

Variations in Plants and Animals

Lesson 1d: Variations in Traits of Plants

Grade 1	Length of lesson: 40 minutes	Placement of lesson in unit: 1d of 5 lessons on variations in plants and animals
Unit central question: How do differences (variations) in the traits of plants or animals of the same kind help them survive so they can produce young (babies or seeds)?		Lesson focus questions: How are plants alike and different? What differences in a trait can they have?
Main learning goal: Plants or animals of the same group share similar features or characteristics that we can recognize. We call these shared characteristics <i>traits</i> . Living things of the same kind also have variations in traits that help them survive.		
Science content storyline: Certain animals and plants can be grouped together because they have many similar traits (characteristics). We group them together because they're more alike than different. For example, we know a plant is a plant because it has a flower, leaves, stem, roots and seeds. Even though plants have the same basic traits, they don't look exactly alike. Their traits can vary from individual to individual. Plants show differences (variations) in many traits that we can observe and describe. Some of these trait variations help individual plants survive in their environment.		
Ideal student response to the focus questions: Plants can be grouped together because they have similar characteristics or traits. For example, all plants roots, stems, leaves, flowers, and seeds. But not all plants look alike. Some grow into tall trees, and others grow into bushes or other kinds of plants. Some have pointy leaves, and some have round, flat leaves. Some have long stems, and some have short stems. If we look carefully, we can see how plants are alike and different, and we can describe those differences or variations. Some variations are important because they help a plant survive.		

Preparation

<p>Materials Needed</p> <ul style="list-style-type: none"> • Student notebooks • Chart paper and markers • Class chart of bird traits and variations (from lesson 1c) • Laminated plant photos (from lesson 1b) (1 set per table group; 2 different photos per pair) <p>Student Handouts</p> <ul style="list-style-type: none"> • 1.8 Plant Traits (1 per student) 	<p>Ahead of Time</p> <ul style="list-style-type: none"> • Review the content background document and Common Student Ideas about Variations in Plants and Animals. • 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. Orient students to the handout and let them practice selecting a trait and writing about two variations. Identify words in the lesson plan to review with students in advance, including <i>traits</i>, <i>characteristics</i>, <i>alike</i>, <i>different</i>, and <i>variations</i>.
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Lesson 1d General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
6 min	Link to previous lesson: The teacher reviews key ideas from the previous lesson and then revisits the unit central question, <i>How do differences (variations) in the traits of plants or animals of the same kind help them survive so they can produce young (babies or seeds)?</i>	<ul style="list-style-type: none"> Birds share many basic traits, but they aren't exactly alike. They also have differences in many traits, such as differences in size, shape, and color, the size and shape of beaks, and the type of feet. These differences in traits are called <i>variations</i>. Even though birds have the same basic characteristics or traits, they may have variations in a trait that can be observed and described.
1 min	Lesson focus questions: The teacher introduces the focus questions, <i>How are plants alike and different? What differences in a trait can they have?</i>	
10 min	Setup for activity: Students compare photographs of two plants and name the traits they share that identify them as plants. Students also consider whether the plants show any differences or variations in these traits.	<ul style="list-style-type: none"> Plants share many basic traits, such roots, stems, leaves, flowers, and seeds. Plants also stay in one place and don't move. These traits help us know whether something is a plant. Even though plants share many traits, they don't look exactly alike. They also have differences in traits, just like birds do. These differences in traits are called <i>variations</i>.
10 min	Activity: Working in pairs, students examine photographs of two plants and identify variations in their traits. Then each pair shares their observations with another pair of students. Afterward, the teacher records on a chart the trait variations students observed.	<ul style="list-style-type: none"> Plants share many basic traits, but they aren't exactly the same. They have differences in many traits, such as stem length, leaf size or shape, and flower color. We call these differences <i>variations</i>. Even though plants have the same basic characteristics or traits, these traits may show variations from individual to individual that can be observed and described.
6 min	Follow-up to activity: Students consider how certain traits and variations help plants survive in their environment.	<ul style="list-style-type: none"> Plants share many basic traits, but they also have differences in traits called <i>variations</i>. These trait variations can help individual plants survive in their environment.
6 min	Synthesize/summarize today's lesson: Students share their ideas for answering the focus questions. Then they write about one plant trait and two variations of the trait that they observed during their investigation.	<ul style="list-style-type: none"> Plants of the same kind share many characteristics or traits that make them more alike than different. But they don't look exactly alike. Their traits vary from individual to individual. These trait variations can help some plants survive in their environment.
1 min	Link to next lesson: The teacher foreshadows the next lesson in which students look for trait variations in sunflowers.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
6 min	<p>Link to Previous Lesson</p> <p>Synopsis: The teacher reviews key ideas from the previous lesson and then revisits the unit central question, <i>How do differences (variations) in the traits of plants or animals of the same kind help them survive so they can produce young (babies or seeds)?</i></p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Birds share many basic traits, but they aren't exactly alike. They also have differences in many traits, such as differences in size, shape, and color, the size and shape of beaks, and the type of feet. These differences in traits are called <i>variations</i>. Even though birds have the same basic characteristics or traits, they may have variations in a trait that can be observed and described. 	Summarize key science ideas.	<p>Show slides 1 and 2.</p> <p>Last time, we looked at how birds are alike and different. What do we call the characteristics that birds share?</p> <p>What do we call differences in those characteristics or traits?</p> <p>Show slide 3.</p> <p>Let's review the bird traits and variations we recorded on our class chart.</p> <p>NOTE TO TEACHER: <i>Display the class chart of bird traits and variations from the previous lesson.</i></p> <p>Who can tell me one way that birds are alike? What is one trait that birds share?</p> <p>What other traits do birds share?</p>	<p>Traits.</p> <p>Variations.</p> <p>They both have beaks.</p> <p>Beaks are one trait that birds share.</p> <p>Wings.</p> <p>Feathers.</p> <p>Tails.</p> <p>Legs and feet.</p>	<p>Can you use the word <i>trait</i>?</p>

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			<p>Who can give me an example of how birds are different? What is one difference or variation in a bird trait?</p> <p>What are some other variations we observed in bird traits?</p> <p>In our last lesson, we also talked about how differences or variations in certain traits might help some birds survive where they live.</p> <p>Who can tell me how a longer beak might help a bird survive?</p> <p>What about claws or talons? How might those help a bird survive?</p> <p>Show slide 4.</p>	<p>Birds have different feather colors.</p> <p>One variation is feather color.</p> <p>Some birds have point beaks, and some birds have curved beaks.</p> <p>Some birds have webbed feet, and some birds have claws.</p> <p>A bird could stick its beak deep in the water and get more food.</p> <p>Claws might help birds tear apart their food.</p>	<p>Can you use the word <i>variation</i> in your sentence?</p>

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			Today we'll think some more about our unit central question, <i>How do differences (variations) in the traits of plants or animals of the same kind help them survive so they can produce young (babies)?</i>		
1 min	<p>Lesson Focus Questions</p> <p>Synopsis: The teacher introduces the focus questions, <i>How are plants alike and different? What differences in a trait can they have?</i></p>	Set the purpose with a <u>focus question</u> or goal statement.	<p>Show slide 5.</p> <p>In this lesson, we'll think about the focus questions, <i>How are plants alike and different? What differences in traits can they have?</i></p> <p>Write these two questions in your science notebooks and draw a box around them.</p> <p>NOTE TO TEACHER: <i>Write the focus questions on the board for students to refer to throughout the lesson.</i></p> <p>In an earlier lesson, we explored how plants are alike. Today we'll explore how they're alike <i>and</i> different.</p>		
10 min	<p>Setup for Activity</p> <p>Synopsis: Students compare photographs of two plants and name the traits they share that identify them as plants. Students also consider whether the plants show any differences or variations in these traits.</p>	Ask questions to elicit student ideas and predictions.	<p>Show slide 6.</p> <p>Look at the plants on this slide.</p> <p>NOTE TO TEACHER: <i>Display two laminated plant photographs from lesson 1b. Make sure the plants have at least one obvious trait variation, such as different-colored flowers or different-shaped leaves.</i></p> <p>How do we know the living things in these photos</p>		

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	<p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants share many basic traits, such roots, stems, leaves, flowers, and seeds. Plants also stay in one place and don't move. These traits help us know whether something is a plant. Even though plants share many traits, they don't look exactly alike. They also have differences in traits, just like birds do. These differences in traits are called <i>variations</i>. 		<p>are plants and not birds? What traits do they share that make them alike?</p> <p>NOTE TO TEACHER: <i>Create a two-column table on chart paper based on the model below. Use the heading "Traits of Plants" for the first column and "How Plants Are Different (Variations in Plant Traits)" for the second column. As students identify traits that plants have in common, such as leaves, flowers, stems or trunks, seeds, or roots, list them in the left-hand column.</i></p> <table border="1" data-bbox="814 716 1346 1019"> <thead> <tr> <th data-bbox="814 716 989 824">Traits of Plants</th> <th data-bbox="989 716 1346 824">How Plants Are Different (Variations in Plant Traits)</th> </tr> </thead> <tbody> <tr> <td data-bbox="814 824 989 899">Trunk or stem</td> <td data-bbox="989 824 1346 899"></td> </tr> <tr> <td data-bbox="814 899 989 938">Leaves</td> <td data-bbox="989 899 1346 938"></td> </tr> <tr> <td data-bbox="814 938 989 977">Flowers</td> <td data-bbox="989 938 1346 977"></td> </tr> <tr> <td data-bbox="814 977 989 1019">Seeds</td> <td data-bbox="989 977 1346 1019"></td> </tr> </tbody> </table> <p>How do we know the traits we listed on our chart are plant traits and not bird traits?</p> <p>We know that plants are plants because they share certain traits that other living things don't have. But are all plants exactly the same? Look at our plant photos again.</p>	Traits of Plants	How Plants Are Different (Variations in Plant Traits)	Trunk or stem		Leaves		Flowers		Seeds		<p>They both have leaves.</p> <p>One trait they have is leaves.</p> <p>Flowers.</p> <p>Seeds.</p> <p>Stems.</p> <p>Roots.</p> <p>Birds don't have flowers or leaves.</p> <p>Birds don't have seeds.</p> <p>No.</p>	<p>Can you use the word <i>trait</i> in your sentence?</p> <p>What other traits do plants share?</p>
Traits of Plants	How Plants Are Different (Variations in Plant Traits)														
Trunk or stem															
Leaves															
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		<p>Make explicit links between science ideas and activities before the</p>	<p>So even though both of these plants have many of the same traits, they aren't exactly alike, are they?</p> <p>When you look closely at these plants, what differences do you notice?</p> <p>What is the word scientists use to describe these differences?</p> <p>What other differences or variations do you notice?</p> <p>NOTE TO TEACHER: <i>As students share the variations they observe, record them in column 2 of the class chart.</i></p> <p>Next, you'll pair up with a partner and explore other ways that plants can have differences or variations in a trait.</p> <p>NOTE TO TEACHER: <i>Have students pair up</i></p>	<p>One plant has pink flowers, and the other plant has yellow flowers.</p> <p>Variations.</p> <p>The cactus has sharp spikes, and the other plant doesn't.</p> <p>The variations I see are that the cactus has spikes, and the other plant doesn't.</p> <p>The leaves have variations. The cactus has small leaves, and the other plant has really big leaves.</p>	<p>Can you use the word <i>variations</i> in your sentence?</p> <p>Any other ideas?</p>

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		activity.	<i>with an elbow partner and form a table group with another pair of students. Then distribute the laminated plant photographs from lesson 1b to each table group. Each student should have a different plant photo so that all four plants are represented in the group. Students are likely to observe more trait differences if they work in pairs, so have pairs compare two plant photos before they compare all four plant photos in their table group.</i>		
10 min	<p>Activity</p> <p>Synopsis: Working in pairs, students examine photographs of two plants and identify variations in their traits. Then each pair shares their observations with another pair of students. Afterward, the teacher records on a chart the trait variations students observed.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants share many basic traits, but they aren't exactly the same. They have differences in many traits, such as stem length, leaf size or shape, and flower color. We call these 	<p>Make explicit links between science ideas and activities during the activity.</p> <p>Engage students in analyzing and interpreting observations.</p>	<p>Show slide 7.</p> <p>Turn and Talk: In an earlier lesson, we talked about how these plants are alike. Now you'll look for differences in their traits!</p> <p>First, I want you and your partner to look at your two plant photos and talk about how the plants are different from each other. What variations do they have for the same traits? Write these variations in your science notebooks and be ready to share them with the other pair of students in your table group.</p> <p>For example, you may notice that their leaves look different or they have different-colored flowers.</p> <p>NOTE TO TEACHER: <i>As pairs share the trait variations they observe in both plants, circulate around the room and remind students to focus on the traits they've identified so far. Encourage them to refer to the traits and trait variations on the class chart.</i></p>		

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	<p>differences <i>variations</i>. Even though plants have the same basic characteristics or traits, these traits may show variations from individual to individual that can be observed and described.</p>	<p>Ask questions to elicit student ideas and predictions.</p> <p>Engage students in analyzing and interpreting data and observations.</p>	<p>Show slide 8.</p> <p>Now that you and your partner have listed the differences in traits you noticed when you compared your plants, I'd like you to share your pictures and observations with the other pair of students in your group. Tell them about the differences or variations you noticed in the plants' traits.</p> <p>NOTE TO TEACHER: <i>As groups share their findings, circulate from group to group and listen carefully to see whether students use the words trait and variation in their descriptions.</i></p> <p>Whole-class share-out: Who would like to share the differences in plant traits that you observed? First, tell us the trait you looked at and then tell us how that trait was different in your plants. Try to use the words <i>trait</i> and <i>variation</i> in your descriptions.</p> <p>NOTE TO TEACHER: <i>If students mention the color, shape, or size of a plant part, add these descriptions to the left-hand column of the chart, since these are plant traits. As students share the trait variations they observed, record them on the right-hand side of the class chart. Many trait variations relate to the color, shape, or size of a specific plant part.</i></p> <p>ELL support: On the word wall, post adjectives that students use to describe different traits (e.g.,</p>	<p>We looked at flower color.</p> <p>Yes.</p> <p>A trait.</p>	<p>Do all four plants in the photos have flowers?</p> <p>If all of the plants have flowers, what do we call that?</p> <p>Did you see any variations in that trait? Were the</p>

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			<p>pointy, smooth, small) so that ELL students can refer to them throughout the unit. You could also prepare visual aids or have students create a word or picture dictionary.</p> <p>What other differences or variations did you notice?</p> <p>NOTE TO TEACHER: <i>Students will likely share a variety of plant traits and variations from the four photographs, such as the following:</i></p> <table border="1" data-bbox="814 1339 1346 1448"> <tr> <td data-bbox="814 1339 972 1448">Traits of Plants</td> <td data-bbox="972 1339 1346 1448">How the Plants Are Different (Variations in Plant Traits)</td> </tr> </table>	Traits of Plants	How the Plants Are Different (Variations in Plant Traits)	<p>The flowers were different colors. Some were pink, and some were yellow.</p> <p>We looked at stems.</p> <p>We're not sure about the cactus, but two other plants had stems, and the tree had a trunk.</p> <p>The tree trunk was thick and straight, and the plant stems were thin and straight or curvy.</p>	<p>flowers the same color?</p> <p>What other trait did you look at?</p> <p>Did all four plants have stems?</p> <p>What differences or variations did you notice?</p>
Traits of Plants	How the Plants Are Different (Variations in Plant Traits)						

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			Trunk or Stem Size Color Shape	Trees have thick trunks. Flowers have thin stems. Some are brown. Some are green. Some are straight and tall. Some stems bend and curve.		
			Leaves Size Shape	Some are small, and some are large. Some are flat and kind of round. Some have spines. Some are pointy.		
			Flowers Color	Yellow Gold Pink		
			<p>Look at all of the traits and variations we recorded on our class chart! Notice that I wrote the words <i>shape, size, and color</i> on the left-hand side of the chart. That's because these are traits or features of living things too.</p> <p>We also found a lot of differences or variations in the traits of our four plants, didn't we?</p>			

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6 min	<p>Follow-Up to Activity</p> <p>Synopsis: Students consider how certain traits and variations help plants survive in their environment.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants share many basic traits, but they also have differences in traits called <i>variations</i>. These trait variations can help individual plants survive in their environment. 	<p>Make explicit links between science ideas and activities after the activity.</p> <p>Engage students in analyzing and interpreting data and observations.</p> <p>Engage students in using and applying new science ideas in a variety of ways and contexts.</p> <p>Ask questions to elicit student ideas and predictions.</p>	<p>Show slide 9.</p> <p>Let’s review the traits and variations we identified during our plant investigation. As we do, think about how differences or variations in traits might help birds survive where they live.</p> <p>This is the first part of 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>Look at the picture of the cactus again.</p> <p>NOTE TO TEACHER: <i>Hold up the picture of the cactus.</i></p> <p> Listen to students’ ideas. What’s visible about student thinking?</p> <p>What traits and variations could help this cactus survive where it lives?</p> <p>NOTE TO TEACHER: <i>Point out that the cactus also stores water, which is a precious commodity in the desert. So the spikes that keep the cactus from being eaten also help it store water.</i></p> <p>How might the bright flowers on the bird of paradise plant help it survive?</p> <p>NOTE TO TEACHER: <i>Hold up the picture of the</i></p>	<p>The sharp spikes could keep animals from eating it.</p> <p>Flowers attract bugs and birds that help spread pollen</p>	

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			<p><i>bird of paradise.</i></p> <p>Now look at the tree.</p> <p>NOTE TO TEACHER: <i>Hold up the picture of the tree.</i></p> <p>What trait variations might help the tree survive where it lives?</p> <p>NOTE TO TEACHER: <i>Students may not be able to explain how some trait variations help plants survive. If it doesn't come up during the discussion, point out that the hard bark on the tree keeps insects and other parasites from getting inside and eating the tree. And the dandelion's flexible stem helps it avoid being trampled or cut down when a mower passes over it.</i></p>	<p>everywhere so more flowers can grow.</p> <p>The bark on the tree keeps bugs from getting inside the tree and eating it.</p>	
6 min	<p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: Students share their ideas for answering the focus questions. Then they write about one plant trait and two variations of the trait that they observed during their investigation.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants of the same kind share many 	<p>Highlight key science ideas and focus question throughout.</p> <p>Engage students in making connections by synthesizing and</p>	<p>Show slide 10.</p> <p>Let's revisit our focus questions, <i>How are plants alike and different? What differences in a trait can they have?</i></p> <p>Think about what you learned from our plant investigation today.</p> <p>How would you answer the first question, <i>How are plants alike and different?</i></p> <p>NOTE TO TEACHER: <i>Encourage students to refer to the class chart and use the words trait and</i></p>		

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	<p>characteristics or traits that make them more alike than different. But they don't look exactly alike. Their traits vary from individual to individual. These trait variations can help some plants survive in their environment.</p>	<p>summarizing key science ideas.</p>	<p>variations <i>in their responses</i>.</p> <p>How would you answer the second question, <i>What differences in a trait can they have?</i></p> <p>Show slide 11.</p> <p>Before we end our lesson, I'd like you to think of something you learned about plant traits and variations today. Then look at our class chart and choose one plant trait. Write that trait on the handout I'll give you and then choose two variations of that trait to write about. You can also draw pictures to show your ideas.</p> <p>Show slide 12.</p> <p>Here's an example of one plant trait and two variations.</p> <p>NOTE TO TEACHER: <i>Distribute handout 1.8 (Plant Traits) and have students paste it in their notebooks. Then orient students to the handout and make sure they understand how to complete it.</i></p> <p>Individual writing and drawing time.</p> <p>Whole-class share-out: Who would like to share the trait and variations you wrote about?</p> <p>NOTE TO TEACHER: <i>During this share-out, reinforce the idea that traits are characteristics of living things that are similar, and variations are</i></p>		

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		<p>Ask questions to probe student ideas and predictions.</p> <p>Ask questions to challenge student thinking.</p>	<p><i>differences in traits among individual organisms of the same kind of living thing. Ask probe and challenge questions to clarify student thinking, and encourage students to use the word trait and variations in their explanations.</i></p>		
1 min	<p>Link to Next Lesson</p> <p>Synopsis: The teacher foreshadows the next lesson in which students look for trait variations in sunflowers.</p>	<p>Summarize key science ideas.</p> <p>Link science ideas to other science ideas.</p>	<p>Today we explored how plants are alike and different, and we talked about how differences or variations in a trait might help plants survive where they live.</p> <p>Show slide 13.</p> <p>In our next lesson, we'll use what we learned today to see if we can find differences or variations in the traits of another kind of plant.</p> <p>Can anyone tell me what the plants on this slide are?</p> <p>That's right! These plants are sunflowers. Next time, we'll talk about how sunflowers are alike and different.</p>	They're sunflowers!	