

Variations in Plants and Animals

Lesson 5b: Trait Variations That Help Giraffes Survive

Grade 1	Length of lesson: 37 minutes	Placement of lesson in unit: 5b 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 the traits of giraffes help them survive so they can produce young (babies)?
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: Necks are one trait that all giraffes have in common. Some giraffes are born with longer necks, and some are born with shorter necks. The giraffes 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 that have long necks, too. This shows how variations (differences) in plants and animals of the same kind help those plants and animals survive in their environments and produce young (seeds/babies).		

Preparation

<p>Materials Needed</p> <ul style="list-style-type: none"> • Student notebooks • Chart paper and markers • Colored pencils or crayons <p>Student Handouts and Teacher Masters</p> <ul style="list-style-type: none"> • 5.4 Giraffes in the Wild (Teacher Master) • 5.5 Traits and Variations in Giraffes (1 per student) 	<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>.
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Lesson 5b General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
4 min	Link to previous lesson: The teacher engages students in reviewing what they learned about trait variations and survival in dandelions in the previous lesson.	<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 or shorter stems in dandelion plants, can help individual plants or animals survive in their environment.
3 min	Lesson focus question: The teacher introduces the focus question, <i>How do differences (variations) in the traits of giraffes help them survive so they can produce young (babies)?</i>	
6 min	Setup for activity: The teacher sets up a use-and-apply scenario in which students determine which variations in a trait will help giraffes survive in their environment.	<ul style="list-style-type: none"> In a particular environment, some trait variations give certain plants or animals a survival advantage.
10 min	Activity: Working in pairs, students investigate which trait variations help giraffes survive in their environment so they can produce young (babies). Then pairs share their ideas and reasoning with another pair of students.	<ul style="list-style-type: none"> Plants or animals of the same kind with a trait variation that helps them survive, such as longer necks in giraffes, 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, those variations become more common in the next generation of plants or animals.
8 min	Follow-up to activity: Students share their ideas about trait variations in giraffes that help them survive and grow in their environment so they can produce the next generation of young (babies).	
5 min	Synthesize/summarize today's lesson: The teacher reviews the focus question, and students use ideas about traits, variations, survival, and the environment to answer it.	<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.
1 min	Link to next lesson: The teacher announces that in the final lesson, students will use everything they've learned about traits, variations, survival, and the environment to answer the unit central question.	

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4 min	<p>Link to Previous Lesson</p> <p>Synopsis: The teacher engages students in reviewing what they learned about trait variations and survival in dandelions in the previous lesson.</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 or shorter stems in dandelion plants, can help individual plants or animals survive in their environment. 	Highlight key science ideas and focus question throughout.	<p>Show slides 1 and 2.</p> <p>What plants did we investigate in our last lesson?</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>ELL support: Encourage ELL students to listen to and respond to each other's ideas. Look for connections between students' ideas and science ideas. As students share their ideas, note any surprising statements or confusion to address later.</p> <p>What traits did we observe in dandelions?</p> <p>What were some variations in those traits?</p>	<p>Dandelions in a city park.</p> <p>Flowers.</p> <p>One dandelion trait is flowers.</p> <p>Stems.</p> <p>Leaves.</p> <p>Seeds.</p> <p>Some dandelions are tall, and some are short.</p>	<p>Can you use the word <i>trait</i> in your answer?</p> <p>Can you use the word <i>variations</i></p>

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			<p>Did being taller or shorter make a difference in the dandelions' survival? Why or why not?</p> <p>So which dandelions were more likely to produce seeds that could blow away in the wind and make new plants?</p> <p>What do you think will happen next year when the</p>	<p>Two variations in the length of dandelion stems are long and short.</p> <p>Some flowers are big, and some are small.</p> <p>It made a difference because the taller dandelions got mowed down, and the shorter ones survived.</p> <p>The shorter dandelions were more likely to makes seeds.</p> <p>The taller dandelions got mowed down, so they couldn't make any seeds.</p>	<p>in your answer?</p> <p>What other variations did we find?</p> <p>Why wouldn't the taller dandelions make seeds?</p>

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		<p>Summarize key science ideas.</p> <p>Make explicit links between science ideas and activities.</p>	<p>dandelion seeds grow? Will there be more tall dandelions or short dandelions?</p> <p>So last time we learned that shorter dandelion plants have a better chance of surviving in their environment because the lawn mower doesn't cut them down.</p> <p>Today we'll look at trait variations in giraffes and investigate whether these variations help them survive in their environment.</p>	<p>I think there will be more short dandelions.</p> <p>The seeds came from the shorter dandelions plants, so the new plants will be short too.</p>	<p>Why do you think there will be more short dandelions?</p>
3 min	<p>Lesson Focus Question</p> <p>Synopsis: The teacher introduces the focus question, <i>How do differences (variations) in the traits of giraffes help them survive so they can produce young (babies)?</i></p>	<p>Set the purpose with a <u>focus question</u> or goal statement.</p>	<p>Show slide 3.</p> <p>Our focus question for this lesson is similar to our focus question from last time: <i>How do differences (variations) in the traits of giraffes help them survive so they can produce young (babies)?</i></p> <p>Write this question in your science notebook and draw a box around it.</p> <p>NOTE TO TEACHER: Write the focus question on the board for students to refer to throughout the</p>		

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			<p><i>lesson.</i></p> <p>Have you ever seen a giraffe at the zoo?</p> <p>NOTE TO TEACHER: <i>Give students a few minutes to share what they know about giraffes.</i></p> <p>What do you know about giraffes? What do they look like?</p>	<p>Giraffes are really tall.</p> <p>They have long necks and spots on their skin.</p> <p>I fed a giraffe at the zoo once, and it had a really long tongue!</p>	
6 min	<p>Setup for Activity</p> <p>Synopsis: The teacher sets up a use-and-apply scenario in which students determine which variations in a trait will help giraffes survive in their environment.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> In a particular environment, some trait 	<p>Select content representations and models matched to the learning goal and engage students in their use.</p> <p>Ask questions to elicit student</p>	<p>Show slide 4.</p> <p>Let's look at a picture of some giraffes.</p> <p>NOTE TO TEACHER: <i>Display handout 5.4 (Giraffes in the Wild) on a document reader in addition to the slide.</i></p> <p>What traits do you see? What features or characteristics do giraffes have in common?</p> <p>NOTE TO TEACHER: <i>As students share their ideas, record them on chart paper.</i></p>	<p>They all have legs.</p>	<p>Can you use the word <i>trait</i> in your answer?</p>

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	<p>variations give certain plants or animals a survival advantage.</p>	<p>ideas and predictions.</p>	<p>What other traits do you observe?</p> <p>What science word do we use when we talk about differences in a trait?</p> <p>Who can give us an example of variations in a trait we studied in another lesson?</p> <p>Look again at the picture of the giraffes. Are all of</p>	<p>One trait they have in common is legs.</p> <p>Another trait they have is spots.</p> <p>They all have mouths.</p> <p>They all have really long necks.</p> <p>Variations.</p> <p>Cottonwood trees have big seeds and small seeds.</p> <p>Cottonwood trees have variations in the size of their seeds. Some seeds are big, and some are small.</p> <p>Birds have variations in the shape of their feet. Some feet are webbed, and some have claws.</p>	<p>Can you use our science word <i>variations</i>?</p>

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			<p>their traits exactly the same?</p> <p>What’s different about their traits? What variations do you notice in one trait?</p> <p>Two of the giraffes in the picture are adults, so they’re fully grown. If both adult giraffes are fully grown, why do you think one has a longer neck than the other?</p> <p>That’s an interesting observation! Just like people, adult giraffes can be taller or shorter.</p> <p>Now look at what the giraffes are doing. What are they eating?</p> <p>What difference do you think having a longer neck might make in what a giraffe eats?</p>	<p>No.</p> <p>Some of their necks are longer, and some are shorter.</p> <p>One giraffe is shorter than the others. Maybe it’s a baby, and the others are the parents!</p> <p>The one with the longer neck is just taller, like the dandelions were taller and shorter.</p> <p>They’re eating leaves from the trees.</p> <p>They’re eating tree branches.</p> <p>Giraffes with longer</p>	<p>What makes you think that?</p>

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		<p>Make explicit links between science ideas and activities before the activity.</p>	<p>Next, you'll work with a partner to investigate how variations in the length of giraffes' necks affects which giraffes find enough food to survive.</p>	<p>necks can reach the leaves all over the tall trees, but giraffes with shorter necks can't reach the leaves at the top.</p> <p>They can reach leaves on the bottoms of trees and other stuff closer to the ground.</p>	<p>What If giraffes with shorter necks can't reach leaves higher in the trees, what food can they reach?</p>
10 min	<p>Activity</p> <p>Synopsis: Working in pairs, students investigate which trait variations help giraffes survive in their environment so they can produce young (babies).</p>	<p>Engage students in using and applying new science ideas in a variety of ways and</p>	<p>Show slide 5.</p> <p>NOTE TO TEACHER: <i>Distribute handout 5.5 (Traits and Variations in Giraffes) and walk students through what they'll do to complete the handout.</i></p> <p>So from the picture of the giraffes that we just looked</p>		

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	<p>Then pairs share their ideas and reasoning with another pair of students.</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, such as longer necks in giraffes, 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, those variations become more common in the next generation of plants or animals. 	<p>contexts.</p>	<p>at, we know they eat tree leaves and maybe even small branches or twigs.</p> <p>Show slide 6.</p> <p>So do you think giraffes with longer necks or shorter necks have a better chance of finding enough food to survive in their environment?</p> <p>Turn and Talk: Talk about this question with an elbow partner. Then draw a circle around the giraffe on your handout that you think will have a better chance of finding enough food to survive. Write <i>longer neck</i> or <i>shorter neck</i> to show which giraffe you circled.</p> <p>You'll have 5 minutes to work on this task. Then you'll share your ideas and reasons with another pair of students.</p> <p>ELL support: Give ELL students an opportunity to discuss this question with a shared-language partner so they can practice expressing their ideas in both their home languages and English.</p> <p> Listen to students' ideas. What's visible about student thinking?</p> <p>Pairs work on use-and-apply task.</p> <p>Now I'd like you to share your ideas with another pair of students and explain why you think the giraffe with the longer or shorter neck will be able to</p>		

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			<p>find enough food to survive in its environment.</p> <p>Show slide 7.</p> <p>Next, look at the giraffe you drew a circle around. If this giraffe survives and has a baby, what do you think the baby will look like?</p> <p>On your handout, draw a baby giraffe next to the giraffe you circled and decide whether to give the baby giraffe a longer neck or a shorter neck.</p> <p>NOTE TO TEACHER: Give students 1 or 2 minutes to draw their pictures. Then direct them to share their pictures and explanations with their partners.</p> <p>Now that everyone has finished drawing your baby giraffes, I'd like you to share your pictures with your partner and explain why you gave the baby giraffe a longer or shorter neck.</p>		
8 min	<p>Follow-Up to Activity</p> <p>Synopsis: Students share their ideas about trait variations in giraffes that help them survive and grow in their environment so they can produce the next generation of young (babies).</p> <p>Main science idea(s):</p>	<p>Engage students in constructing explanations and arguments.</p> <p>Summarize key science ideas.</p>	<p>Show slide 8.</p> <p>Let's hear your ideas about which trait variation gives giraffes a better chance of surviving in their environment.</p> <p>What giraffe trait did we investigate today?</p> <p>What variations in this trait did we look at?</p>	<p>We looked at the neck trait of the giraffes.</p> <p>We looked at long necks and short</p>	

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	<ul style="list-style-type: none"> Plants or animals of the same kind with a trait variation that helps them survive, such as longer necks in giraffes, 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, those variations become more common in the next generation of plants or animals. 		<p>Which giraffe did you circle on your handout? Why do you think that giraffe has a better chance of finding enough food to survive in its environment?</p> <p>NOTE TO TEACHER: <i>As students share their ideas and reasoning, record them on chart paper.</i></p> <p>Show slide 9.</p> <p>Which giraffe has a better chance of surviving in its environment?</p>	<p>necks.</p> <p>I chose the giraffe with the longer neck because it can reach more leaves at the tops of the trees.</p> <p>Because the giraffe with a shorter neck can't reach the leaves at the tops of the tall trees, so it won't get as much to eat. It can only eat leaves at the bottom of the trees.</p> <p>The giraffe with a longer neck has a better chance of surviving.</p> <p>Because it can reach leaves all over the trees, so it can find more food to eat than the giraffe with</p>	<p>Why didn't you choose the giraffe with the shorter neck?</p> <p>Why do you think so?</p>

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			<p>What do you think will happen to the giraffe with the shorter neck?</p> <p>Which giraffes are more likely to have babies—giraffes with longer necks or shorter necks?</p> <p>Who would like to share your picture of a baby giraffe? Does it have a longer or shorter neck?</p> <p>NOTE TO TEACHER: <i>During this discussion,</i></p>	<p>a shorter neck.</p> <p>I don't think it will find enough food to eat, so it might die.</p> <p>I guess it depends on whether all of the trees are really tall. If all the trees are tall, the giraffes with shorter necks might not be able to reach any leaves at all. If all the trees are short, then all of the giraffes could reach the leaves.</p> <p>Giraffes with longer necks are more likely to have babies.</p> <p>I drew a baby giraffe with a longer neck.</p>	<p>What if all of the trees are the same size? Will the shorter giraffes get enough to eat? Why or why not?</p> <p>Why do you think so?</p> <p>Why did you</p>

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			<p><i>display students' drawings on a document reader. Help students make sense of the progression from giraffes with longer necks eating more leaves to their surviving long enough to have babies that grow into new adults with longer necks.</i></p> <p>Show slide 10.</p> <p>So do you think we'll see more giraffes with longer necks or shorter necks in this environment next year? Which variation in this trait will we be more likely to see?</p>	<p>Because more giraffes with longer necks will survive and have babies.</p> <p>Because they can reach more leaves.</p> <p>Because they won't find enough leaves to eat, so they'll die before they can have babies.</p> <p>I think there will be more giraffes with longer necks.</p> <p>Because more giraffes with longer necks will survive and have babies, and the babies will look like the</p>	<p>give it a longer neck?</p> <p>Why do you think so?</p> <p>Why won't giraffes with shorter necks have babies?</p> <p>Why do you think so?</p>

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				parents.	
5 min	<p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: The teacher reviews the focus question, and students use ideas about traits, variations, survival, and the environment to answer it.</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>Highlight key science ideas and focus question throughout.</p> <p>Engage students in making connections by synthesizing and summarizing key science ideas.</p>	<p>Show slide 11.</p> <p>The focus question we've been exploring today is <i>How do differences (variations) in the traits of giraffes help them survive so they can produce young (babies)?</i></p> <div data-bbox="871 609 945 673" style="text-align: center;">  </div> <p style="text-align: center;"><i>Embedded Assessment Task</i></p> <p>Before we end our lesson, let's summarize what we've learned about traits, variations, survival, and the environment that can help us answer this question.</p> <p>How would you answer the focus question based on today's giraffe investigation?</p> <p>NOTE TO TEACHER: <i>Encourage students to use the science words trait, variations, survive, and environment in their answers. Direct them to visual and language resources.</i></p> <p>Which variation in neck length gives giraffes a better chance of surviving and having babies? Why?</p>	<p>Longer necks help giraffes survive better because they can find more food to eat high up in the trees. If they have enough food to</p>	

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		Summarize key science ideas.	<p>Why doesn't a shorter neck help giraffes survive?</p> <p>If all the trees in their environment were short, would the giraffes with longer necks still be more likely to survive than giraffes with shorter necks?</p> <p>How does the environment affect whether giraffes with longer or shorter necks will survive and have babies?</p> <p>Show slide 12.</p> <p>So trait variations, like longer necks, can give giraffes a better chance of surviving and having babies, but giraffes also need a good environment to survive and grow. Both of these are important for giraffes to survive.</p> <p>If giraffes with short and long necks live in an environment where they can all find enough leaves to eat, they'll be more likely to survive, won't they?</p>	<p>survive, they can have babies.</p> <p>Because giraffes with shorter necks can't reach leaves high up in the trees. And if they can't get enough food to eat, they'll die.</p> <p>I guess that having a longer neck wouldn't matter then.</p> <p>If the environment has what the giraffes need to live, then they'll survive and have babies.</p>	

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1 min	<p>Link to Next Lesson</p> <p>Synopsis: The teacher announces that in the final lesson, students will use everything they've learned about traits, variations, survival, and the environment to answer the unit central question.</p>	Link science ideas to other science ideas.	<p>Show slide 13.</p> <p>We've learned so much about traits and variations in this unit, haven't we? Just think about all of the plants and animals we've investigated. We've looked at birds and snakes and giraffes and sunflowers and cottonwood trees and dandelions and so much more.</p> <p>In our final lesson of this unit, we'll use everything we've learned about traits and variations from our investigations to answer 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>Are you ready to show what you know?</p>		