

Variations in Plants and Animals

Lesson 2a: More Trait Variations in Plants

Grade 1	Length of lesson: 42 minutes	Placement of lesson in unit: 2a 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 sunflowers alike and different? What traits and variations do they have?
Main learning goal: Plants or animals of the same group share similar characteristics or traits that we can recognize. They also have variations in traits that help them survive.		
Science content storyline: Plants, such as sunflowers, can be grouped together because they have many similar traits. We group them together because they're more alike than different. But even though plants of the same group share the same basic traits, they don't look exactly alike. Their traits can vary from individual to individual. Individual plants of the same group show differences (variations) in many traits that we can observe and describe. These variations can help individual plants survive in their environment.		
Ideal student response to the focus questions: Sunflowers can be grouped together because they have traits that are more alike than different. For example, they all have roots, a stem, leaves, flowers, and seeds. But sunflowers aren't exactly the same. Some have a lot of petals, and some don't have as many. Some have bright yellow flowers, and some have orange flowers. If we look carefully, we can see how sunflowers are alike and different, and we can describe their traits and variations.		

Preparation

Materials Needed

- Student notebooks
- Chart paper and markers
- Class chart of bird traits and variations (from lesson 1c)
- Class chart of plant traits and variations (from lesson 1d)
- A variety of cut sunflowers (real or artificial) (2 different sunflowers per pair)
- Red and blue pencils or crayons (1 set per student)

Student Handouts

- 2.1 Sunflowers (1 photo per student)
- 2.2 Sunflower Traits (1 per student)

Ahead of Time

- Review Common Student Ideas about Variations in Plants and Animals and sections 3 and 4 in the content background document.
- Cut apart handout 2.1 (Sunflowers).
- **Note:** Each pair of students should have different types of sunflowers to compare. No two sunflowers should be exactly the same.
- **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. Prepare visual resources from previous lessons. Orient students to handout 2.2 (Sunflower Traits) 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 *traits*, *characteristics*, *alike*, *different*, and *variations*.

Lesson 2a General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
6 min	Link to previous lessons: The teacher engages students in reviewing the traits and variations they observed in birds and plants in previous lessons.	<ul style="list-style-type: none"> Animals, such as birds, can be grouped together because they share many similar traits. Plants can also be grouped together because they share many similar traits. But the traits within each group of birds or plants can vary from individual to individual.
1 min	Lesson focus questions: The teacher introduces the focus questions, <i>How are sunflowers alike and different? What traits and variations do they have?</i>	
8 min	Setup for activity: Students identify the traits sunflowers share based on the chart of plant traits from the previous lesson. Then students consider whether sunflowers have any trait variations.	<ul style="list-style-type: none"> Sunflowers can be grouped together because they share many traits that make them more alike than different. Sunflowers also have variations in their traits, such as flower color, the shape and size of flowers and leaves, and the number of petals.
10 min	Activity: Working in pairs, students examine two sunflowers and identify similarities and differences (variations) in their traits.	<ul style="list-style-type: none"> All sunflowers have the same basic traits, such as petals, leaves, stems, roots, and seeds. But they also have variations in their traits that we can observe and describe. For example, sunflowers can have different flower colors.
10 min	Follow-up to activity: The teacher reviews the focus questions; then students share the traits and variations they observed during their sunflower investigation. As students share their observations, the teacher records them on a class chart.	<ul style="list-style-type: none"> If we look carefully, we can see how sunflowers are alike and different. All sunflowers have the same basic traits that make them more alike than different. But they also have trait variations we can observe and describe, such as different flower colors, shapes, and sizes.
5 min	Synthesize/summarize today's lesson: To summarize their understandings of traits and variations, students write about one sunflower trait and two variations in this trait that they observed during the sunflower investigation.	<ul style="list-style-type: none"> Plants of the same group share many of the same basic traits. We can group them together because they're more alike than different. But plants of the same group don't look exactly alike; their traits can vary from individual to individual. We can observe and describe these variations.
2 min	Link to next lesson: The teacher summarizes what students have learned so far about traits and variations in plants and animals. Then the teacher previews the next lesson.	

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6 min	<p>Link to Previous Lessons</p> <p>Synopsis: The teacher engages students in reviewing the traits and variations they observed in birds and plants in previous lessons.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Animals, such as birds, can be grouped together because they share many similar traits. Plants can also be grouped together because they share many similar traits. But the traits within each group of birds or plants can vary from individual to individual. 	<p>Engage students in analyzing and interpreting data and observations.</p> <p>Summarize key science ideas.</p> <p>Highlight key science ideas and focus question throughout.</p>	<p>Show slides 1 and 2.</p> <p>So far in this unit, we've been exploring the traits of animals and plants.</p> <p>Who can describe one trait that birds share? You may refer to our class chart if you need a reminder. And please use the word <i>trait</i> in your answers.</p> <p>NOTE TO TEACHER: <i>For this review, display the class charts of bird and plant traits and variations from lessons 1c and 1d.</i></p> <p>Who can name two traits that plants share? Look at our class chart if you need a reminder. And make sure to use the word <i>trait</i> in your answers.</p> <p>Show slide 3.</p> <p>We've also been exploring variations in the traits of animals or plants.</p> <p>What does the word <i>variation</i> mean?</p> <p>ELL support: During the lesson preview, remind</p>	<p>One trait that birds share is the color of their feathers.</p> <p>Wings!</p> <p>Leaves and flowers.</p> <p>Two traits that plants share are leaves and flowers.</p> <p>A variation is something that's different.</p>	<p>Who can share another bird trait?</p> <p>Please use the word <i>trait</i> in your answer.</p>

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			<p>ELL students of what variations are and use visual references (photos) to highlight variations in plants and animals.</p> <p>Who can name two variations of a bird trait that we found? First name the trait and then name the variations. Use the sentence starter on the slide:</p> <p><i>One trait we looked at was _____. Two variations in this trait were _____.</i></p> <p>Who can name two variations of a plant trait that we observed? Name the trait first and then name the variations. Use the sentence starter on the slide.</p> <p>Today we'll look at another kind of plant and add to our ideas about traits and variations in living things of the same kind.</p>	<p>One bird trait we looked at was beak shape. Two variations in this trait were sharp beaks and curvy beaks.</p> <p>One trait we looked at was flower color. Two variations in this trait were pink flowers and yellow or orange flowers.</p>	
1 min	<p>Lesson Focus Questions</p> <p>Synopsis: The teacher introduces the focus questions, <i>How are sunflowers alike and different? What traits and</i></p>	Set the purpose with a <u>focus question</u> or goal statement.	<p>Show slide 4.</p> <p>In this lesson, we'll think about the focus questions, <i>How are sunflowers alike and different? What traits and variations do they have?</i></p>		

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	<i>variations do they have?</i>		<p>Write these 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>Instead of looking at photographs of plants today, we'll look at plants we can touch and examine up close!</p>		
8 min	<p>Setup for Activity</p> <p>Synopsis: Students identify the traits sunflowers share based on the chart of plant traits from the previous lesson. Then students consider whether sunflowers have any trait variations.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Sunflowers can be grouped together because they share many traits that make them more alike than different. Sunflowers also have variations in their traits, such as flower color, the shape and size of flowers and leaves, and the number of petals. 	Ask questions to elicit student ideas and predictions.	<p>Show slide 5.</p> <p>Today's focus question gives you a clue about the kind of plant we'll be exploring today. Who can tell me what these plants are?</p> <p>NOTE TO TEACHER: <i>In addition to the sunflowers on the slide, hold up two cut sunflowers so that everyone can see them.</i></p> <p>Raise your hand if you think all sunflowers are similar. In what ways are they alike?</p> <p>What do we call the characteristics that all plants share?</p>	<p>Sunflowers.</p> <p>Sunflowers have stems.</p> <p>They have flowers.</p> <p>They have leaves.</p> <p>They have seeds.</p> <p>Traits.</p>	

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		<p>Make explicit links between science ideas and activities before the activity.</p>	<p>Let's look at our class chart of plant traits. Do these two sunflowers have the same traits as the plants in the photos we looked at last time?</p> <p>NOTE TO TEACHER: <i>Have students look at the class chart of plant traits from lesson 1d and check to see whether the sunflowers you're holding have stems, seeds, flowers, and leaves,. The roots on the sunflower you're holding won't be visible because the stems have been cut, but students can speculate on whether they would find roots in sunflowers growing in a field.</i></p> <p>ELL support: Read the traits on the chart aloud as a class to help ELL students develop their English-language skills.</p> <p>Do our two sunflowers have all of the traits on our chart?</p> <p>Now raise your hand if you think all sunflowers are <i>exactly</i> alike.</p> <p>Look closely at these two sunflowers. Are they <i>exactly</i> alike?</p>	<p>Yes, except for the roots.</p> <p>Yes.</p> <p>I disagree because one of the sunflowers is red, and the other is</p>	<p>What makes you think that?</p> <p>Does anyone disagree?</p>

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			<p>What is another difference or variation in a sunflower trait?</p> <p>Next, we'll see if we can find other traits and variations in sunflowers.</p>	<p>yellow.</p> <p>One sunflower is darker in the middle.</p>	
10 min	<p>Activity</p> <p>Synopsis: Working in pairs, students examine two sunflowers and identify similarities and differences (variations) in their traits.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> All sunflowers have the same basic traits, such as petals, leaves, stems, roots, and seeds. But they also have variations in their traits that we can observe and describe. For example, sunflowers can have different flower colors. 	<p>Make explicit links between science ideas and activities during the activity.</p>	<p>Show slide 6.</p> <p>We'll begin today's investigation by observing how sunflowers are alike and different. First, I'd like you to pair up with an elbow partner. Then I'll give each pair two sunflowers to study and two pictures of a sunflower.</p> <p>NOTE TO TEACHER: <i>Have students pair up with an elbow partner. Then distribute two cut sunflowers to each pair of students and give each student a sunflower picture from handout 2.1 (Sunflowers). First, have pairs look at their cut sunflowers and talk about how they're alike. Then on their sunflower pictures, have students draw a circle around the traits they identified. Next, have pairs talk about differences or variations in the sunflower traits. Then have students use colored pencils or crayons to draw lines pointing to trait variations on their sunflower pictures (e.g., colors of petals, shapes of leaves). Make sure students label each variation.</i></p> <p><i>Alternatively, you could walk students through the activity step by step and talk about similarities and differences if that works better for your class.</i></p>		

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		Engage students in analyzing and interpreting data and observations.	<p><i>Then have students glue their sunflower pictures (from handout 2.1) into their science notebooks.</i></p> <p>Look very carefully at your two sunflowers. Then talk with your partner about what is <i>alike</i> about the sunflowers. Remember that the things that are the same about the sunflower are the traits they share.</p> <p>ELL support: Further explain and model what it means to observe and identify traits and variations if students need clarification.</p> <p>Next, on your sunflower handouts, draw a circle around each of the traits you observed when you studied both sunflowers.</p> <p>After you circle the traits on your handouts, talk with your partner about what’s <i>different</i> about your two sunflowers. Who can tell me the science word for these differences?</p> <p>Then on your sunflower handouts, draw a line pointing to each difference or variation in a trait you observed in your sunflowers. For example, if the color of the flower petals is different in both sunflowers, draw a line to the petals on the sunflower picture and write a label like “orange petals and yellow petals” to describe the variation.</p> <p>Who can describe a trait in the two sunflowers I’m holding?</p> <p>What is one variation in that trait?</p>	Variations.	

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		<p>Ask questions to probe student ideas and predictions.</p> <p>Ask questions to challenge student thinking.</p>	<p>Now you can begin investigating your sunflowers.</p> <p>NOTE TO TEACHER: <i>As pairs work together, circulate around the room and listen to their conversations. Pay attention to whether they're using the science words trait and variation to describe similarities and differences in their sunflowers. Ask questions to probe and challenge student thinking about traits and variations. Also ask students to describe the traits and variations they marked on their handouts and explain their reasoning.</i></p> <p> Listen to students' ideas. What's visible about student thinking? Are students beginning to make sense of traits and variations?</p>		
10 min	<p>Follow-Up to Activity</p> <p>Synopsis: The teacher reviews the focus questions; then students share the traits and variations they observed during their sunflower investigation. As students share their observations, the teacher records them on a class chart.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • If we look carefully, we 	<p>Highlight key science ideas and focus question throughout.</p> <p>Make explicit links between science ideas and activities after the activity.</p>	<p>Show slide 7.</p> <p>Our focus questions for today's lesson are <i>How are sunflowers alike and different? What traits and variations do they have?</i></p> <p>Show slide 8.</p> <p>Let's talk about what you noticed when you compared your sunflowers and what you drew on your handouts.</p> <p>NOTE TO TEACHER: <i>Ask several pairs to share the sunflower traits and variations they</i></p>		

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	<p>can see how sunflowers are alike and different.</p> <ul style="list-style-type: none"> All sunflowers have the same basic traits that make them more alike than different. But they also have trait variations we can observe and describe, such as different flower colors, shapes, and sizes. 	<p>Engage students in analyzing and interpreting data and observations.</p>	<p><i>observed. Encourage students to explain where and why they marked traits and variations on their handouts. Create a two-column table similar to the ones you created in lesson 1. Use the heading “Traits of Sunflowers” for the first column and “How Sunflowers Are Different (Variations in Sunflower Traits)” for the second column. As students identify traits and variations of sunflowers, record them on the chart. Pairs probably won’t come up with the same trait variations.</i></p> <table border="1" data-bbox="835 683 1428 956"> <thead> <tr> <th data-bbox="835 683 1012 794">Traits of Sunflowers</th> <th data-bbox="1012 683 1428 794">How Sunflowers Are Different (Variations in Sunflower Traits)</th> </tr> </thead> <tbody> <tr> <td data-bbox="835 794 1012 834"></td> <td data-bbox="1012 794 1428 834"></td> </tr> <tr> <td data-bbox="835 834 1012 875"></td> <td data-bbox="1012 834 1428 875"></td> </tr> <tr> <td data-bbox="835 875 1012 915"></td> <td data-bbox="1012 875 1428 915"></td> </tr> <tr> <td data-bbox="835 915 1012 956"></td> <td data-bbox="1012 915 1428 956"></td> </tr> </tbody> </table> <p><i>Encourage students to make changes on their handouts if their classmates share ideas about traits and variations that would make their drawings better or more accurate.</i></p> <p>How are your sunflowers alike? Look at the traits you circled on your handouts.</p> <p>ELL support: Ask questions one at a time to help ELL students track the conversation.</p> <p>What do we call features or characteristics of sunflowers that are similar?</p>	Traits of Sunflowers	How Sunflowers Are Different (Variations in Sunflower Traits)										
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			<p>Now look at where you drew lines on your handouts. How are your sunflowers different?</p> <p>What do we call the differences in sunflower traits?</p> <p>Look at the variations in sunflower traits that we recorded on our class chart.</p> <p>Who can name one of the differences or variations we found?</p> <p>Yes, we can see trait variations in the size of the flowers.</p> <p>Where else did we find variations in a trait?</p> <p>Yes, there are variations in the colors of the sunflowers.</p> <p>What was another kind of variation?</p> <p>Yes, another variation in a sunflower trait is the number of flower petals.</p> <p>Who can share some other variations we found?</p>	<p>Traits.</p> <p>Variations.</p> <p>The sizes of the flowers are different.</p> <p>The color of the flowers is different.</p> <p>There are variations in the flower color.</p> <p>The flowers have different numbers of petals.</p> <p>We found variations in the size of the</p>	<p>Can you use our science word variation?</p>

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			<p>You're right! The size of the leaves and the length of the stems were different on some of the sunflowers.</p>	<p>leaves and the length of the stems.</p>	
<p>5 min</p>	<p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: To summarize their understandings of traits and variations, students write about one sunflower trait and two variations in this trait that they observed during the sunflower investigation.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants of the same group share many of the same basic traits. We can group them together because they're more alike than different. But plants of the same group don't look exactly alike; their traits can vary from individual to individual. We can observe and describe these variations. 	<p>Summarize key science ideas.</p> <p>Engage students in making connections by synthesizing and summarizing key science ideas.</p>	<p>Show slide 9.</p> <p>Today's sunflower investigation helped us add to our understandings of traits and variations in plants.</p> <p>We learned that sunflowers share many of the same traits plants have. For example, all sunflowers have leaves, seeds, flowers, and a stem. They also have roots. But all sunflowers aren't exactly the same. They have many differences or variations in their traits too.</p> <p>Show slide 10.</p> <p> <i>Embedded Assessment Task</i></p> <p>Before we end our lesson, I'd like you to think about the sunflower traits and variations we explored today. Then look at our class chart and choose one sunflower 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>NOTE TO TEACHER: <i>Distribute handout 2.2 (Sunflower Traits) and have students paste it in</i></p>		

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			<p><i>their notebooks. Then orient students to the handout and make sure they understand how to complete it.</i></p> <p>ELL support: During the lesson preview, model for ELL students how to identify variations in a trait. Also give them an opportunity to practice choosing a sunflower trait and writing about two variations in that trait so they know what to expect and will be able to participate more fully in the lesson activity.</p>		
2 min	<p>Link to Next Lesson</p> <p>Synopsis: The teacher summarizes what students have learned so far about traits and variations in plants and animals. Then the teacher previews the next lesson.</p>	<p>Summarize key science ideas.</p> <p>Link science</p>	<p>Show slide 11.</p> <p>So far in this unit, we've learned that <i>traits</i> are features or characteristics that living things of the same group share.</p> <p>What are some traits that birds share?</p> <p>What are some traits that plants share?</p> <p>So living things of the same kind, like plants or birds, share a lot of the same traits, but are they exactly alike?</p> <p>What do we call differences in traits?</p> <p>So wings are one trait that all birds share, but they</p>	<p>Wings.</p> <p>Feathers.</p> <p>Leaves.</p> <p>Flowers.</p> <p>No!</p> <p>Variations.</p>	

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		<p>ideas to other science ideas.</p>	<p>can have differences or variations in the color of their wings, can't they? We also saw that plants can have variations in a trait, such as different flower colors.</p> <p>Show slide 12 for Option B Show slide 13 for Option A</p> <p>NOTE TO TEACHER: <i>If you plan to teach the supplemental math lessons, end this lesson with Option A below. Make sure to unhide slide 13 and hide slide 12. Announce that in the next lesson, students will measure variations in the traits of sunflowers. Then go to supplemental math lesson 1.</i></p> <p><i>If you won't be teaching the math lessons, end the lesson with Option B. Ask students some rhetorical questions to get them thinking about how trait variations might influence their chances of surviving in their environment. After this discussion, announce that in the next lesson (lesson 2b), students will explore traits and variations in snakes.</i></p> <p>Option A: In our next lesson, we'll measure different sunflower traits and record our data on a data table so we can compare variations in those traits.</p> <p>Option B: Today we explored the traits that sunflowers share, and we observed some variations in these traits.</p>		

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			<p>In our next lesson, we'll look at some slithery snakes and explore how they're alike and different. We'll also think about how variations in their traits might help them survive so they can have baby snakes.</p>		