

Lesson 6: Explaining Other Examples of Decomposers Growing, Moving, and Functioning

Overview

Students do optional readings and activities about different types of decomposers. Then they practice explaining other examples of decomposers growing, moving and functioning and take the unit posttest.

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Teacher's Guide

Guiding Question

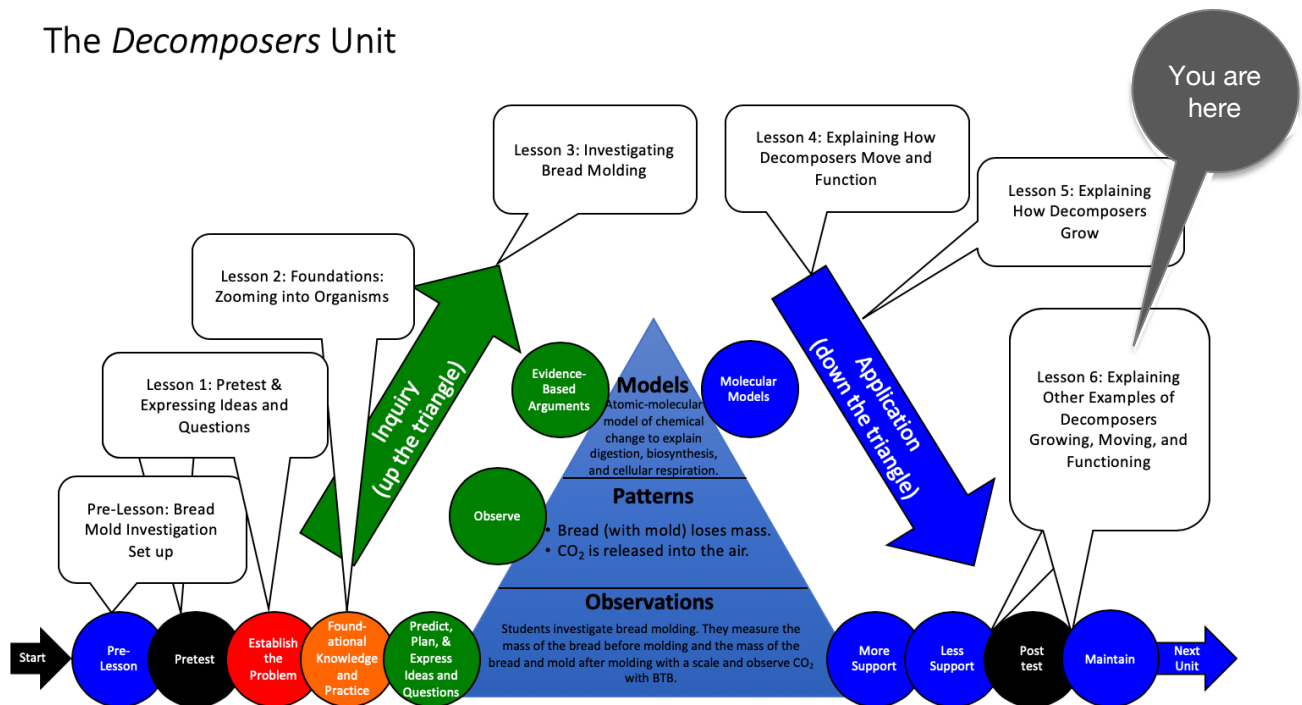
How do other decomposers grow, move, and function?

Activities in this Lesson

- (Optional) Activity 6.1: Exploring Different Kinds of Decomposers (varies)
- Activity 6.2: Explaining Other Examples of Decomposers Growing, Moving, and Functioning (50 min)
- Activity 6.3: Comparing Decomposers, Plants, and Animals (50 min)
- Activity 6.4: Functions of All Decomposers (50 min)
- Activity 6.5: Decomposers Unit Posttest (40 min)

Unit Map

The *Decomposers* Unit



Learning Goals

Target Performances

Activity	Target Performance
<i>Lesson 6 – Explaining Other Examples of Decomposers Growing, Moving, and Functioning (students as explainers)</i>	
(Optional) Activity 6.1: Exploring Different Kinds of Decomposers	Students explain how matter and energy move and change in other phenomena involving decomposers, included aerobic and anaerobic bacteria, fermentation, spontaneous combustion of hay, and decomposition in forests.
Activity 6.2: Explaining Other Examples of Decomposers Growing, Moving, and Functioning	Students develop integrated accounts of how other fungi (bracket fungi, bread mold, mycorrhizal fungi) grow and function through the processes of digestion, cellular respiration, and biosynthesis.
Activity 6.3: Comparing Decomposers, Plants, and Animals	Students compare how matter moves and changes and how energy changes in decomposers, plants, and animals.
Activity 6.4: Functions of All Decomposers	Students develop integrated accounts of how all aerobic decomposers grow and function through the processes of digestion, cellular respiration, and biosynthesis.
Activity 6.5: Decomposers Unit Posttest	Students show their end-of unit proficiencies for the overall unit goal: Questioning, investigating, and explaining how decomposers move and change matter and energy as they live and grow.

NGSS Performance Expectations

High School

- Chemical Reactions. HS-PS1-4. Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends on the changes in total bond energy.
- Chemical Reactions. HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
- From Molecules to Organisms: Structures and Processes. HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- Matter and Energy in Organisms and Ecosystems. HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
- Matter and Energy in Organisms and Ecosystems. HS-LS1-7. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

- Matter and Energy in Organisms and Ecosystems. HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

Middle School

- Structure and Properties of Matter. MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.
- Chemical Reactions. MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.
- From Molecules to Organisms: Structures and Processes. MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- Matter and Energy in Organisms and Ecosystems. MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
- Matter and Energy in Organisms and Ecosystems. MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

Background Information

Three-dimensional Learning Progression

In this final lesson of the unit, students have completed the inquiry and explanation sequences for decomposers' growth and movement. The activities in the previous lessons were designed to walk students through a cognitive apprenticeship model of Establishing the Problem, Modeling, Coaching, and Fading. The results of the unit posttest will help you determine if your students are ready to move on to other units and carry forward concepts from this unit into those future units. If the results from your posttest imply that a majority of your students are still struggling with certain concepts, it might be valuable to return to some of the main concepts they are struggling with before moving on to the next *Carbon TIME* unit.

Key Ideas and Practices for Each Activity

Activity 6.1 is an optional activity that allows students to explore other types of decomposers through activities, readings, and videos. The [6.1 Decomposers Without Oxygen Reading and Modeling Handout](#) is the only activity in the *Decomposers* unit that addresses anaerobic conditions which is a component of HS-LS2-3.

Activity 6.2 is the **Fading** phase of the Explanation Activity Sequence, which provides students with important less-scaffolded practice with digestion, biosynthesis, and cellular respiration. Students should take more responsibility for their work than in Lessons 4 and 5, which included the Modeling and Coaching phases. Students answer the Three Questions for different decomposers growing and moving using the Explanations Tools, coordinating accounts at the macroscopic and atomic-molecular scales. Macroscopic scale accounts include these components:

- the structure of the system (the decomposer in this case) and the movement of materials through the system;
- the location where chemical changes take place (outside and inside decomposers' cells);
- the materials involved in the chemical changes: the reactants going in and the products coming out.

Atomic-molecular scale accounts include three different ways of representing chemical change:

- molecular models, with twist ties to represent units of energy, that students use to physically rearrange the atoms of the reactant molecules into the molecules of the products;
- a chemical equation that shows how atoms are rearranged into new molecules in a compact way (but does not account for energy);
- the Explanations Tools, which provide a way for students to account for changes in matter and energy in writing by answering the Three Questions.

In Activity 6.3, which is also part of the **Fading** phase of the Explanation Activity Sequence, students think across the macroscopic-focused *Carbon TIME* units to compare how decomposers grow and function with how animals and plants grow and function.

In Activity 6.4, the final component of the **Fading** phase of the Explanation Activity Sequence, students write generalized explanations of how all decomposers grow, move, and function with reduced scaffolding.

Activity 6.5 includes summative assessment for the unit. You can track students' progress by having them take the unit posttest (identical to the unit pretest) and comparing the results of the two assessments.

Key Carbon-Transforming Processes: Digestion, Biosynthesis, and Cellular Respiration

Content Boundaries and Extensions

Talk and Writing

This lesson of the unit represents the fading portion of the **Explanations Phase**. This means that students are expected to develop explanations for carbon-transforming processes they studied in this unit in *new* and *novel* contexts. The table below shows specific talk and writing goals for the Explanations Phase of the unit.

Talk and Writing Goals for the Explanations Phase	Teacher Talk Strategies That Support This Goal	Curriculum Components That Support This Goal
Examine student ideas and correct them when there are problems. It's ok to give the answers away during this phase! Help students practice using precise language to describe matter and energy .	<i>Let's think about what you just said: air molecules. What are air molecules? Are you talking about matter or energy? Remember: atoms can't be created. So that matter must have come from somewhere. Where did it come from? Let's look at the molecule poster again... is carbon an atom or a molecule?</i>	Molecule Poster Three Questions Poster
Focus on making sure that explanations include multiple scales .	<i>The investigation gave us evidence for what was happening to matter and energy at a macroscopic scale. But what is happening at an atomic-molecular scale? What is happening to molecules and atoms? How does energy interact with atoms and molecules during chemical change? Why doesn't the macroscopic investigation tell us the whole story? Let's revisit our scale poster... what is happening to matter at the molecular scale?</i>	Molecular Models Molecular Modeling Worksheets Explanation Tools PPT Animation of chemical change Powers of Ten Poster
Encourage students to recall the investigation.	<i>When did this chemical change happen during our investigation? How do we know that? What is our evidence?</i>	Evidence-Based Arguments Tool Investigation Video

	<i>What were the macroscopic indicators that this chemical change took place?</i>	
Elicit a range of student explanations. Press for details. Encourage students to examine, compare, and contrast their explanations with others'.	<i>Who can add to that explanation?</i> <i>What do you mean by _____? Say more.</i> <i>So, I think you said _____. Is that right?</i> <i>Who has a different explanation?</i> <i>How are those explanations similar/different?</i> <i>Who can rephrase _____'s explanation?</i>	Explanation Tools

(Optional) Activity 6.1: Exploring Different Kinds of Decomposers (varies)

Overview and Preparation

Target Student Performance

Students explain how matter and energy move and change in other phenomena involving decomposers, including aerobic and anaerobic bacteria, fermentation, spontaneous combustion of hay, and decomposition in forests.

Materials You Provide

- Spontaneous combustion of hay video: <https://www.youtube.com/watch?v=zRNCrHqD0zE>
- Paper for writing answers to the questions on [6.1 Exploring Different Kinds of Decomposers Handout](#)
- Molecular model kits for modeling fermentation (if you do [6.1 Decomposers Without Oxygen Reading and Modeling](#))

Resources Provided

- [6.1 Exploring Different Kinds of Decomposers Handout](#) (1 per student)
- [6.1 Bacteria Reading](#)
- [6.1 Dr. Death Reading](#)
- [6.1 Decomposers Without Oxygen Reading and Modeling Handout](#)

Recurring Resources

- [Questions, Connections, Questions Student Reading Strategy](#) (1 per student)

Setup

For this Activity, you can choose which of the four sub-activities you would like your students to do. You may opt to concentrate on one or two of the sub-activities, allow your students to choose, or organize a jigsaw activity in which different groups of students do different sub-activities. For all the sub-activities, you can decide if you want to do them as a whole class or for students to work on them individually or in small groups. For all the sub-activities, prepare one copy of [6.1 Exploring Different Kinds of Decomposers Handout](#) for each student.

For the Learning more about bacteria sub-activity, prepare a copy of [6.1 Bacteria Reading](#) for each student.

For the Reading about Dr. Death sub-activity, prepare a copy of [6.1 Dr. Death Reading](#) for each student.

For the Learning about spontaneous combustion of hay sub-activity, prepare a computer and projector to show the video (or allow students to access personal electronic devices or individual laptops/tables to watch the video individually, in pairs, or in small groups).

For the Modeling fermentation sub-activity, prepare a copy of [6.1 Decomposers Without Oxygen Reading and Modeling](#) for each student and a model kit for each pair of students.

Directions

1. Explain to students which sub-activities they will be doing

Give each student a copy of [6.1 Exploring Different Kinds of Decomposers Handout](#). Explain which of the four options on the handout they will be doing (see the possibilities under Setup above).

2. (Option 1) Introduce a new kind of decomposer: bacteria.

If students are doing Option 1 (Learning more about bacteria), then tell them that so far in this unit we have used fungi (mushrooms) and mold (bread mold) as examples of decomposers. In this activity they will consider a new type of decomposer: bacteria.

- Begin by asking students what they know about bacteria. Have students share their stories, prior knowledge, and experiences with the class.

3. Have students read about bacteria.

Divide students into pairs and give each student a copy of the [6.1 Bacteria Reading](#).

- Have the students read the handout in pairs while using the [Questions, Connections, Questions Student Reading Strategy](#). See the [Questions, Connections, Questions Reading Strategy Educator Resource](#) document for information about how to engage students with this strategy.
- After students have read the handout, ask them to answer the questions in Part 1 of [6.1 Exploring Different Kinds of Decomposers Handout](#) with their partner.
- Combine pairs to form groups of four. Have each pair take turns discussing their answers to the questions.
- Bring the groups back to the whole class and ask them what they learned about bacteria from the reading.

4. (Option 2) Have students read about Dr. Death.

If students are doing Option 2 (Reading about Dr. Death), then divide students into pairs and give each student a copy of the [6.1 Dr. Death Reading](#).

- Have the students read the handout in pairs while using the [Questions, Connections, Questions Student Reading Strategy](#). See the [Engaging Students with Readings and the Question, Connections, Questions Reading Strategy Educator Resource](#) document for information about how to engage students with this strategy.
- After students have read the handout, ask them to answer the questions in Part 2 of [6.1 Exploring Different Kinds of Decomposers Handout](#) with their partner.
- Combine pairs to form groups of four. Have each pair take turns discussing their answers to the questions.
- Bring the groups back to the whole class and ask them what they learned about decomposers from the reading.

5. (Option 3) Have students watch about spontaneous combustion of hay.

If students are doing Option 3 (Learning about spontaneous combustion of hay), prepare to show the video.

- Have students read the questions for Part 3 of [6.1 Exploring Different Kinds of Decomposers Handout](#).
- Show the video while students answer the questions on a separate sheet of paper.
- Discuss the students' answers to the questions, and how what they have figured out about decomposers from other activities in the unit helps them to answer the questions.

5. (Option 4) Have students read about and model fermentation.

If students are doing Option 4 (Modeling fermentation), tell students that they will think about how bacteria can survive in environments without oxygen. Note that the [6.1 Bacteria Reading](#) introduces this idea, so that reading could be used before this activity.

- Divide students into pairs and give each student a [6.1 Decomposers Without Oxygen Reading and Modeling Handout](#) and each pair a molecular modeling kit.
- Have the students read the explanation of fermentation on the handout,
- Have pairs follow the instructions on the handout to model the chemical process of ethanol fermentation.
- Ask students to answer the questions in Part 4 of [6.1 Exploring Different Kinds of Decomposers Handout](#) with their partner.
- Bring the groups back to the whole class and discuss (a) answers to the questions and (b) other examples of fermentation that students have encountered.

Assessment

During the sub-activities, consider how students connect the new phenomena related to decomposers in this Activity with what they have learned more generally about decomposers throughout the earlier Lessons of the unit.

Differentiation & Extending the Learning

Differentiation

- Form strategic groups to ensure strong students in each.
- Allow students to highlight important information individually before joining with their groups.
- Have students do more than one option by cycling the groups through each option station, sharing out ideas and answers at the end.

Modifications

Activity 6.2: Explaining Other Examples of Decomposers Growing, Moving, and Functioning (50 min)

Overview and Preparation

Target Student Performance

Students develop integrated accounts of how other fungi (bracket fungi, bread mold, mycorrhizal fungi) grow and function through the processes of digestion, cellular respiration, and biosynthesis.

Materials You Provide

- (from previous lesson) [1.2 Expressing Ideas and Questions Tool for Bread Molding](#)
- (from previous lesson) [3.3 Evidence-Based Arguments Tool for Bread Molding](#)

Resources Provided

- [6.2 Explaining Other Examples of Decomposers Growing, Moving, and Functioning PPT](#)
- [6.2 Other Decomposers Reading: Bracket Fungi](#)
- [6.2 Other Decomposers Reading: Bread Mold](#)
- [6.2 Other Decomposers Reading: Mycorrhizal Fungi](#)
- [6.2 Bracket Fungi Worksheet](#)
- [6.2 Bread Mold Worksheet](#)
- [6.2 Mycorrhizal Fungi Worksheet](#)
- [6.2 Grading Bracket Fungi Worksheet](#)
- [6.2 Grading Bread Mold Worksheet](#)
- [6.2 Grading Mycorrhizal Fungi Worksheet](#)

Recurring Resources

- [Three Questions 11 x 17 Poster](#) (1 per class)
- [Three Questions Handout](#) (1 per student)
- [Bread Molding Class Results 11 x 17 Poster](#)
- [Bread Molding Class Results Spreadsheet](#)

Setup

Prepare several copies of each version of the [6.2 Other Decomposers Readings](#), and the [6.2 Bracket Fungi/Bread Mold/Mycorrhizal Fungi Worksheets](#) so that there is one of each for each student. Gather the class results poster and/or spreadsheet from Activity 3.2, as well as their completed copies of [1.2 Expressing Ideas and Questions Tool for Bread Molding](#) and [3.3 Evidence-Based Arguments Tool for Bread Molding](#). Prepare a computer and a projector to display the PPT.

Directions

1. **Use the instructional model to show students where they are in the course of the unit.**

Display Slide 2 of the [6.2 Explaining Other Examples of Decomposers Moving and Growing PPT](#).

2. **Review the ways in which decomposers use food.**

Use Slides 3-6 of the PPT to review what students have figured out about how decomposers use food.

- Slide 3 reminds students that the unit is about all kinds of decomposers.
- Slide 4 reminds students of structures that all decomposers have in common at different scales: cells that are made of molecules that are made of atoms.
- Slide 5 reminds students that all decomposers eat food made mostly of water and large organic molecules.
- Slide 6 reminds students that after food is digested outside the decomposers the molecules can either be used for growth through biosynthesis or to obtain energy through cellular respiration.
- Tell students that their explanations today will be to tell this whole story for other types of decomposers.

3. Have students complete the reading and corresponding explanation worksheet for one other type of decomposer.

Display Slide 7 of the [6.2 Explaining other Examples of Decomposers Growing, Moving and Functioning PPT](#).

- Give students a copy of one of the [6.2 Other Decomposers Readings](#). About 1/3 of the students should read about each decomposer.
- Have students complete the [6.2 Bracket Fungi/Bread Mold/Mycorrhizal Fungi Worksheet](#) for the decomposer they read about.

Modifications: Students can work in pairs or small groups with those who have the same decomposer.

4. Have students who focused on the same decomposer form a group.

Display Slide 8 of the [6.2 Explaining Other Examples of Decomposers Growing, Moving, and Functioning PPT](#).

- In their groups, have students discuss their answers to the questions on the [6.2 Bracket Fungi/Bread Mold/Mycorrhizal Fungi Worksheet](#) and come to consensus about their explanations and answers to the questions.

5. Have students share about how their decomposer grows, moves and functions.

Display Slide 9 of the [6.2 Explaining Other Examples of Decomposers Growing, Moving, and Functioning PPT](#).

- Decide how to have students share the explanation for the decomposer they studied.
 - Students who focused on the same decomposer could present to the whole class. They could make a poster to share
 - Students could form groups of three composed of one student who focused on each of the three decomposers. Each student could share their explanation with their small group.

6. Have students discuss the similarities and differences between the decomposers.

Display Slide 10 of the [6.2 Explaining Other Examples of Decomposers Growing, Moving, and Functioning PPT](#).

- Have a class discussion about the similarities and differences between the three decomposers. Students should recognize that the chemical changes are similar in each case and that the rules about atoms and energy always apply.

7. Have students revisit their initial ideas and questions from Lesson 1.

Display Slide 11. Have students look back at their initial ideas and questions on [1.2 Expressing Ideas and Questions Tool for Bread Molding](#).

- Ask them to share some of their initial ideas, their thinking about how their ideas have changed, and what their initial questions were.
- Ask them how they would now answer their initial questions.

8. Have students revisit their data and unanswered questions from the Bread Molding Investigation in Lesson 3.

Display Slide 12. Have students review the class investigation data using the [Bread Molding Class Results 11 x 17 Poster](#) (or [Spreadsheet](#)).

- Have students review their evidence-based arguments and unanswered questions from their [3.3 Evidence Based Arguments Tool for Bread Molding](#).
- Have them consider how they would now answer their unanswered questions.

9. Have students complete an exit ticket.

Show 13 of the [6.2 Explaining Other Examples of Decomposers Growing, Moving, and Functioning PPT](#).

- On a sheet of paper or a sticky note, have students individually answer the exit ticket questions. Depending on time, you may have students answer both questions, assign students to answer a particular question, or let students choose one question to answer. Collect and review the answers.
 - Conclusions: What is the same about how all fungi grow and function?
 - Predictions: How is the decomposer you studied different from other decomposers?
- The conclusions question will provide you with information about what your students are taking away from the activity. Student answers to the conclusions question can be used on the [Driving Question Board](#) (if you are using one). The predictions question allows students to begin thinking about the next activity and allows you to assess their current ideas as you prepare for the next activity. Student answers to the predictions question can be used as a lead into the next activity.

Assessment

Use [6.2 Grading Bracket Fungi/Bread Mold/Mycorrhizal Fungi Worksheets](#) to grade students' explanations. Although the decomposers are different, the answers should be similar across all the decomposers.

Tips

Emphasize the similarities among the explanations of all decomposers. There are different decomposers, but many of the chemical changes at the atomic-molecular scale are the same. The same rules about matter and energy apply to all types of decomposers.

Differentiation & Extending the Learning

Differentiation

- Hand out Other Decomposers readings strategically to form strong groups
- Give readings to all groups so that students can read along as groups present their results
- Students should highlight important information individually

- Have groups present their findings orally to the whole class, rather than using the Jigsaw model
- Use Other Decomposers worksheets as a review for the test. All students complete all three before the test.

Modifications

Extending the Learning

Have students read the articles and/or watch the videos listed in the Digging Deeper section of the [6.2 Other Decomposers Readings](#).

Activity 6.3: Comparing Decomposers, Plants, and Animals (50 min)

Overview and Preparation

Target Student Performance

Students compare how matter moves and changes and how energy changes in decomposers, plants, and animals.

Resources Provided

- [6.3 Comparing Decomposers, Plants, and Animals PPT](#)
- [6.3 Comparing Decomposers, Plants, and Animals Worksheet](#) (1 per student)
- [6.3 Grading the Comparing Decomposers, Plants, and Animals Worksheet](#)

Recurring Resources

- [Three Questions 11 x 17 Poster](#) or [Handout](#)

Setup

Prepare one copy of [6.3 Comparing Decomposers, Plants, and Animals Worksheet](#) for each student. Prepare a computer and a projector to display the PPT.

Directions

- 1. Use the instructional model to show students where they are in the course of the unit.**

Display Slide 2 of the [6.3 Comparing Decomposers, Plants, and Animals PPT](#).

- 2. Have students try explaining new examples.**

Display Slides 3-4. Have students work to explain the scenarios on the slides about decomposer's growth, movement, and function.

- Have students discuss the scenarios with a partner and then discuss each as a class.
- At this point in the unit, you will want to point out places where their explanations do not align with scientific explanations.

- 3. Have students compare decomposers, plants, and animals.**

Display Slide 5 of the [6.3 Comparing Decomposers, Plants, and Animals PPT](#). Tell students they will be comparing what they learned about in the *Plants* and *Animals* units with what they have learned about decomposers.

- Pass out the [6.3 Comparing Decomposers, Plants, and Animals Worksheet](#) to each student.
- Have students complete the comparison individually or in pairs.
- Students may need to look back at their Process Tools from *Plants* and *Animals*.
- Display Slide 6 of the PPT to remind students that good answers to the questions about decomposers, plants, and animals should address each of the four numbered questions of the [Three Questions 11 x 17 Poster](#) (or [Handout](#)).

- 4. Allow students to share their explanations with the class.**

Display Slide 7 of the [6.3 Comparing Decomposers, Plants, and Animals PPT](#).

- Go through the worksheet with the class and have students share their ideas. At this point in the unit, students should have scientifically correct explanations. Check that they are following the rules about matter and energy.

Assessment

Use the [6.3 Grading the Comparing Decomposers, Plants, and Animals Worksheet](#) to grade students' work.

Differentiation & Extending the Learning

Differentiation

Modifications

Activity 6.4: Functions of All Decomposers (50 min)

Overview and Preparation

Target Student Performance

Students develop integrated accounts of how all aerobic decomposers grow and function through the processes of digestion, cellular respiration, and biosynthesis.

Materials You Provide

- computers (1 per pair of students, for option 2 in step 2)
- blank posters (1 per pair of students or small group, for option 3 in step 2)

Resources Provided

- [6.4 Functions of All Decomposers PPT](#)
- [6.4 Explaining Functions that All Decomposers Share Worksheet](#) (1 per student for option 1 in step 2)
- [6.4 Grading the Explaining Functions that All Decomposers Share Worksheet](#)

Recurring Resources

- (Optional) [Big Idea Probe: Leaf Pack Experiment](#) (1 per student)
- (Optional) [Assessing the Big Idea Probe: Leaf Pack Experiment](#)
- [Three Questions 11 x 17 Poster](#) or [Handout](#)
- [Learning Tracking Tool for Decomposers](#) (1 per student)
- [Assessing the Learning Tracking Tool for Decomposers](#)

Setup

Decide how students will construct their explanations (see options in step 2 of the directions). If students will use the worksheet, prepare one copy of [6.4 Explaining Functions that All Decomposers Share Worksheet](#) for each student. If students will create a PowerPoint, check that computers or tablets are working and ready. If students will make a poster, get one blank poster for each pair or small group of students. Decide how you will have students present their explanations (see step 3 of the directions). Prepare a computer and a projector to display the PPT.

Directions

- 1. Use the instructional model to show students where they are in the course of the unit.**

Display Slide 2 of the [6.4 Functions of All Decomposers PPT](#).

- 2. Have students explain the primary functions that decomposers have in common.**

Display Slide 3 of the [6.4 Functions of All Decomposers PPT](#). Tell students they will be constructing explanations that answer the Three Questions about the functions of decomposers that are shared by all aerobic decomposers.

Option 1: Have students construct their explanations on [6.4 Explaining Functions that All Decomposers Share Worksheet](#) in pairs. Students' explanations can include words, illustrations, diagrams, and/or charts. Students may need additional sheets to answer each of the questions.

Option 2: Have students construct their explanations in a PowerPoint presentation in pairs for each of the questions.

Option 3: Have students construct their explanations on a poster in pairs or small groups.

For all options, display Slide 4 of the PPT and remind students that good answers to questions about decomposer cells should address each of the four numbered questions of the [Three Questions 11 x 17 Poster](#) (or [Handout](#)).

3. Allow students to share their explanations with the class.

Display Slide 5 of the [6.4 Functions of All Decomposers PPT](#). Provide students an opportunity to share their explanations with the class.

- Decide how you will have students present depending on the option you chose in step 2 and the needs of your students and classroom.
 - If students did option 1, they could verbally share their explanations or share them with the class using a document camera.
 - If student did option 2, they could present their PPT to the class.
 - If students did option 3, they could share their posters with the whole class or you could organize a gallery walk in which students circulate the classroom and view the posters.
- Have students share feedback on their classmates' explanations as to if the explanations addressed each of the Three Questions.

4. Lead a discussion about how student ideas have changed over time.

Display Slide 6 of the PPT.

- Have students consider how their ideas changed with regard to scale, movement, and carbon. What do they know about how decomposers grow and move now that they didn't know before this unit?

5. (Optional) Have students complete the Big Idea Probe: Leaf Pack Experiment for the final time.

If you decided to use the [Big Idea Probe: Leaf Pack Experiment](#), have students complete it and share their ideas again. Have students discuss how their ideas have changed throughout the unit. See [Assessing the Big Idea Probe: Leaf Pack Experiment](#) and [Using Big Idea Probes](#) for suggestions about how to use the Big Idea Probe.

6. Have students complete the Learning Tracking Tool for this Lesson.

Show Slide 7 of the [6.4 Comparing Decomposers, Plants, and Animals PPT](#).

- Pass out a [Learning Tracking Tool for Decomposers](#) to each student.
- Have students write the activity chunk name in the first column, "Explaining Other Examples" and their job as the "Explainer."
- Have a class discussion about what students did during the activity chunk. When you come to consensus as a class, have students record the answer in the second column of the tool.
- Have a class discussion about what students figured out during the activity chunk that will help them in answering the unit driving question. When you come to consensus as a class, have students record the answer in the third column of the tool.
- Have a class discussion about what students are wondering now that they have answered the unit driving questions. Have students record their lingering questions in the fourth column of the tool.

• Example Learning Tracking Tool			
Activity Chunk	What Did We Do?	What Did We Figure Out?	What Are We Asking Now?
7. Explaining Other Examples Explainer	Practice explaining digestion, biosynthesis, and cellular respiration in other decomposers, and take the unit posttest.	All aerobic decomposers use digestion, biosynthesis, and cellular respiration to grow and function.	How does matter cycle and energy flow in an ecosystem?

Assessment

Use the [6.4 Grading the Explaining Functions that All Decomposers Share Worksheet](#) to grade students' explanations. Regardless of how students constructed their explanations, they should include similar information.

Differentiation & Extending the Learning

Differentiation

- Provide sentence stems for explanations of each process.

Modifications

Activity 6.5: Decomposers Unit Posttest (40 min)

Overview and Preparation

Target Student Performance

Students show their end-of unit proficiencies for the overall unit goal: Questioning, investigating, and explaining how decomposers move and change matter and energy as they live and grow.

Materials You Provide

- pencils (1 per student)

Resources Provided

- [6.5 Grading the Decomposers Unit Posttest](#)
- [6.5 Decomposers Unit Posttest](#) (1 per student)

Setup

Print one copy of the [6.5 Decomposers Unit Posttest](#) for each student.

Directions

1. Describe the unit posttest.

Explain the purpose of the unit posttest to students:

- It will help you as a teacher understand how students think about what happens when decomposers move, grow, and function.
- It will help them think about what they learned and how their ideas changed over time.

2. Have students take the unit posttest.

Distribute copies of [6.5 Decomposers Unit Posttest](#) to be completed with paper and pencil.

Assessment

Students should be able to answer the questions correctly, so it is reasonable to grade them at this point. Use [6.5 Grading the Decomposers Unit Posttest](#) to check students' answers.

Differentiation & Extending the Learning

Differentiation

- Read the questions aloud to the class. Reframe or reword questions for clarity.
- Provide sentence stems for written responses.
- Provide visual aids for any examples of animals that are not provided.

Modifications