Paper Food Chains and Food Web

Purpose

To build model food chains and a food web and to discover how species can be interconnected within an ecosystem.

Process Skills

Make a model, communicate, analyze data, draw conclusions

Materials

- ❑ research resources (e.g., library books, websites)
- ❑ Species Strips (1 page per group)
- ❑ scissors
- ❑ markers
- ❑ pen or pencil
- ❑ clear tape
- ❑ hangers
- ❑ yarn

Background

Many different types of **organisms** depend on each other for survival within an **ecosystem**. A **food chain** can be a helpful way to show how several living things within an ecosystem depend on each other for the energy they need. A **food web** is a more detailed way of describing many food interrelationships within an ecosystem. The living things, or organisms, in a food chain or food web can be **producers**, **consumers**, or **decomposers**. Generally, plants are producers, and animals are consumers. Decomposers include some fungi, bacteria, and invertebrates. Animals may be predators or prey, and some can be a **predator** to one animal and **prey** to another. Animals can also be described as **carnivores** (meat eaters), **herbivores** (plant eaters), or **omnivores** (meat and plant eaters). Every living thing is part of an ecosystem.

Time – 1 hour, plus research time
Grouping – Small groups and whole class

Procedure

Part One: Making a Paper Food Chain

1. Each group will receive a page with four species strips on it. Cut these apart and choose one or two students to work on each species.

© Learning A–Z, Inc. All rights reserved.

2. Use research resources to learn what your species eats (or how else it gets energy). Also research other species that eat it. Do not limit your results to just the other species on your group's page; research as many other living things as you can that it eats and that eat it. List these on the left and right sides of your paper strip, under the correct heading.
3. Identify your species as a producer, consumer, or decomposer, and write this in marker below the species name on the paper strip. If it is a producer, write it in green.
   If it is a consumer, write it in red. If it is a decomposer, write it in brown.
   In the same area of your paper strip, write whether your species is a predator, prey, or both predator and prey. Finally, if your species is a consumer, write whether your species is a carnivore, herbivore, or omnivore.
4. On the back of the paper strip, write any additional important or interesting facts you know or have learned about your species, such as its habitat, whether it is a scavenger, or whether it is endangered. Also, you may want to add a sketch or printed picture of the species to the paper strip.
5. Now your group will combine its four paper strips into a food chain. Discuss the order in which you should connect the species. Then turn the paper strips into rings so the species names face out. Close the rings with tape to create your group's food chain.
6. Hang your group's food chain from a hanger so the whole class can see all of the food chains near each other. Display your paper food chain so that the highest consumer or top predator is at the top, and the lowest member of the food chain is at the bottom.

Part Two: Turning Food Chains into a Food Web

1. A *food chain* shows how a few living things in an ecosystem are related by what they eat. But real ecosystems are more complex. A *food web* can show how more things within an ecosystem are interconnected. Now that each group has a complete food chain, the class will combine them into one food web. One group at a time should present to the class each of the species from its food chain. When it is your turn, identify your species and explain what it eats and what eats it.

© Learning A–Z, Inc. All rights reserved.

2. As other students present their species, listen closely to decide whether any of the species from another group's food chain could be connected to yours, based on your research in Part One. The rings can be connected if one of the species eats or gets energy from the other.
3. After all of the food chains have been presented, work as a group to connect your food chain to other food chains with yarn. Tie a loop of yarn around the appropriate species ring from each food chain to connect them. Keep adding yarn as you find more connections, creating a single class food web.
4. Discuss as a class whether there is any reason to connect the far top end of the class food web to the far bottom end. If so, choose a way to represent this, turning the food web into a complete cycle.
5. As a class, discuss how you could show that the Sun is an important part of the ecosystem. Then use art supplies or other materials to represent the Sun's relationship to the class food web.
6. Your teacher may want you to explain why you connected certain species. As a group, prepare to explain your decisions and to share some of the important or interesting facts from the inside of the rings.

© Learning A–Z, Inc. All rights reserved.

Name_____ Date_____

Analyze Data

1. As your group made its food chain, was it difficult to decide the order in which to connect certain rings? Why or why not?

2. As the class made its food web, was it difficult to decide whether to connect certain rings? Why or why not?

3. Are there any paper rings with no yarn connecting them to another ring? What does this tell you about the species on those rings?

4. How did you represent the Sun in your food web? Why did you show it as you did?

5. Where would humans fit into your food web, if at all?

Draw Conclusions

1. How do food chains and food webs each help demonstrate food relationships in an ecosystem?

2. Which species would probably have the greatest and smallest populations within the ecosystem the class studied, and why?

© Learning A–Z, Inc. All rights reserved.

What it eats
or how it gets energy

ARCTIC FOX

What eats it

What it eats
or how it gets energy

SAXIFRAGE

What eats it

What it eats
or how it gets energy

ARCTIC WOLF

What eats it

What it eats
or how it gets energy

ARCTIC HARE

What eats it

© Learning A–Z, Inc. All rights reserved.

What it eats
or how it gets energy

POLAR COD

What eats it

What it eats
or how it gets energy

HARP SEAL

What eats it

What it eats
or how it gets energy

ZOOPLANKTON

What eats it

What it eats
or how it gets energy

POLAR BEAR

What eats it

© Learning A–Z, Inc. All rights reserved.

What it eats
or how it gets energy

GLAUCOUS GULL

What eats it

What it eats
or how it gets energy

SQUID

What eats it

What it eats
or how it gets energy

KRILL

What eats it

What it eats
or how it gets energy

LITTLE AUK

What eats it

© Learning A–Z, Inc. All rights reserved.

What it eats
or how it gets energy

ALGAE

What eats it

What it eats
or how it gets energy

EIDER DUCK

What eats it

What it eats
or how it gets energy

PRAWN

What eats it

What it eats
or how it gets energy

CAPELIN

What eats it

© Learning A–Z, Inc. All rights reserved.

What it eats
or how it gets energy

_____
species name

What eats it

What it eats
or how it gets energy

_____
species name

What eats it

What it eats
or how it gets energy

_____
species name

What eats it

What it eats
or how it gets energy

_____
species name

What eats it

© Learning A–Z, Inc. All rights reserved.

Paper Food Chains and Food Web

TEACHING TIPS

These process activities will help students understand that every plant, animal, and other living thing is part of an ecosystem. Food chains, food webs, and energy pyramids can be helpful tools for understanding how the living things within an ecosystem depend on each other for the energy they need to perform daily activities. Whatever happens to one species in a food web can affect many other species that depend on it, or that it depends on, for survival. Humans are also part of food webs all around the world. We are affected when any part of our own food web is changed. We can also have an impact on many other living things within our own food web and in other webs as well.

SET-UP AND PROCEDURES

- Before beginning the project, schedule time and gather resources so students can conduct research on the organisms they will use in their food chains. The *Unit Guide* offers suggestions for conducting an Internet search related to unit concepts.
- In Part One, step 3, students are asked to use separate marker colors for producers, consumers, and decomposers. Once the food chains are assembled, encourage students to observe which color appears most frequently and have them explain why they think this is so.
- The procedures in Part One, step 6 direct students to hang each food chain from a hanger. In order to display all the food chains together, and to create a class food web, you can hang a sturdy rope across the room (e.g., a laundry line) and hang the hangers from it, or use clothespins instead of hangers.
- Be sure students understand why two rings from separate food chains should be connected with yarn to create the food web. For example, a glaucous gull may eat a capelin fish, but these two species were not listed within the same food chain. Model how to gently tie a loop of yarn around the two paper rings being connected. In some cases, several strands of yarn may connect to a single ring.

SAFETY

- Students may require supervision when conducting Internet research.

MATERIALS

- While research will be done in Part One, it may also be helpful to have research resources available during Part Two so students can investigate ways their species might be connected to others within the class food web.
- Have clippable nature magazines available—or let students print images of their species from the Internet—and have students attach pictures to their species strips.

© Learning A–Z, Inc. All rights reserved.

EXTENSIONS AND VARIATIONS

- *Inquiry Science:* Have students create food chains based on the organisms that live in or near the school playground, or have students choose a food chain relationship described in the nonfiction book *Food Chains and Food Webs*. Let students use copies of the blank Species Strips to create their new food chains.
- *Variation:* Have each group choose a different ecosystem from the one provided and have students research species to describe on blank Species Strips.
- *Project:* Challenge groups to invent a list of species that live in a fictional ecosystem. Students can decide what each imaginary species eats and what eats each species. (For example, Yonks eat Squigtigs and Squigtigs eat Zudes.) Then they can use blank Species Strips to create food chains and a food web to represent the interrelationships within the mock ecosystem.
- *Art:* Have students convert the class food web into a colorful poster or mural in which they draw each organism and position it appropriately around other species in the web.
- *Writing:* After the project, have students write about the activity in a science journal, and add sketches of the work they created. For extensive writing instruction within many genres, visit Writing a-z.com.
- *Research:* See Using the Internet in the *Unit Guide* for suggested websites to extend the learning.

© Learning A–Z, Inc. All rights reserved.

ANSWER KEY AND EXPLANATIONS

Analyze Data

1. As your group made its food chain, was it difficult to decide the order in which to connect certain rings? Why or why not?

Answers will vary. Students may need help in researching what each species eats and what eats each species. Students may find that one species eats more than one of the other species within the chain. Should this happen, students can model these extra connections with pieces of yarn within their chain.

2. As the class made its food web, was it difficult to decide whether to connect certain rings? Why or why not?

Answers will vary. Again, students may need help in researching what each species eats and what eats each species. Sometimes a predator eats species from various places in a food chain.

3. Are there any paper rings with no yarn connecting them to another ring? What does this tell you about the species on those rings?

If any rings are unconnected by yarn, this indicates that—among the available food chains—there were no other consumers of that organism besides the one on the linked paper ring. Or it indicates that this organism probably has a very specialized diet and only eats the organism it is connected to by a paper ring.

4. How did you represent the Sun in your food web? Why did you show it as you did?

Solutions will vary. The Sun is not a living thing and should not be connected to the web by a paper ring or with yarn. Instead, students may devise a way to connect the Sun to the producers, or may simply hang a picture of the Sun in the classroom to indicate that the whole ecosystem depends on it.

5. Where would humans fit into your food web, if at all?

Humans would either be at the top of one of the food chains or in a separate food chain altogether, because humans have no natural predators and may or may not eat the species in each of the groups' chains. Humans could be connected by yarn to some of the organisms in each food chain.

Draw Conclusions

1. How do food chains and food webs each help demonstrate food relationships in an ecosystem?

A food chain is a simple way to learn how energy passes through levels in an ecosystem. But in nature, the patterns of eating are rarely as simple as food chains represent them. A food web represents more eating patterns in a complex web of relationships between living things.

2. Which species would probably have the greatest and smallest populations within the ecosystem the class studied, and why?

Producers generally have the greatest population, because only a small portion of the energy in each organism can be transferred to the many species above them in a food chain.

© Learning A–Z, Inc. All rights reserved.