

Plants and Animals

Lesson 4a: Investigating What Plants Need

Grade: Kindergarten	Length of lesson: 40 minutes	Placement of lesson in unit: 4a of 6 lessons on plants and animals
Unit central question: Do plants and animals need the same things to live and grow? Explain your thinking.		Lesson focus questions: Do plants need light to live and grow? What is your evidence?
Main learning goal: Plants need light to live and grow. Plants kept in the dark turn yellow and eventually die.		
Science content storyline: To find out whether plants need light to live and grow, we conducted an experiment where we put some plants in the dark and some plants in the light. The plants in the light stayed green and grew taller. The plants in the dark turned yellow and wilted. This is evidence that plants need light to live and grow. We now have evidence from our experiments to show that plants need air and light to live and grow. But not all plants need soil.		
Ideal student response to the focus questions: To find out whether plants need light to live and grow, we did an experiment. We put some plants in the light, and we put some plants in the dark. The plants in the light stayed green and grew taller, but the plants in the dark got yellow and droopy. This is evidence that plants need light to live and grow.		

Preparation

Materials Needed

- Science notebooks
- Chart paper and markers
- Arrow-shaped sticky notes (1/2 pack per class)
- Class evidence chart (tree map) from lesson 3a (“Do Plants Need Air? Our Evidence”)
- Circle map from lesson 3a (“Our Beginning Ideas: What Do Plants Need to Live and Grow?”)
- Class evidence chart (tree map) from lesson 3b (“Do Plants Need Light? Our Evidence”)
- Plants from the light experiment
- Crayons (1 set per pair of green, tan, brown, and yellow) (from lesson 3b)

Student Handouts and Teacher Masters

- **Optional:** 3.1 Observations Worksheet: Light Experiment (from lesson 3b)
- **Optional:** 4.1 Scientist Sophie Experiments with Plants (Teacher Master) (**Note:** Read only the light experiment for this lesson.)
- 4.2 Do Plants Need Light? (1 per student)

Ahead of Time

- Review section 4 in the content background document, focusing on what plants need.
- Review Common Student Ideas about Plants and Animals, focusing on student ideas about plants.
- One or two days before this lesson, have students make their final plant observations for the light experiment and record in their science notebooks or handouts the evidence they’ll analyze in this lesson.
- **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 vocabulary terms in the lesson plan to review with students in advance, including *experiment*, *prediction/predict*, *claim*, *evidence*, the verb *record*, *observe*, and *environment*. Post any new vocabulary terms and definitions on a word wall for easy reference. Also have students record these terms in their science notebooks and in their picture dictionary if they’ve made one.

Lesson 4a General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
1 min	Link to previous lessons: The teacher revisits the light experiment and the question students are trying to answer.	<ul style="list-style-type: none"> Experiments and observations help us find out what plants need to live and grow.
2 min	Lesson focus questions: The teacher introduces the focus questions, <i>Do plants need light to live and grow? What is your evidence?</i> Then the teacher elicits ideas from students about how the light experiment can help them answer these questions.	
10 min	Setup for activity: The teacher prepares students to communicate in scientific ways as they examine the evidence they collected from their light experiment and use it to answer the question, “Do plants need light?”	<ul style="list-style-type: none"> Scientists use observations and evidence to help them answer questions about the world around them.
10 min	Activity: Working in pairs, students observe and compare the plants they grew in light and no-light conditions. Then they discuss whether plants need light based on the evidence they’ve collected and construct claims they support with evidence from the experiment.	<ul style="list-style-type: none"> We have evidence from our experiment that plants need light to live and grow.
10 min	Follow-up to activity: Pairs present their claims and evidence about whether plants need light to live and grow, and classmates communicate their feedback in scientific ways. The class works toward a consensus that plants need light to live and grow. Then the teacher summarizes the evidence that supports this claim.	
6 min	Synthesize/summarize today’s lesson: The teacher reviews the circle map of students’ initial ideas about the needs of plants. Then students identify the needs they have evidence for based on the experiments they’ve conducted so far.	<ul style="list-style-type: none"> Based on evidence from our experiments, we know that plants need light and air to grow and live, but not all plants need soil.
1 min	Link to next lesson: The teacher announces that in the next lesson, students will examine the evidence they collected from their water experiment and use this evidence to find out whether plants need water to live and grow.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
1 min	<p>Link to Previous Lessons</p> <p>Synopsis: The teacher revisits the light experiment and the question students are trying to answer.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Experiments and observations help us find out what plants need to live and grow. 		<p>Show slides 1 and 2.</p> <p>NOTE TO TEACHER: <i>Display the Communicating in Scientific Ways (CSW) poster where students can see it clearly. Then have students sit together on the floor near the poster. Throughout this lesson, students will use and apply a number of the CSW concepts, including (1) ask how and why questions, (2) observe, (3) think of an idea or claim, (4) give evidence for their claims, (5) agree or disagree with others' ideas, (6) and add onto someone else's idea. Refer students to the CSW poster and sentence starters as needed to help them communicate in scientific ways.</i></p> <p>Earlier in this unit, we started some experiments to find out what plants need to live and grow.</p> <p>Today we're going to find out what happened to the plants with light and without light, and we'll talk about the evidence we collected.</p> <p>What are we trying to find out with this experiment?</p> <p>And what question are we trying to answer?</p> <p>That's right! In this experiment, we're trying to find out whether plants need light to live and grow. The evidence we've been collecting will help us answer</p>	<p>Whether plants need light to live and grow.</p> <p>Do plants need light?</p>	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			our question, “Do plants need light?”		
2 min	<p>Lesson Focus Questions</p> <p>Synopsis: The teacher introduces the focus questions, <i>Do plants need light to live and grow? What is your evidence?</i> Then the teacher elicits ideas from students about how the light experiment can help them answer these questions.</p>	<p>Set the purpose with a <u>focus question</u> or goal statement.</p> <p>Ask questions to elicit student ideas and predictions.</p>	<p>Show slide 3.</p> <p>Today’s focus questions are <i>Do plants need light to live and grow? What is your evidence?</i></p> <p>NOTE TO TEACHER: Write the questions on the board for students to refer to throughout the lesson and draw a box around them. Point to each word as you repeat the questions aloud.</p> <p>How can our experiment of growing plants with and without light help us answer our focus questions?</p> <p>ELL support: Give ELL students an opportunity to practice answering this question during the lesson preview.</p>	<p>We can tell if plants need light by looking at what happened in our experiment.</p> <p>We’re looking to see if the plants are green or pale yellow.</p> <p>Whether the plants are standing up</p>	<p>And how will we know whether plants need light? What evidence are we looking for?</p> <p>What other evidence are we looking for?</p>

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
				<p>straight or are drooping.</p> <p>Whether the plants are alive and growing.</p>	
10 min	<p>Setup for Activity</p> <p>Synopsis: The teacher prepares students to communicate in scientific ways as they examine the evidence they collected from their light experiment and use it to answer the question, “Do plants need light?”</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Scientists use observations and evidence to help them answer questions about the world around them. 	<p>Highlight key science ideas and focus question throughout.</p> <p>Engage students in communicating in scientific ways.</p>	<p>NOTE TO TEACHER: <i>The following content introduces students to communicating in scientific ways and how to use the sentence starters on the CSW poster. If students have already been using the sentence starters, you may want to modify the content in this phase. However, students may benefit from a more detailed review.</i></p> <p><i>As you focus on a specific concept on the poster, place a sticky arrow next to the row to highlight it for students. Then point to the text as you read it together.</i></p> <p>Show slide 4.</p> <p>Let’s talk a bit about how we can communicate more like scientists when we talk about the experiments we’ve been doing.</p> <p>This poster shows many of the different ways that scientists talk. We looked at it before, but we’re going to learn more about it today.</p> <p>Look at the row on the poster that shows a picture, or symbol, of an eye.</p>		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p>NOTE TO TEACHER: <i>Point to the eye and place a sticky arrow next to the second row on the poster.</i></p> <p>What have we been doing with our eyes during our plant experiments?</p> <p>ELL support: Review the CSW poster with ELL students during the lesson preview and give them time to practice identifying and explaining the symbols on the poster so they can participate more fully during the class discussion.</p> <p>Can anyone read what these words say?</p> <p>NOTE TO TEACHER: <i>Point to the words “I see ...” under the column “What a Scientist Says.”</i></p> <p>That’s right! When you describe your observations, you could use the words <i>I see</i>, but you could also say, “I observe.”</p> <p>You’ll observe your plants again today, and then you’ll share your observations with the class. When you do, I want you to use the sentence starters “I saw” or “I observed.”</p> <p>Now let’s look at another row on our poster.</p> <p>NOTE TO TEACHER: <i>Move the sticky arrow next to the first row that says “Ask why and how questions.” Point to each word as you read the sentence aloud.</i></p>	<p>We’ve been looking at our plants.</p> <p>I see.</p>	<p>Yes, you’ve been using your eyes to observe your plants, just like scientists.</p>

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p>What picture or symbol do you see on this row?</p> <p>What does the question mark tell us about what scientists think and talk about?</p> <p>Let’s look at the kinds of questions scientists ask. One of the questions they ask is “How come ...?”</p> <p>NOTE TO TEACHER: <i>Point to the question on the poster.</i></p> <p>What are some other questions on the poster that scientists ask?</p> <p>That’s right! Scientists ask questions like “Why?” and “How?” to learn more about something they’re studying.</p> <p>Have you ever seen a science show on TV or visited a science museum?</p> <p>ELL support: ELL students may not have this kind of background knowledge. Instead, you may want to ask them to think about the experiments they’ve been</p>	<p>It’s a person with a question mark.</p> <p>It tells us that scientists ask questions.</p> <p>I wonder ...</p> <p>Why ...?</p> <p>How do they know that ...?</p>	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
		Ask questions to elicit student ideas and predictions.	<p>conducting in this unit or other science ideas they’ve been learning about.</p> <p>Who can think of a question a scientist might ask that begins with the word <i>how</i> or <i>why</i>? For example, a scientist might ask, “How do animals communicate with each other if they can’t talk like people do?”</p> <p>NOTE TO TEACHER: <i>If students have trouble thinking of how and why questions, include a few more examples, such as “Why do people get sick?” “How can we use experiments to find out whether plants need food to live and grow?” and “Why do plants need light?”</i></p> <p>ELL support: During the lesson preview, review the questions on the poster with ELL students and have them practice coming up with examples.</p> <p>Scientists ask questions about all kinds of things in the world around us. And just like we’ve been doing, they ask questions about how plants and animals get what they need from their environment.</p> <p>Show slide 5.</p> <p>What question are you and your partner trying to answer about plants and light? Think about this for a moment and be prepared to share your answer with the class.</p> <p>Individual think time.</p>	<p>Why are there so many stars in the sky?</p> <p>How do plants grow?</p>	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions										
			<p>So what question are you and your partner trying to answering about plants and light?</p> <p>Yes! The question we're trying to answer in this light experiment is "Do plants need light?"</p> <p>Now let's look at our class evidence chart.</p> <p>NOTE TO TEACHER: <i>Display the evidence chart you created in lesson 3b. Then point to the investigation question at the top of the chart. If there isn't enough space at the bottom of the chart to add possible claims and evidence during the class discussion, use a separate sheet of chart paper.</i></p> <table border="1" data-bbox="856 915 1430 1304"> <thead> <tr> <th colspan="2" data-bbox="856 915 1430 943">Do Plants Need Light?</th> </tr> <tr> <th colspan="2" data-bbox="856 943 1430 971">Our Evidence</th> </tr> <tr> <th data-bbox="856 971 1142 1008">Plants with Light</th> <th data-bbox="1142 971 1430 1008">Plants with No Light</th> </tr> </thead> <tbody> <tr> <td data-bbox="856 1008 1142 1101"><i>Record student observations and evidence here.</i></td> <td data-bbox="1142 1008 1430 1101"><i>Record student observations and evidence here.</i></td> </tr> <tr> <td colspan="2" data-bbox="856 1101 1430 1304"> <p>Our Claim Is ...</p> <p>Plants need light to live and grow. Our evidence is ...</p> <p>OR</p> <p>Plants do NOT need light to live and grow. Our evidence is ...</p> </td> </tr> </tbody> </table> <p>NOTE TO TEACHER: <i>Highlight the different parts of the chart and read the words. Then point to the</i></p>	Do Plants Need Light?		Our Evidence		Plants with Light	Plants with No Light	<i>Record student observations and evidence here.</i>	<i>Record student observations and evidence here.</i>	<p>Our Claim Is ...</p> <p>Plants need light to live and grow. Our evidence is ...</p> <p>OR</p> <p>Plants do NOT need light to live and grow. Our evidence is ...</p>		Do plants need light to live and grow?	
Do Plants Need Light?															
Our Evidence															
Plants with Light	Plants with No Light														
<i>Record student observations and evidence here.</i>	<i>Record student observations and evidence here.</i>														
<p>Our Claim Is ...</p> <p>Plants need light to live and grow. Our evidence is ...</p> <p>OR</p> <p>Plants do NOT need light to live and grow. Our evidence is ...</p>															

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
		Summarize key science ideas.	<p><i>word</i> evidence.</p> <p>What does <i>evidence</i> mean?</p> <p>Show slide 6.</p> <p>That’s right! <i>Evidence</i> is a clue that helps us answer a question or explain something in the world around us. Evidence helps us figure out whether our ideas are right or wrong.</p> <p>Let’s see what our poster says about evidence.</p> <p>NOTE TO TEACHER: <i>Point to the row that says “Give evidence for your idea or claim” and move the sticky arrow to that row. Then read the sentence aloud and point to each word.</i></p> <p>Like scientists, what words can we say when we talk about our evidence?</p> <p>We’ve been using these words a lot in this unit, haven’t we?</p> <p>Now look at this row.</p>	<p>It’s like clues.</p> <p>It means to prove something.</p> <p>Evidence helps us answer questions or explain things.</p> <p>My evidence is ...</p>	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p>NOTE TO TEACHER: <i>Point to the fourth row on the CSW poster that says “Think of an idea, claim, prediction, or model to explain your data and observations.” Move the sticky arrow to this row and read the sentence aloud as you point to each word. Then point to the lightbulb symbol on the poster.</i></p> <p>What do you think this picture or symbol of a lightbulb means?</p> <p>The lightbulb represents the ideas scientists think of to try to answer their questions. But scientists need evidence and reasons to support their ideas too.</p> <p>NOTE TO TEACHER: <i>Point to the magnifying glass on the row of the CSW poster that says “Give evidence for your idea or claim” and then point to the boy making a presentation on the row that says “Reason from evidence or models to explain your data and observations.”</i></p> <p>Let’s review what we’ve talked about so far.</p> <p>What does this eye help you remember to do as a scientist? <i>[Point to the eye on the poster.]</i></p>	<p>That the person has a lightbulb.</p> <p>The person has a good idea.</p> <p>The person found some evidence?</p> <p>Observe or look</p>	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
		<p>Make explicit links between science ideas and activities before the activity.</p>	<p>What does this question mark help you remember to do as a scientist? <i>[Point to the question mark on the poster.]</i></p> <p>What does this lightbulb help you remember to do? <i>[Point to the lightbulb on the poster.]</i></p> <p>And what does this magnifying glass help you remember? <i>[Point to the magnifying glass on the poster.]</i></p> <p>What does this boy with the pointer remind you to do? <i>[Point to the boy with the pointer on the poster.]</i></p> <p>Show slide 7.</p> <p>So in a few minutes, you're going to <i>observe</i> the plants you've been growing in the light and the dark. <i>[Point to the eye on the poster again.]</i></p> <p>Look carefully at your plants. Then look at the words and pictures you've recorded <i>[in your science notebooks/on your handouts]</i>. These are your observations.</p> <p>After you observe your plants, you're going to think of an idea about how to answer our question, "Do</p>	<p>carefully at things.</p> <p>To look for clues!</p> <p>Ask questions.</p> <p>Think of an idea to explain something.</p> <p>That we need evidence for our ideas.</p> <p>To give reasons for our ideas.</p>	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p>plants need light?" <i>[Point to the lightbulb on the poster and then point to the question mark.]</i></p> <p>Then you're going to give evidence and reasons for your idea. <i>[Point to the magnifying glass on the poster and then point to the boy with the pointer.]</i></p> <p>You and your investigation partner will work together on this activity.</p> <p>Show slide 8.</p> <p>Let's review what you'll be doing:</p> <ol style="list-style-type: none"> 1. First, you'll observe your plants and look at the observations you recorded earlier in this unit. 2. Next, you'll talk with your partner and come up with an idea or claim to answer our question, "Do plants need light?" 3. Then you and your partner will talk about the evidence and reasons you have to support your idea or claim. <p>ELL support: Go over the activity instructions with ELL students during the lesson preview and give them time to practice so they know what's expected of them.</p>		
15 min	<p>Activity</p> <p>Synopsis: Working in</p>		<p>Now I'd like you to pair up with your investigation partner, and then I'll give you the handout you'll be using for this activity.</p>		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
	<p>pairs, students observe and compare the plants they grew in light and no-light conditions. Then they discuss whether plants need light based on the evidence they've collected and construct claims they support with evidence from the experiment.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> We have evidence from our experiment that plants need light to live and grow. 	<p>Make explicit links between science ideas and activities during the activity.</p> <p>Ask questions to probe student thinking.</p> <p>Ask questions to challenge student thinking.</p> <p>Engage</p>	<p>NOTE TO TEACHER: <i>Have students pair up with their investigation partner. Then distribute handout 4.2 (Do Plants Need Light?) and direct students to write their names and the date at the top of the handout.</i></p> <p>Remember, you need to observe your plants and then look at the observations you recorded during the experiment before you talk about the claim and evidence you can use to answer our question, "Do plants need light?"</p> <p>I'll be walking around the room, so if you have any questions, just raise your hand.</p> <p>NOTE TO TEACHER: <i>As pairs work together, circulate around the room and support them in (1) verbally constructing a claim (agreeing on whether plants need or don't need light), and (2) supporting the claim with evidence from the experiment (e.g., plant color, plant sturdiness or drooping). Ask probe and challenge questions to clarify student thinking. Give pairs about 10 minutes to make observations and develop their claims and evidence.</i></p> <p>ELL support: Review the handout with ELL students during the lesson preview and have them practice completing it as a group so they understand what's expected of them and can participate more fully in the activity.</p>		<p><i>Questions to ask during pairs work:</i></p> <ul style="list-style-type: none"> What is your claim? Do you both agree? What is your evidence?

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
		<p>students in analyzing and interpreting data and observations.</p> <p>Engage students in constructing explanations and arguments.</p>	<p>Pairs work on claims and evidence (10 min).</p> <p>Now that you and your partner have discussed your ideas and evidence, I want you to write them down on your handouts. Then you'll share your conclusions with the rest of the class.</p> <p>NOTE TO TEACHER: <i>Display the handout on a document reader as you discuss what students will do next.</i></p> <p>Look at the first section of your handout that says "Our claim is." Now look at the two claims. One claim says that plants need light, and the other claim says that plants do not need light. Talk with your partner about the claim you're making and then circle that claim on the handout.</p> <p>Then in the next section that says "Our evidence is," I want you to draw and write down the evidence you have to support your idea or claim. Give as many different kinds of evidence as you can from the observations you recorded during the experiment. For example, the color of the plants is one kind of evidence.</p> <p>NOTE TO TEACHER: <i>Give pairs about 5 minutes to complete their handouts.</i></p>		
10 min	<p>Follow-Up to Activity</p> <p>Synopsis: Pairs present</p>		<p>NOTE TO TEACHER: <i>Following the activity, have students sit on the floor near the class evidence chart (from lesson 3b). Decide whether to have them bring</i></p>		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
	<p>their claims and evidence about whether plants need light to live and grow, and classmates communicate their feedback in scientific ways. The class works toward a consensus that plants need light to live and grow. Then the teacher summarizes the evidence that supports this claim.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> We have evidence from our experiment that plants need light to live and grow. 	<p>Make explicit links between science ideas and activities after the activity.</p>	<p><i>their plants with them as well. Choose a few pairs to share their claims and evidence with the class. Make sure at least two pairs of plants are visible during the discussion. During each presentation, display students' handouts on the document reader.</i></p> <p>ELL support: Give ELL students an opportunity to practice presenting claims and evidence during the lesson preview so they know what's expected of them. Also have students practice giving feedback using the CSW sentence starters.</p> <p>Next, I'm going to ask a few of you to share your claims and evidence with the class. As you share, we'll display your handout on the document reader so that everyone can see the pictures you drew and what you wrote.</p> <p>NOTE TO TEACHER: <i>Display a blank copy of handout 4.2 (Do Plants Need Light?) on a document reader and have students read the claim sentences with you.</i></p> <p>Show slide 9.</p> <p>If you're sharing your claim with us, I want you to say one of the two sentences on the handout. Let's say these sentences together:</p> <p><i>Plants need light to live and grow.</i></p> <p><i>Plants do NOT need light to live and grow.</i></p>		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
		Engage students in communicating in scientific ways	<p>If you and your partner decided that plants need light, say the first sentence. If you decided that plants don't need light, say the second sentence.</p> <p>Then I want you to say, "Our evidence is _____" when you share your evidence.</p> <p>Show slide 10.</p> <p>I want everyone else to listen carefully as your classmates share their claims and evidence. That means don't talk or move around.</p> <p>After each pair has finished sharing their claim and evidence, you'll have an opportunity to agree or disagree or add a new idea.</p> <p>Let's look at our Communicating in Scientific Ways poster again. Here's how I want you to talk like scientists.</p> <p>What does this sentence say you can do? <i>[Point to the row that says "Agree or disagree with others' ideas." and read the sentence aloud. Then point to the thumbs-up/thumbs-down symbol.]</i></p> <p>When you agree or disagree, always give a reason. Let's read the two sentence starters on the poster together:</p> <p><i>I agree with _____ because ...</i></p>	We can agree or disagree.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p><i>I disagree with _____ because ...</i></p> <p>What does this sentence say you can do? [<i>Point to the row that says “Add onto someone else’s idea.” and read the sentence aloud. Then point to the plus sign on the poster.</i>]</p> <p>When you add on, use one of the sentence starters on our poster:</p> <p><i>I want to piggyback on _____’s idea.</i></p> <p><i>I want to add onto what _____ said.</i></p> <p>This is your job as scientists. You can agree or disagree with what someone else says, or you can add new ideas to what someone else shares.</p> <p>What does the thumbs-up or thumbs-down symbol on the poster remind you to do as a scientist? [<i>Point to the symbol on the poster.</i>]</p> <p>And what does the plus sign on the poster remind you to do? [<i>Point to the symbol on the poster.</i>]</p> <p>OK, let’s have one pair come up and share your claims and evidence with the class.</p> <p>NOTE TO TEACHER: <i>Have the first pair you selected come to the front of the class and give you</i></p>	<p>We can add our own ideas to what someone else says.</p> <p>Agree or disagree.</p> <p>Add our own ideas.</p>	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p><i>their handout(s) to display on the document reader.</i></p> <p>First, tell us what question you were trying to answer.</p> <p>What is your idea or claim? Make sure to use one of the sentences on the handout.</p> <p>Now tell us about your evidence. Start with “Our evidence is</p> <p>Now let’s hear from other scientists. Do you agree or disagree with your classmates’ claim and evidence? Why? Do you have anything to add on?</p> <p>NOTE TO TEACHER: <i>Record any new observations and evidence on the class evidence chart (tree map) during this discussion. Then have a few more pairs come up and share their claims and evidence.</i></p>	<p>Do plants need light?</p> <p>Plants need light to live and grow.</p> <p>Our evidence is that the plant in the dark looked yellow and very weak and droopy.</p> <p>I agree because the plant without light looks like it’s dying.</p> <p>I disagree because the plant without light is taller than the one with light.</p> <p>I have other evidence. The leaves of the plant without light are all shriveled up.</p>	<p><i>Questions to ask during the discussion:</i></p> <ul style="list-style-type: none"> • How does your drawing show me that plants do/don’t need light? • Does anyone agree or disagree? Why? • Does anyone have a different idea or different

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p>I like how you gave evidence and described the observations you made.</p> <p>So let’s look at our class evidence chart. We have quite a bit of evidence to support the claim that plants need light to live and grow. We also have some evidence to support the claim that plants don’t need light to live and grow.</p> <p>Which evidence do you think is stronger and why?</p> <p>NOTE TO TEACHER: <i>Summarize the evidence on the class evidence chart and work toward a consensus that plants need light to live and grow. After the class reaches a consensus, display a clean copy of handout 4.2 on the document reader and circle the agreed-upon claim. Then write down the evidence that supports the claim.</i></p> <p><i>If the class is unable to reach a consensus that plants need light to live and grow, tell students that scientists often repeat their experiments many times to make sure of their findings.</i></p> <p><i>Then introduce the story from handout 4.1 (Scientist Sophie Experiments with Plants) and read the first paragraph and the Experiment 1 section aloud (Do Plants Need Light?). Don’t read any of the other experiments on the handout.</i></p>		<p>evidence?</p> <ul style="list-style-type: none"> • Does anyone have an idea to add?

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p><i>After reading about the light experiment, ask students the questions on the handout.</i></p> <p>So what did Scientist Sophie find out from her light experiment?</p> <p>And what did we find out from our light experiment?</p> <p>So we have even more evidence to add to our class evidence chart to support our claim that plants need light to live and grow.</p> <p>Do you think our evidence for this claim is strong enough now that we can all agree that plants need light to live and grow?</p>	<p>She found out that plants need light to live and grow.</p> <p>We found out the same thing that Scientist Sophie did. Our plants with light stayed green and were straighter than the ones without light.</p>	
6 min	<p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: The teacher reviews the circle map of students' initial ideas about the needs of plants.</p>	Highlight key science ideas and focus question throughout.	<p>Show slide 11.</p> <p>Today's focus questions are <i>Do plants need light to live and grow? What is your evidence?</i></p> <p>NOTE TO TEACHER: <i>Display the circle map from lesson 3a ("Our Beginning Ideas: What Do Plants</i></p>		

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
	<p>Then students identify the needs they have evidence for based on the experiments they've conducted so far.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Based on evidence from our experiments, we know that plants need light and air to grow and live, but not all plants need soil. 	<p>Engage students in making connections by synthesizing and summarizing key science ideas.</p> <p>Engage students in communicating in scientific ways.</p>	<p><i>Need to Live and Grow?").</i></p> <p>Show slide 12.</p> <p>To help us answer these questions, let's revisit our circle map from lesson 3 that shows our beginning ideas about what plants need to live and grow.</p> <p>Now that we have more information from our experiment, let's circle the things we know plants need because we have evidence from our experiments or from scientists' experiments.</p> <p>ELL support: Review the circle map with ELL students in advance to facilitate their participation in this discussion.</p> <p>Which ideas should we circle? Which ones do we have evidence for?</p> <p>Turn and Talk: Talk about this with your partner and be ready to share your ideas and evidence with the class.</p> <p>Whole-class discussion: Let's hear your ideas. Which ideas should we circle? Which ones do we have evidence for so far?</p> <p>EL Support: Consider allowing students to demonstrate their understandings of the evidence by using nonlinguistic modes of expression, such as acting out their ideas and evidence.</p>	<p>We should circle <i>air</i> because we know from the scientist's experiment that plants need air to live and grow.</p>	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p>How do we know that plants need air? Who can tell us what the scientist did in her air experiment?</p> <p>What other ideas should we circle on our map? What else do we have evidence for?</p> <p>Do you think we should circle any other ideas on our map?</p>	<p>The scientist grew some plants with air and some without air.</p> <p>It turned brown and shriveled up.</p> <p>We should circle <i>light</i> because the plant without light in our experiment got pale and all droopy.</p> <p>I think we should circle <i>environment</i>.</p> <p>All of the plants that</p>	<p>And what happened to the plant without air?</p> <p>Does anyone want to agree, disagree, or add on?</p> <p>Does anyone agree, disagree, or want to add on?</p> <p>And what's our evidence?</p>

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
		Summarize key science ideas.	<p>NOTE TO TEACHER: <i>By the end of the discussion, light and air should be circled. Students might also want to circle the word environment. If so, explain that plants get light and air from their environment, and you can't design an experiment with and without an environment. However, this may be too challenging for kindergarten students to understand, so feel free to circle environment as something plants need if your students argue for it. (See sample dialogue in columns 5 and 6.)</i></p> <p><i>If an idea on the chart wasn't addressed in any of the experiments, leave it on the chart and tell students that you don't have enough information from the experiments to know whether this is something plants need to live and grow. Keep this chart to use in lesson 5.</i></p> <p>Show slide 13.</p> <p>From our experiments so far, we know that plants need air and light to live and grow because they wither and die without these things. We also know</p>	<p>lived and grew were in an environment.</p> <p>I agree, because if there wasn't an environment, the plants couldn't get light and air.</p>	<p>Does anyone agree, disagree, or want to add on?</p>

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
			<p>that not all plants need soil to live and grow. Some plants can grow in air or water.</p> <p>Show slide 14.</p> <p>Now that we know more about what plants need, have any of your beginning ideas changed?</p>		
1 min	<p>Link to Next Lesson</p> <p>Synopsis: The teacher announces that in the next lesson, students will examine the evidence they collected from their water experiment and use this evidence to find out whether plants need water to live and grow.</p>	Link science ideas to other science ideas.	<p>Show slide 15.</p> <p>In our next lesson, we'll see what's happening with the plants we've been growing with and without water, and then we'll look at the evidence we've collected and see if it helps us figure out whether plants need water to live and grow.</p>		