show slide 8.</p> <p>Look at the pictures of plants and animals we’ve observed, measured, and investigated in this unit.</p> <p>Choose one of these plants or animals and think about how you can use what you know about traits, variations, survival, and the environment to answer our unit central question.</p> <p>NOTE TO TEACHER: <i>Point out the unit central question on the board and read it again or have students read it together.</i></p> <p>Show slide 9.</p> <p>After you choose your plant or animal, think about these questions:</p> <ul style="list-style-type: none"> What traits does your plant or animal have? What are two variations of that trait? Why is it important for this plant or animal to survive in its environment? How might a certain trait variation help this plant or animal survive in its environment so it can make seeds or babies? <p>Student think time.</p> <p>Show slide 10.</p> <p>Now turn in your notebook on a new page and draw a picture of the plant or animal you’re going to tell a story about. Your picture should show the traits of this plant</p>		

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			<p>or animal.</p> <p>At the top of the page, write the name of the plant or animal and label each trait. Then circle the trait you're going to include in your story. For that trait, draw two variations of that trait and label them. Then write a sentence explaining why one trait variation will give your plant or animal a better chance of surviving in its environment so it can have seeds or babies. Your sentence should answer our unit central question.</p> <p>Make sure to use our science words from the word wall and include evidence from our investigations. You can use any of the handouts or other resources, like our class charts, to help you as you write your stories.</p> <p>ELL support: Remind ELL students where they can find information for each plant and animal, as well as other resources to help them write their stories.</p> <p>Individual work time.</p> <p>Whole-class share-out: Let's hear your stories about the animal or plant you wrote about! Who would like to share first? Make sure to use our science words in your explanation and include evidence from our investigations to support your ideas. Also be sure your explanation answers our unit central question.</p> <p>NOTE TO TEACHER: <i>As students share their stories and explanations with the class, display their drawings on a document reader. Record students' ideas for answering the unit central question on chart paper.</i></p>		

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		Summarize key science ideas.	<p>Congratulations! You showed what you know about variations in plants and animals and answered our unit central question!</p> <p>Show slides 11–12.</p> <p>Let’s review some of the big ideas we’ve explored:</p> <p>NOTE TO TEACHER: <i>Instead of displaying these slides and reading through the information, you could work these ideas into earlier discussions of traits and variations in different plants and animals from this unit.</i></p> <ul style="list-style-type: none"> • Plants or animals of the same kind share many traits that make them more alike than different. • But plants or animals of the same kind aren’t exactly alike. They also have differences or variations in their traits. • All plants and animals live in environments that are always changing. • Some trait variations help plants or animals of the same kind survive in their environment. • These variations can give individual plants or animals a better chance of surviving and having seeds or babies with the same trait variations as their parents. • Variations in traits <i>and</i> the environment determine which plants or animals of the same kind survive and which don’t. • The variations of plants or animals of the same kind that survive become more common in the next generation. 		