Where Does Matter Go? Modeling the Food Web Loop

Teacher		**Class**	Grade 5
Subject	Science	**Topic**	Food webs and decomposers
Date		**Room**	
Lesson length	60 minutes	**Country**	United States

Students learn how matter moves from plants to animals to decomposers and back. They build a small box model to trace one speck of matter.

Curriculum links

- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Learning objectives

- Students will trace matter flow among plants, animals, decomposers, soil and air.
- Students will explain how decomposers return matter for new plant growth.
- Students will build a labeled model that shows matter moving with arrows.

Success criteria

- I can trace matter from a plant to an animal to decomposers.
- I can name what decomposers leave behind for new plants.
- I can explain what one arrow in my model shows.

What students already know

Show a fallen leaf and droppings picture: ask where dead leaves and animal wastes go if no one cleans up.

Key words

producer	a plant that makes its own food using sunlight, water and carbon dioxide [3]
consumer	an animal that gets energy by eating a plant or another animal [3]
decomposer	a living thing like mold or bacteria that breaks down dead matter and wastes into tiny pieces [6]
food web	many linked eating chains that show who eats whom in one place [3]
matter	the tiny stuff that makes up living things, soil, water and air [6]

Materials

- Slides 1-4, 7, 9-12
- Video clip 8 "what are decomposers" (0:00-2:53)
- shoebox or tray per pair
- green paper plants, paper animals, brown soil paper, gray mushroom and mold cutouts
- clay or paper balls for specks of matter
- four labels: plants, animals, decomposers, air and soil

Before the lesson

- Print four labels per pair: plants, animals, decomposers, air and soil, plus wastes and dead matter labels for stretch
- Pre-cut plant, animal, soil, mushroom and mold pieces and arrow starters
- Make clay or paper balls for matter specks, one set per pair
- Test Slides 1-4, 7, 9-12 and Video clip 8 (0:00-2:53)

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- arrow strips, glue, pencils, colored pencils
- Set tables for pairs with shoebox or tray, glue and pencils

Lesson outline

0–5 min **Starter** 5 min · Whole class

Hook interest in the matter loop and recall what plants and animals need.

YOU DO

1. Show Slide 1 Food Webs: Where Does Matter Go? and read the title.
2. Ask the hook: Can you fit a whole rotting log, a plant, a rabbit, and the air in one box?
3. Show Slide 2 Today we will and read the three goals in student words.
4. Take 3 quick answers on where fallen leaves seem to go.

STUDENTS DO

1. Look at Slide 1 and listen to the challenge.
2. Call out ideas about disappearing leaves.
3. Repeat the class goal: I can trace matter from plant to animal to decomposer.

Say: Today you will be model builders. You will fit a plant, a rabbit, rotting bits, and the air into one box. By the end you will trace one tiny speck of matter all the way around.

Ask: If nothing ever cleaned up dead leaves and droppings, what would our field look like? (It would pile up with dead leaves, logs and wastes.) · What do plants need to make food? (Sunlight, water and carbon dioxide from the air [3].)

Check understanding: Thumbs up if you can say the goal back; if not, repeat Slide 2 goals together.

Support: Show leaf and rabbit pictures while asking so students can point. **Stretch:** Ask what plants might run out of if dead leaves never broke down.

Use: Slides 1-2

5–15 min **Teaching** 10 min · Whole class

Explain producer, consumer and decomposer roles and how arrows show matter flow.

YOU DO

1. Show Slide 3 Who Does What in a Food Web? and define each group.
2. Show Slide 4 How Matter Moves and walk the four steps with hand motions.
3. Model arrow direction on the board: leaf -> rabbit -> fox.
4. Add decomposers to the end and link them back to soil and air.

STUDENTS DO

1. Chant each role with a motion: grow like plant, munch like animal, crumble like mold.
2. Copy the leaf -> rabbit -> fox arrows on mini whiteboards.
3. Point to where matter goes next at each step.

Say: Producers make food matter. Animals get that matter by eating. Arrows point from the food to the eater. Decomposers break down what dies or is left as waste and send matter back.

Worked example: Leaf makes food matter from carbon dioxide, water and sunlight [6]. Rabbit eats leaf and uses matter to grow [3]. Fox eats rabbit, so matter moves to fox [3]. Droppings and later dead rabbit and fox are broken down by mold and bacteria [6].

Ask: Which way should the arrow point between rabbit and fox, and why? (From rabbit to fox, because energy flows from prey to predator when eaten [4].) · What makes a producer different from a consumer? (A producer makes its own food through photosynthesis [3]; a consumer must get energy from eating a plant or animal [3].) · What is a decomposer? (An organism which digests or breaks down dead plants and animals [3].)

Check understanding: Hold up whiteboards; all arrows must go leaf to rabbit to fox. Reteach arrow direction if reversed.

Support: Give sentence frame: Matter moves from ___ to ___. **Stretch:** Add a second food for the rabbit and explain the new matter path.

Use: Slides 3-4

15–25 min **Decomposers** 10 min · Whole class

Show how mold and bacteria recycle dead matter into soil and air.

YOU DO

1. Show Slide 7 Decomposers Are Recyclers and read the four bullets.
2. Play Video clip 8 what are decomposers (0:00-2:53) to show breaking into tiny pieces.
3. Show Slide 10 A Leaf's Matter Journey and trace the leaf to rabbit to wastes to mold.
4. Stress that recycled matter no longer contains food energy but can be used again by plants [6].

STUDENTS DO

1. Watch and list what decomposers eat and what they leave behind.
2. Trace Slide 10 chain with a finger and say each step.
3. Tell a partner one thing plants reuse after decay.

Say: The main decomposers are mold, a type of fungus, and bacteria [6]. They use wastes and dead producers and consumers as food and break matter into tiny pieces [6]. What is left becomes minerals, carbon dioxide and water that plants can take in and use again [6].

Worked example: Green leaf grows using air, water, minerals. Rabbit eats leaf and leaves droppings. Fallen leaves pile up. Mold and bacteria break them into minerals, carbon dioxide and water in soil and air [6], which a new plant takes in.

Ask: What do mold and bacteria do with dead leaves and wastes? (They use them as food and break them down into tiny pieces [6].) · What returns to soil and air for plants to use again? (Minerals, carbon dioxide and water [6].)

Check understanding: Cold-call three students to name eat, break down, return; replay last 30 seconds if vague.

Support: Post eat -> break into tiny pieces -> minerals, water, carbon dioxide with pictures. **Stretch:** Predict what would happen to matter if mold and bacteria were removed for a month.

Use: Slides 7, 10; Video clip 8 (0:00-2:53)

25–50 min **Main activity** 25 min · Pairs

Build and explain a desktop model that tracks matter through the loop.

YOU DO

1. Show Slide 9 Your task and read the four steps for the web model.
2. Demo a 1-minute tour moving one paper-ball speck from plant to rabbit to fox to mold to soil and air.
3. Hand out shoebox or tray, pre-cut pieces, four labels, arrows and matter balls.
4. Circulate, ask each pair to move their speck and say the route in order.

STUDENTS DO

1. Build mini scene: plants, paper animals, brown soil, gray mushroom and mold, and labels.
2. Move paper-ball speck along arrows from plant to animal to decomposer to soil and air.
3. Practice 1-minute tour: point to each arrow and say where matter goes next.

Say: Pick a plant, two animals and decomposers for your web. Draw boxes for living things, soil and air. Move one speck step by step and glue arrows to show matter moving. Label what it is at each stop.

Worked example: Start: speck in green leaf as food matter made from carbon dioxide, water and sunlight [15]. Rabbit eats leaf, speck moves to rabbit [3]. Fox eats rabbit, speck moves to fox. Fox leaves wastes and later dies. Mold breaks down dead matter into chemical parts to recycle nutrients [5]. Speck is now minerals and carbon dioxide in soil and air [6] for a new leaf.

Ask: Where does your speck go after the fox dies or leaves wastes? (To decomposers, which break down dead plants and animals [3].) · How does matter get back to a new plant? (Decomposers recycle nutrients back into soil and air for use by plants [7]; when plants and animals die, decomposers add nutrients to soil so new plants may grow [13].) · What does your arrow show? (Movement of energy from prey to predator [3][4] and then matter to decomposers to be recycled [3].)

Check understanding: Each pair shows the full speck route; if arrows are missing or backward, fix before plenary.

Support: Provide pre-cut pieces and four labels: plants, animals, decomposers, air and soil, with arrow starters. **Stretch:** Have students add labels for wastes and dead matter and show two different routes to decomposers.

Use: Slide 9

50–60 min **Plenary** 10 min · Whole class

Share models and check that matter cycles while energy does not return.

YOU DO

1. Show Slide 11 Think, pair, share and ask: If nothing ever rotted, what would plants run out of and why?
2. Invite two pairs to give 1-minute tours of their desktop models.
3. Show Slide 12 Exit ticket and have students write two sentences and draw one arrow.
4. Collect exits and link back to objectives on Slide 2.

STUDENTS DO

1. Think, then tell a partner what plants would run out of without rot.
2. Watch tours and check arrows point prey to predator and to decomposers.
3. Complete exit ticket: one way matter gets back, one question, one arrow explained.

Say: If nothing rotted, dead matter would pile up because nothing breaks it down to nutrients [3]. Plants would run out of minerals, water and carbon dioxide to reuse [6]. Show me that loop in your model.

Ask: If nothing ever rotted, what would plants run out of and why? (Minerals, carbon dioxide and water [6], because decomposers would not free them from dead matter.) · Why must matter keep looping? (All living organisms must eat some type of food for survival [3], and producers need recycled matter to make new food.)

Check understanding: Read exits for correct return path; reteach decomposer link tomorrow if many miss it.

Support: Allow pointing to model while answering and give starter: One way matter gets back is ___. **Stretch:** Explain the difference: matter is recycled but recycled matter does not contain food energy [6].

Use: Slides 11-12

Common mistakes

Mistake	How to spot it	How to fix it
Arrows point from eater to food, like fox -> rabbit.	Model arrows face backward toward the plant.	Reteach arrows point from prey to predator because they show energy flow to the eater [4].
Thinking only dead animals go to decomposers.	Student leaves out fallen leaves, logs and droppings.	Remind that decomposers work at every level [3] and use wastes and dead producers and consumers as food [6].
Thinking matter disappears when things rot.	Student says leaf is gone for good.	Show matter remains as minerals, carbon dioxide and water that plants reuse [6].

Support

- Provide pre-cut pieces and four labels: plants, animals, decomposers, air and soil, with arrow starters.

Stretch

- Have students add labels for wastes and dead matter and show two different routes to decomposers.

For the LSE or teaching assistant

Stay with target pairs during building: help place four labels, prompt speck tour language, and check arrow direction.

Check for understanding

Question	Answer
One way matter gets back to plants is...	Mold and bacteria break down dead matter and wastes and leave minerals, carbon dioxide and water plants reuse [6].
Draw one arrow from your model and explain it.	Arrow points from food to eater, showing energy flow from prey to predator [4]; e.g., leaf to rabbit.
What would happen to matter if there were no decomposers?	Dead matter and wastes would pile up because nothing breaks them down to nutrients [3].

Homework

Sketch your box model at home and tell someone the journey of one speck of matter.

Sources

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