

Food Webs

Lesson 5b: Decomposition in Food Webs

Grade 5	Length of lesson: 50 minutes	Placement of lesson in unit: 5b of 7 two-part lessons on food webs
Unit central question: How do living things depend on one another to get the food (matter and energy) they need to live and grow?		Lesson focus question: What happens to the matter that makes up wastes and dead organisms? (Part 2)
Main learning goal: Decomposers recycle matter by breaking down dead organisms into carbon dioxide, water, and minerals that plants can use again.		
Science content storyline: What happens to the wastes organisms leave behind, and what happens to dead organisms? Do they just pile up? When we observed strawberries that were no longer part of a strawberry plant, we saw that they started to rot. Organisms called <i>decomposers</i> used this once-living matter as food. The main decomposers are mold (a type of fungus) and bacteria. To get their food from wastes and dead matter, decomposers have to break down the matter into tiny pieces. They take in some of these pieces and use it as food. But they leave behind other small pieces of matter in the form of water, carbon dioxide, and minerals that enter the soil or the air. Plants can take in and use these tiny bits of matter (carbon dioxide and water) to make food. Plants also use minerals from the soil to stay healthy so they can continue making food out of carbon dioxide and water. Because of the decomposers, wastes and dead matter don't just pile up! They change into a form plants can use again. For this reason, we say that matter is recycled in food chains. Matter changes forms and moves from organism to organism and between organisms and the environment, but it is never lost or destroyed.		
Ideal student response to the focus question: When living things die, decomposers like mold and bacteria break down these organisms into tiny pieces and use some of the pieces as food. Decomposers also leave behind small pieces of matter in the air and the soil. This matter is made up of minerals, carbon dioxide, and water that plants can take in and use again, but it doesn't contain food energy. Plants use the carbon dioxide and water to make food, and they use the minerals to stay healthy. In this way, matter is used again and again, but it never gets used up.		

Preparation

<p>Materials Needed</p> <ul style="list-style-type: none"> • Science notebooks • Jars of rotting strawberries from lesson 5a • Chart of student questions about the strawberries from lesson 5a • Chart paper, markers <p>Student Handouts</p> <ul style="list-style-type: none"> • 5.2 Rotting Is a Good Thing! (1 per student) 	<p>Ahead of Time</p> <ul style="list-style-type: none"> • Review the Food Webs Content Background Document: sections 2.4 and 3.1. • Review the PowerPoint slides and modify them as you wish. • Display these words for students to use at the end of the lesson (synthesize/summarize activity): <ul style="list-style-type: none"> • Required words: <i>decomposers, minerals, recycle, matter, food</i> • Bonus words: <i>carbon dioxide, water, growth, wastes, energy, producers, consumers</i>
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Lesson 5b General Outline

Time	Phase of Lesson	How the Science Content Storyline Develops
5 min	Link to previous lesson and lesson focus question: Students review the focus question from the previous lesson: <i>What happens to the matter that makes up wastes and dead organisms?</i> Then they discuss their conclusions so far and their questions about what is happening with the strawberries.	<ul style="list-style-type: none"> • Dead organisms and parts of dead organisms break down into tiny pieces. This is called <i>decomposition</i>
4 min	Setup for activity: Students prepare to read an essay about decomposition.	<ul style="list-style-type: none"> • Dead organisms and parts of dead organisms break down into tiny pieces. This is called <i>decomposition</i>.
15 min	Activity: Students read an essay about decomposition.	<ul style="list-style-type: none"> • Mold and bacteria are the main decomposers. These living things get the matter and energy they need to live and grow by eating wastes and dead matter. • Decomposers recycle matter by breaking down dead organisms into minerals, carbon dioxide, and water that plants can use again.
10 min	Follow-up to activity: Students review the essay to find new ideas related to the analysis questions. Then they discuss these ideas.	
15 min	Synthesize/summarize today's lesson: Students add decomposers to their simple food-chain diagrams and show what happens to matter in this food chain.	<ul style="list-style-type: none"> • Each organism in a food chain uses food matter for growth and as a source of energy. Organisms also leave some of the food matter behind as wastes. • Producers make food matter from carbon dioxide, water, and sunlight. Some of this matter gets passed along to consumers in the food chain. • Decomposers use wastes and dead producers and consumers as their food. As decomposers consume their food, they recycle matter by breaking down the dead organisms into minerals, carbon dioxide, and water that plants can use again. • Thus, matter changes forms and moves from organism to organism and between organisms and the environment, but it's never lost or destroyed.
1 min	Link to next lesson: The teacher previews ideas that will be explored in the next lesson.	

Time	Phase of Lesson and How the Science Content Storyline Develops	STeLLA Strategy	Teacher Talk and Questions	Anticipated Student Responses	Possible Probe/Challenge Questions
5 min	<p>Link to Previous Lesson and Lesson Focus Question</p> <p>Synopsis: Students review the focus question from the previous lesson: <i>What happens to the matter that makes up wastes and dead organisms?</i> Then they discuss their conclusions so far and their questions about what is happening with the strawberries.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Dead organisms and parts of dead organisms break down into tiny pieces. This is called <i>decomposition</i>. 	<p>Set the purpose with a <u>focus question</u> or goal statement.</p> <p>Link science ideas to other science ideas.</p>	<p>Show slides 1 and 2.</p> <p>Last time we started investigating strawberries to help us answer the focus question, <i>What happens to the matter that makes up wastes and dead organisms?</i></p> <p>This will be our focus question again today.</p> <p>Show slide 3 (title only).</p> <p>Who remembers some of the things we've discovered so far about what is happening to the strawberries in our jars?</p> <p>Show the rest of slide 3.</p> <p>NOTE TO TEACHER: <i>Reveal the rest of slide 3 to summarize key conclusions so far.</i></p>	<p>The strawberries are decomposing.</p> <p>They look yucky.</p> <p>They're shrinking, and there's a lot of liquid in there.</p> <p>They have mold growing on them.</p>	<p>You say the strawberries have mold growing on them. Do you think the mold is alive? Why or why not?</p>

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			<p>Show slide 4 (title only).</p> <p>We also came up with a list of questions about what’s happening with the strawberries. Let’s read the questions we listed on our chart.</p> <p>Show the rest of slide 4.</p> <p>NOTE TO TEACHER: <i>Reveal the rest of slide 4 to add your questions.</i></p> <p>And I had two more questions:</p> <ol style="list-style-type: none"> 1. What does the mold on the strawberries have to do with decomposition? 2. Why isn’t the mass of the jar going down as the strawberries get smaller? <p>Let’s see how many of these questions we can answer today!</p>		
4 min	<p>Setup for Activity</p> <p>Synopsis: Students prepare to read an essay about decomposition.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Dead organisms and parts of dead organisms break down into small pieces. This is called <i>decomposition</i>. 	<p>Make explicit links between science ideas and activities before the activity.</p>	<p>Show slide 5.</p> <p>You’ve done some really good thinking about what’s happening with our decomposing strawberries!</p> <p>Next we’re going to read some science ideas about decomposition. As you read the essay, look for any new ideas this gives you about how to answer two analysis questions:</p> <ol style="list-style-type: none"> 1. How do the strawberries decompose? 2. Why did the mass of the strawberry jar stay 		

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			<p>the same?</p> <p>NOTE TO TEACHER:</p> <ul style="list-style-type: none"> • <i>Distribute handout 5.2, Rotting Is a Good Thing! Decide whether to have students read the handout as a class, in pairs, in small groups, or individually.</i> • <i>Make sure the two analysis questions remain visible to students during the reading.</i> • <i>After they've read the whole text, ask students to go back and underline one sentence in the handout that helps answer analysis question 1, and one sentence that helps answer analysis question 2.</i> • <i>Feel free to have students use additional active-reading strategies that you use in your classroom.</i> 		
15 min	<p>Activity</p> <p>Synopsis: Students read an essay about decomposition.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Mold and bacteria are the main decomposers. These living things get the matter and energy they need to live and grow by eating wastes and dead matter. • Decomposers recycle matter by breaking 	Make explicit links between science ideas and activities during the activity.	So let's read this essay about rotting [<i>as a class/in pairs/in small groups/individually</i>]. Remember to look for new ideas about decomposition that will help us answer our questions about the strawberries.		

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	down dead organisms into minerals, carbon dioxide, and water that plants can use again.				
10 min	<p>Follow-Up to Activity</p> <p>Synopsis: Students review the essay to find new ideas related to the analysis questions. Then they discuss these ideas.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Mold and bacteria are the main decomposers. These living things get the matter and energy they need to live and grow by eating wastes and dead matter. • Decomposers recycle matter by breaking down dead organisms into minerals, carbon dioxide, and water that plants can use again. 	<p>Make explicit links between science ideas and activities after the activity.</p> <p>Engage students in communicating in scientific ways.</p>	<p>Now I'd like you to go back through the handout and underline one sentence that helps answer analysis question 1, and one sentence that helps answer analysis question 2. Look for one new idea for each question.</p> <p>ELL support: Model for students how to identify sentences in the handout that will help answer these questions.</p> <p>Individual work time.</p> <p>Show slide 6.</p> <p>Whole-class round-robin: As we go around the room, I'd like to hear one new idea from each of you [<i>or as many as time allows</i>]. Tell us what your new idea is in a complete sentence, and how you think it will help us answer one of our analysis questions.</p> <p>Listen carefully to the ideas being shared and be ready to add on, agree, disagree, or ask clarification questions.</p>	<p><i>Sample sentences that help answer analysis question 1:</i></p> <ul style="list-style-type: none"> • Rotting happens when decomposers like mold eat dead organisms or materials that were once part of 	<p><i>Questions to use throughout this discussion:</i></p> <ul style="list-style-type: none"> • Can anyone add on? • Does anyone agree or disagree? • Who has a clarification question?

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				<p>a living thing.</p> <ul style="list-style-type: none"> • Mold can eat and grow on anything that was once alive or was part of once-living plant materials. • Mold uses lemon peels as food. • As mold eats the lemon peel, or other foods, it breaks the peel into tiny bits of matter. • The mold uses chemicals to break down the lemon peel it can be used for food that the mold needs to live and grow. <p><i>Sample sentences that help answer analysis question 2:</i></p> <ul style="list-style-type: none"> • Matter is never lost, and it never disappears. • Instead, decomposers recycle matter so it's used over and 	

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				over again.	
15 min	<p>Synthesize/Summarize Today's Lesson</p> <p>Synopsis: Students add decomposers to their simple food-chain diagrams and show what happens to matter in this food chain.</p> <p>Main science idea(s):</p> <ul style="list-style-type: none"> • Each organism in the food chain uses food matter for growth and as a source of energy. Organisms also leave some of the food matter behind as wastes. • Producers make food matter from carbon dioxide, water, and sunlight. Some of this matter gets passed along to consumers in the food chain. • Decomposers use wastes and dead producers and consumers as their food. As decomposers consume their food, they recycle matter 	Engage students in making connections by synthesizing and summarizing key science ideas.	<p>NOTE TO TEACHER: <i>Ideally, students should work on this activity individually or in pairs (your choice) and then compare their diagrams with the sample on slide 8. If time is running short, you can do this as a class discussion and then have students make changes to their diagrams based on the slide.</i></p> <p>Show slide 7.</p> <p>Let's review the food-chain diagrams you created during the previous lesson. Add decomposers to your drawings and then add as many details as you can to explain what happens to the matter when an organism dies. Be sure to label your arrows.</p> <p>As you're working on your diagrams, use all of the required words listed in bold in the word bank:</p> <ul style="list-style-type: none"> • Decomposers • Minerals • Recycle • Matter • Food <p>Also try to use these bonus words in your drawings:</p> <ul style="list-style-type: none"> • Carbon dioxide • Water • Growth • Wastes • Energy • Producers • Consumers <p>Individual work time.</p>		

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	<p>by breaking down the dead organisms into minerals, carbon dioxide, and water that plants can use again.</p> <ul style="list-style-type: none"> Thus, matter changes forms and moves from organism to organism and between organisms and the environment, but it's never lost or destroyed. 		<p>Show slide 8.</p> <p>Whole-class discussion: Look carefully at the diagram on this slide and compare it with your own diagrams. Keep in mind that your diagrams do not have to look exactly the same.</p> <p>What do you have on your diagrams that's similar to this one?</p> <p>What do you have on your diagrams that's different from this one?</p> <p>What's on this slide diagram that isn't on yours? Do you want to add it?</p>	<p>My diagram has arrows going from the bush and the mouse and the hawk to the decomposers.</p> <p>I put "matter is recycled" on the arrow from the decomposers to the bush.</p> <p>I didn't write <i>minerals, carbon dioxide, and water</i> on my arrow from the decomposers to</p>	<p>Tell us more about what those arrows mean.</p> <p>What do others think of this addition?</p>

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				<p>the bush.</p> <p>I didn't have an arrow going from the decomposers to the bush.</p> <p>I didn't put a title on my diagram.</p>	<p>Why do you think those words are on the slide diagram?</p> <p>Why not?</p>
1 min	<p>Link to Next Lesson</p> <p>Synopsis: The teacher previews ideas that will be explored in the next lesson.</p>	<p>Summarize key science ideas.</p> <p>Link science ideas to other science ideas.</p>	<p>Show slide 9.</p> <p>We've talked about a lot of different things that happen to matter as producers change it into food matter and it's passed from organism to organism in a food chain.</p> <p>Today we learned that decomposers also use food matter, but as they use it, they break it down into tiny pieces that plants can use again. This way, matter is recycled.</p> <p>Next time we'll think about what happens to energy in food chains. Can it be recycled like matter?</p>		