

HANDS-ON ACTIVITY Small groups 1 class period

Modeling Matter Moving within an Ecosystem

3D Learning Objective

SEP Developing and Using Models

Students develop a research-based model of a specific ecosystem and use it to explore ecosystem interactions.

Materials

The materials listed in the Student Edition are a starting point. Other suggested materials are masking tape, coat hangers, paper plates, plastic cups, craft sticks, string, chenille stems, and discarded newspapers.

Preparation

Arrange computer lab time, or ask a media specialist to assemble reference materials about ecosystems. Another option is to invite a park ranger or conservationist to speak about a local ecosystem. Pre-assemble materials bundles for student pairs or groups.

CCC Matter and Energy

Remind students that all living things need energy to survive. As students carry out research, ask them to think about where the energy is coming from and where it is going.

DCI LS2.A Interdependent Relationships in Ecosystems

As students begin research, circulate and probe groups for their understanding of the role of producers.

Ask: Which organisms are typically producers? **plants**

Procedure

STEP 1 Monitor students to be sure that their research includes a wide variety of producers, consumers, and decomposers. The activity will work best if they have some food chains that overlap.



HANDS-ON ACTIVITY

Modeling Matter Moving within an Ecosystem

Objective

Collaborate with a partner to choose and model an ecosystem. Use this model to show how matter moves among organisms and their environment.

What question will you investigate to meet this objective?

Possible question: *How are the organisms in a food web related?"*

Materials

- materials to model
- scissors
- index cards
- markers
- paste
- string or yarn
- stapler



Procedure

STEP 1 With your partner, choose an ecosystem to model. Research the organisms you will include in your model ecosystem.

Which ecosystem are you researching?

Possible answer: *I am researching an aquatic ecosystem.*



Use your research to complete the table below.

Ecosystem	
Energy source	
Producers <i>Check students' tables.</i>	Consumers
Decomposers	



STEP 2 Discuss with your partner how you want to model your ecosystem. For example, you could choose to make a diorama, create a poster, or design a digital model.

Describe how you will model your ecosystem.

Possible answer: My partner and I will design a poster model of an ecosystem.

STEP 3 Start by making the pieces of your system. Label each of your organisms as a producer, consumer, scavenger, or decomposer.



STEP 4 Arrange the organisms into food chains.

Based on your research, how do the organisms interact to move matter through the ecosystem?

Possible answer: Based on my research, the organisms interact as one organism eats another. This moves matter through the ecosystem.

STEP 5 Find the food chains that overlap. Connect the chains together. Your end result should look like a food web.



What is the relationship between food chains and food webs?

Possible answer: Food webs are made up of connected food chains.

STEP 2 Circulate as students work to describe their models.

Ask: What does each model piece represent? **individual organisms within the ecosystem, either a producer, consumer, or decomposer**

Ask: How will you show the interactions among your model pieces? **I will connect the organisms using string or arrows.**

Analyze Your Results

STEP 5 Help students connect their models to real-world behaviors.

Ask: What happens at the places where food chains connect? **Two consumers feed on the same producer or prey, or one consumer feeds on two producers or prey.**

Ask: What makes a food source more important to an ecosystem? **when more animals depend on it for food or if it is the only kind of food a certain animal eats**

Connection to English Language Arts

This activity is an opportunity to reinforce basic research skills. Remind students that good notetaking includes recording sources: the webpage URL and date visited; the book, author, and page number; encyclopedia volume and page number; and so on. You may wish to have students add this information to their data tables.

RI.5.9 Use multiple sources.

Support the Unit Project and Performance Task

This activity supports student understanding of how energy and matter move through a system. Students can use the understanding derived from the activity to determine how to develop a model ecosystem that includes what animals need to survive.

Analyze Your Results, continued

SEP Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

Ask: How does looking for similarities among the food webs help you better understand the general idea of ecosystems?

Similarities show what properties are the same for most ecosystems, so that helps you understand what an ecosystem is.

Draw Conclusions

STEP 8 A food web is a system with inputs and outputs that interact. The various components are an energy source, producers, consumers, scavengers, and decomposers.

Claims, Evidence, and Reasoning

Have students work with a partner to critique each other's claims and evidence in Step 9. Ask each pair to be prepared to share one way that they changed or improved their claim based on their evidence. Discuss responses as a class.

Ask: What is the most reliable evidence about food webs that you gathered during this investigation? Why do you think so? *Students may cite information that they researched or observations made during the activity. Accept reasonable answers.*

Scoring Rubric for Hands-On Activity

3	identifies all components of a food web, makes a claim well supported by evidence and reasoning
2	identifies most components of the food web, makes a claim, and cites some evidence and reasoning
1	names at least one food chain, but is not successful in tying it to a food web
0	does not participate or follow the procedures as described

Analyze Your Results

STEP 6 Compare your food web with those of other groups. How are they alike? How are they different?

Possible answer: My food web and the food webs of other groups are similar because they include producers and consumers. They are different because they include different organisms and are of different ecosystems.

STEP 7 Predict what might happen if one of the organisms in your web disappeared. Remove one of the organisms from your web. Describe the results.

Possible answer: Removing one organism from the food web affects all of the other organisms in the food web because the available food changes.

Draw Conclusions

STEP 8 Is your food web a system? If so, what are the components in the food web?

Possible answer: Yes, the food web is a system. The components of the food web are made up of the organisms in the ecosystem.

STEP 9 State a claim that is related to your question at the beginning of this activity.

Possible claim: The organisms in a food web affect one another.

Cite evidence from your food web to support your claim.

Possible answer: Evidence to support my claim includes the fact that removing one organism from the food web changes the populations of other organisms in the food web.

STEP 10 Write another question you would like to ask about how matter moves through an ecosystem.

Possible question: How does matter change as it moves between organisms?