

Plants and Animals

Lesson 6b: Synthesis

Grade: Kindergarten	Length of lesson: 37 minutes	Placement of lesson in unit: 6b 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 question: Do plants and animals need the same things to live and grow? Explain your thinking.
Main learning goal: Both plants and animals need food, water, and air to live and grow. Animals get these things from their environment. Plants use sunlight, water, and air from their environment to make their own food. Animals can't do this.		
Science content storyline: Both plants and animals need food, water, and air to live and grow. Plants also need sunlight to live and grow. Animals get the things they need directly from their environment. Plants take in sunlight, water, and air from their environment, but they get their food in a different way. Using the sunlight, water, and air they get from their environment, plants make their own food inside their leaves. Animals can't do this. They have to get food from their environment by eating plants and other animals.		
Ideal student response to the focus question: Both plants and animals need air and water to live and grow, but only plants need sunlight. They get all of these things from their environment. Plants and animals need food, too, but they get their food in different ways. Plants use sunlight, air, and water from their environment to make their food inside their leaves. Animals can't make their own food. They have to get food from their environment by eating plants and other animals.		

Preparation

Materials Needed

- Science notebooks
- Chart paper and markers
- Final version of the double bubble thinking map from lessons 5a–d

Student Handouts

- 6.1 Terrarium Checklist (1 per student)

Ahead of Time

- **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. In particular, review the unit central question and walk students through the letter-writing activity so they know what to expect and can participate more fully in the lesson. Also review each of the items on the terrarium checklist (handout 6.1) and have students practice articulating the reasons for their choices for items to include in the other class's terrarium.

Lesson 6b General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
6 min	Link to previous lessons: The teacher engages students in reviewing what the plants and animals in their class terrarium need to live and grow. Then the teacher summarizes key ideas about what plants and animals need.	<ul style="list-style-type: none"> Both plants and animals need air, water, and food to live and grow, but they get their food in different ways. Plants also need sunlight from their environment, which they use with air and water to make their own food inside their leaves. Animals can't make their own food. They have to get food from their environment by eating plants or other animals.
1 min	Lesson focus question: The teacher reviews the focus question and unit central question from the previous lesson: <i>Do plants and animals need the same things to live and grow? Explain your thinking.</i>	
2 min	Setup for activity: The teacher reads a letter to students from a fictional kindergarten teacher asking them to help her class design a terrarium environment that includes the things a praying mantis and a plant will need to live and grow.	<ul style="list-style-type: none"> Plants and animals need certain things from their environment to live and grow. Animals need to get food, water, and air from their environment, and plants need to get sunlight, water, and air from their environment to make their own food.
10 min	Activity: Students look at different pictures of materials the other class might need for their terrarium. Then they use what they've learned about the needs of plants and animals to help them complete a checklist of what to include in the terrarium. Afterward, they share their recommendations and reasons with a partner.	<ul style="list-style-type: none"> Plants and animals have some common needs, such as food, water, and air, but plants also need sunlight. Plants and animals get their food in different ways. Plants use sunlight, air, and water from their environment to make their own food inside their leaves. Animals can't make their own food. They have to get food from their environment by eating plants or other animals.
8 min	Follow-up to activity: Students share their recommendations with the class and explain why they think the praying mantis and the plant need the things they recommended in order to live and grow in their environment.	
10 min	Synthesize/summarize today's lesson: Together, the class writes a letter to the other kindergarten class sharing their recommendations for the terrarium based on what they've learned about the needs of plants and animals.	

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 Lessons</p> <p>Synopsis: The teacher engages students in reviewing what the plants and animals in their class terrarium need to live and grow. Then the teacher summarizes key ideas about what plants and animals need.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Both plants and animals need air, water, and food to live and grow, but they get their food in different ways. Plants also need sunlight from their environment, which they use with air and water to make their own food inside their leaves. Animals can't make their own food. They have to get food from their environment by eating plants or other animals. 	Link science ideas to other science ideas.	<p>Show slides 1 and 2.</p> <p>NOTE TO TEACHER: <i>Hold up the class terrarium so that everyone can see it.</i></p> <p>At the beginning of our unit on plants and animals, we set up this class terrarium to learn about what plants and animals need to live and grow.</p> <p>What kinds of animals do we have in our terrarium?</p> <p>What do these animals need from their environment to live and grow?</p> <p>What else do we have in our terrarium besides the animals?</p> <p>What do the plants in our terrarium environment need to live and grow?</p>	<p>A praying mantis.</p> <p>Worms.</p> <p>Ladybugs.</p> <p>Air.</p> <p>Food.</p> <p>Water.</p> <p>Plants.</p> <p>They need air, water, and food just like animals, but they need sunlight, too.</p>	<p>Does anyone agree, disagree, or want to</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>Show slide 3.</p> <p>So in this unit, we've been learning about the needs of animals and plants. Animals need food, water, and air to live and grow, and they get these things from their environment. Plants need food, water, and air too, but they also need sunlight. Plants make their own food by using the sunlight, water, air, they get from their environment. Animals can't make their own food, so</p>	<p>I disagree because plants don't get their food from the environment. They make their own food.</p> <p>They get water, air, and sunlight from the environment and mix them together to make their food.</p> <p>No. Those are the things plants use to make food, but they aren't food for plants.</p>	<p>add on?</p> <p>How do plants make their own food?</p> <p>So are sunlight, air, and water food for plants?</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
			they have to get food from their environment by eating plants and other animals.		
1 min	<p>Lesson Focus Question</p> <p>Synopsis: The teacher reviews the focus question and the unit central question from the previous lesson: <i>Do plants and animals need the same things to live and grow? Explain your thinking.</i></p>	Set the purpose with a <u>focus question</u> or goal statement.	<p>Show slide 4.</p> <p>Last time, we used everything we’ve been learning about the needs of plants and animals to answer our big question for this unit, <i>Do plants and animals need the same things to live and grow? Explain your thinking.</i></p> <p>That big question was our focus question for the last lesson, and it’s our focus question for today, too.</p> <p>We’ve learned so much from our experiments about what plants and animals need from their environments, haven’t we?</p>		
2 min	<p>Setup for Activity</p> <p>Synopsis: The teacher reads a letter to students from a fictional kindergarten teacher asking them to help her class design a terrarium environment that includes the things a praying mantis and a plant will need to live and grow.</p> <p>Main science idea(s):</p>	Make explicit links between science ideas and activities before the activity.	<p>Show slide 5.</p> <p>Today we’ll use what we’ve learned to help another class of kindergarten students. Listen carefully as I read the letter I received their teacher.</p> <p style="padding-left: 40px;">Dear <i>[your name]</i>,</p> <p style="padding-left: 40px;">My kindergarten class is interested in having a terrarium in our classroom. We want to put a praying mantis and a plant in our terrarium, but we aren’t sure what else they’ll need in their environment to live and grow. When we heard that you have a terrarium in your classroom, we</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
	<ul style="list-style-type: none"> Plants and animals need certain things from their environment to live and grow. Animals need to get food, water, and air from their environment, and plants need to get sunlight, water, and air from their environment to make their own food. 		<p>wanted to ask for your advice. What we should put in our terrarium to make sure that the praying mantis and the plant have what they need to live and grow?</p> <p>Thank you for any help your class can give us. We look forward to hearing from you.</p> <p>Sincerely,</p> <p><i>[Make up another teacher's name]</i></p> <p>Show slide 6.</p> <p>So do you think we can help this teacher's class design a terrarium that contains everything the praying mantis and the plant need to live and grow in their environment?</p>	Yes!	
10 min	<p>Activity</p> <p>Synopsis: Students look at different pictures of materials the other class might need for their terrarium. Then they use what they've learned about the needs of plants and animals to help them complete a checklist of what to include in the</p>	<p>Engage students in using and applying new science ideas in a variety of ways and contexts.</p> <p>Select content representations and models</p>	<p>The teacher sent pictures of different things that the students in her class thought they might need for their terrarium. Let's look at these things together.</p> <p>Show slides 7–13 (one at a time).</p> <p>This picture shows a dark room. Think about whether the class should put their terrarium in a dark room.</p> <p>The next picture shows some ladybugs. Think about whether the praying mantis or the plant needs ladybugs in its environment.</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>terrarium. Afterward, they share their recommendations and reasons with a partner.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants and animals have some common needs, such as food, water, and air, but plants also need sunlight. Plants and animals get their food in different ways. Plants use sunlight, air, and water from their environment to make their own food inside their leaves. Animals can't make their own food. They have to get food from their environment by eating plants or other animals. 	<p>matched to the learning goal and engage students in their use.</p> <p>Make explicit links between science ideas and activities during the activity.</p> <p>Engage</p>	<p>What does this next picture show?</p> <p>Think about whether the praying mantis or the plant needs a toy lizard in its environment.</p> <p>What's coming through the window in this next picture?</p> <p>Think about whether the terrarium needs light.</p> <p>Where have you seen the next picture before?</p> <p>What's happening to the plant under the bell jar?</p> <p>Think about whether the terrarium shouldn't have any air.</p> <p>What does the next picture show?</p> <p>Think about what we learned about whether plants and animals need water.</p> <p>And do you see in this last picture?</p> <p>Think about whether the class should put shells in their terrarium.</p> <p>Now I'm going to give you handout with these pictures</p>	<p>A toy lizard!</p> <p>Sunlight.</p> <p>In the scientist's experiment about air.</p> <p>It's not getting any air.</p> <p>Water.</p> <p>A shell.</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>students in analyzing and interpreting data and observations.</p> <p>Engage students in constructing explanations and arguments.</p>	<p>on it. Listen carefully to the instructions so you know what to do.</p> <p>NOTE TO TEACHER: <i>Distribute handout 6.1 (Terrarium Checklist) and read through the instructions. Direct students to think about whether the item in each picture will help the praying mantis and/or the plant live and grow in their environment. Encourage them to refer to the double bubble map from lesson 5 to remind them of the things plants and animals need from their environment to live and grow.</i></p> <p><i>Students should indicate their decisions by marking yes or no for each item in the corresponding box on the handout.</i></p> <p>Show slide 14.</p> <p>Look at each picture on the handout and think about whether the praying mantis or the plant or both of them need the thing in the picture to live and grow in their terrarium environment. Use the double bubble map to remind you of what plants and animals need.</p> <p>If you think the other class needs this thing for their terrarium, put an <i>X</i> in the YES box. If you don't think it should be in the terrarium, put an <i>X</i> in the NO box. Make sure you can give good reasons for your decisions.</p> <p>NOTE TO TEACHER: <i>After students complete the</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>Ask questions to probe student ideas and predictions.</p> <p>Ask questions to challenge student thinking.</p>	<p><i>checklist independently, have them pair up and discuss their choices with an elbow partner. They should also be able to explain why they think the praying mantis and/or the plant need a particular item to help them live and grow in the terrarium. Circulate around the room as students work on their checklists and then discuss their decisions and reasoning with a partner. Ask probe and challenge questions to make student thinking visible and address any student misconceptions.</i></p>		
8 min	<p>Follow-Up to Activity</p> <p>Synopsis: Students share their recommendations with the class and explain why they think the praying mantis and the plant need the things they recommended in order to live and grow in their environment.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants and animals have some common needs, such as food, water, and air, but plants also need sunlight. Plants and animals get their food in different ways. Plants use 	<p>Make explicit links between science ideas and activities after the activity.</p> <p>Engage students in making connections by synthesizing and summarizing key science ideas.</p> <p>Engage students in analyzing and</p>	<p>Let's hear what you think the other class should put in their terrarium so the praying mantis and the plant get what they need to live and grow in their environment. Be sure to give a reason for your decisions.</p> <p>First, let's have a show of hands. How many of you think the other class will need a dark room for their terrarium? How many think they won't need a dark room?</p> <p>OK. We seem to agree that they won't need a dark room.</p> <p>Who can give me a scientific reason for that choice? Be sure to talk about both the plants and the animals when you give your reasons.</p> <p>NOTE TO TEACHER: <i>Display a copy of handout 6.1 (Terrarium Checklist) on a document reader and mark which items on the list the class agrees should be</i></p>	<p>Plants need sunlight to live and grow, not a dark room!</p> <p>Our plants didn't do</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>sunlight, air, and water from their environment to make their own food inside their leaves. Animals can't make their own food. They have to get food from their environment by eating plants or other animals.</p>	<p>interpreting data and observations.</p> <p>Engage students in constructing explanations and arguments.</p> <p>Engage students in communicating in scientific ways.</p> <p>Ask questions to probe student ideas and predictions.</p> <p>Ask questions to challenge student thinking.</p>	<p><i>included in the terrarium and which shouldn't be. Encourage students to use language (sentence starters) from the CSW poster as they share their ideas and reasons.</i></p> <p>How about the ladybugs? How many of you think the other class should put ladybugs in their terrarium? How many of you think they shouldn't put ladybugs in their terrarium?</p> <p>What scientific reasons can you give for your decision?</p> <p>The third picture shows the toy lizard. How many of you think the class needs to put that in the terrarium? How many of you said no? What are your reasons?</p> <p>NOTE TO TEACHER: <i>Scientists often express humor and/or individuality by including some sort of whimsical element in their research, such as a toy lizard or a shell. Encourage students to come up with their own whimsical ideas for things to include in the</i></p>	<p>well in a dark room. They turned pale and drooped.</p> <p>The plants from our experiment that we put in the light stayed green and strong, and they grew taller.</p> <p>They need to put ladybugs in their terrarium because the praying mantis eats ladybugs as its food.</p> <p>I said no. The praying mantis and the plant don't need a toy lizard!</p> <p>A real lizard might eat the praying</p>	<p>What about a real lizard?</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>terrarium.</i></p> <p>Does the terrarium need sunlight?</p> <p>What about the picture that shows a plant with no air? What will happen to the plant in the terrarium if it has no air?</p> <p>Why do plants die if they don't get air?</p>	<p>mantis, so that wouldn't be a good thing to put in the terrarium!</p> <p>Yes! The plant needs sunlight to make its food.</p> <p>Without air, the plant will die!</p> <p>The scientist's experiment showed that plants die without air.</p> <p>Both plants and animals need air to live and grow.</p> <p>Like animals, they can't breathe.</p> <p>Plants need air to make their food, so</p>	<p>How do you know the plant will die?</p> <p>Is there another reason plants die if they don't get air? What do plants need air 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>Right! Without air in the terrarium, the plant wouldn't be able to make any food, and it would starve to death. The praying mantis would die too because it needs air to breathe.</p> <p>What about the water? Do you think the class should put water in their terrarium?</p> <p>What will happen to the plant if it doesn't get any water?</p> <p>Finally, what do you think about the shell? Is it something either the praying mantis or the plant need to live and grow in the terrarium?</p>	<p>if they can't make food, they'll die!</p> <p>Yes, because both the plant and the praying mantis need water to live and grow.</p> <p>It will die.</p> <p>It will dry out.</p> <p>It won't be able to make food anymore</p> <p>I think the praying mantis would use it to stand on.</p> <p>The praying mantis could stand on the</p>	<p>Why will the plant die if it doesn't get water?</p> <p>Do you think the praying mantis needs the shell?</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>shell, but it doesn't need the shell to live and grow.</p> <p>But what if it uses the shell to protect itself from getting caught? Maybe it could hide underneath it. Then the shell would help it stay alive.</p> <p>But there's nothing in the terrarium that would eat the praying mantis!</p>	<p>Does anyone agree, disagree, or want to add on?</p>
10 min	<p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: Together, the class writes a letter to the other kindergarten class sharing their recommendations for the terrarium based on what they've learned about the needs of plants and</p>	<p>Engage students in using and applying new science ideas in a variety of ways and contexts.</p> <p>Engage students in</p>	<p>Show slide 15.</p> <p>Now that we've decided what the praying mantis and the plant need in their terrarium to live and grow, let's write a letter to share our advice with the other class.</p> <p>NOTE TO TEACHER: <i>Write the letter on chart paper and have students help you construct it. Ask them to look at the things on the checklist that they decided plants and animals need to live and grow, such as water, air, and sunlight. Then ask students</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>animals.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> Plants and animals have some common needs, such as food, water, and air, but plants also need sunlight. Plants and animals get their food in different ways. Plants use sunlight, air, and water from their environment to make their own food inside their leaves. Animals can't make their own food. They have to get food from their environment by eating plants or other animals. 	<p>making connections by synthesizing and summarizing key science ideas</p>	<p><i>what they want to tell the other class about these things and why the praying mantis and the plant will need them to live and grow in their environment.</i></p> <p><i>Allow students to add a whimsical element to the letter (like the toy lizard and/or the shell or something else), as long as they understand that plants and animals don't need them to live and grow.</i></p> <p><i>See the sample letter below for ideas.</i></p> <p>Dear [teacher's name] class,</p> <p>We think you should put your terrarium in the sunlight because the plant needs light to make its own food. The praying mantis can't make its own food, so you will need to put some food in the terrarium. Praying mantises like to eat ladybugs.</p> <p>You will need to give the praying mantis and the plant water so they don't die. And make sure your terrarium has small holes in it for air, because plants and animals need air. You can add soil to hold up the plant, but the plant doesn't need soil to live and grow. We found out that seeds and plants can live and grow without soil.</p> <p>We hope our advice is helpful to you and that your praying mantis and plant live in your terrarium for a long time.</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>Sincerely,</p> <p><i>[Your name's]</i> class</p> <p>NOTE TO TEACHER: <i>You could have each student in your class sign the letter as well.</i></p> <p>Congratulations! You used what you've learned about plants and animals to help another class design their own terrarium!</p> <p>Show slide 16.</p> <p>We've learned so much about the needs of plants and animals. Let's review some of these important ideas:</p> <ul style="list-style-type: none"> • Animals need food, water, and air to live and grow, and they get these things from their environment. • Plants need food, water, and air too, but they also need sunlight. • Plants get sunlight, water, and air from their environment, and they use these things make their own food inside their leaves. • Animals can't make their own food, so they have to get food from their environment by eating plants and other animals. <p>Now that you know what plants and animals need to live and grow, maybe you can help someone else build a terrarium environment!</p>		