

Food Chain Gangs

Student Objectives

The student:

- given a list of plant and animal species can put them into food chains
- given a food chain, can explain the relationship between the members
- given an “interrupter” of a food chain (such as insecticide or extinction), can explain the effect on the other members of the chain.

Key Words:

extinction
food chain
insecticide
interdependent
pollution

Time:

1 hour

Materials:

- Food Chain Cards (enough cards to give five to each student)
- Science Journal

Background Information

A food chain can be described as a transfer of energy from one organism to another. The original source of energy for all of the Earth is the Sun. This means that all food chains must start with the Sun. Only plants can convert sunlight into food, and the herbivore that consumes the plants gets its energy from the Sun through the plant. The carnivore in turn receives the Sun's energy from eating the herbivore.

A food chain can be diagramed. For example:

Sun ----> grass seeds ----> mouse ----> owl

Each animal and plant can be thought of as a link in a chain. The Sun is not usually included in the food chain diagram because it is assumed that we know the Sun is in every food chain.

Food chains only show one possible source of food for the animal. A better way of seeing what an animal eats is to construct a food web. A food web describes all the relationships of one animal or plant to the other members of the community. Most plants and animals are members of many different food chains. The animal eats a variety of different foods, but it is being preyed on by a number of predators. The food web allows us to trace these different food chains and to see how each chain is related to all the other food chains.

Procedure

1. Discuss food chains with students. Do an example on the board, and discuss what type of energy each member of the sample food chain eats, and where that energy (food) came from.

2. Distribute one Food Chain Card to each student. Instruct the students to find the other members of their food chain and line up in order, WITHOUT SPEAKING. At this time, there should be five students to each food chain, and each chain should begin with the Sun.
3. Once everyone has found their place, each person shares what they are, and how they fit or don't fit in their food chain.
4. Collect all the Food Chain Cards. Randomly pass out five cards to every student. (This is where you will use the extra cards you have copied.) Have them make a food chain if possible, out of their five cards. Food chains do not have to use all five cards.
5. Have students pair up with a partner. Using their 10 cards, have the students construct as many different food chains as possible. The groups should construct one food chain after the other, reusing cards as needed, but keeping track of how many different food chains they have made.
6. Students should complete questions 1-3 in their Science Journal while working with their food chain cards.
7. Discuss with the class what would happen if the number of members of one species was severely reduced. What would happen if the amount of sunshine was severely reduced?

Key Words and Definitions

- **extinction** – no longer in existence; the act of putting an end to, putting out, or destroying
- **food chain** – a succession of organisms in an ecological community that constitutes a continuation of food energy from one organism to another as each consumes a lower member and in turn is preyed upon by a higher member
- **insecticide** – a substance that kills insects, which can also be toxic to humans and other animals
- **interdependent** – mutually dependent
- **pollution** – the contamination of soil, water, or the atmosphere by the discharge of unwanted or harmful substances

Further Research

1. Where does your food come from? Trace your lunch back to the origins of its component parts (and ultimately the Sun!).
2. What eats this plant? Pick one plant and list every animal that might use it for food.
3. Play Food Chain Tag (requires a large field).
 - In a class of 25 - 40, choose three to five students to be predators and seven to ten to be plant-eaters. The remainder will be plants. This represents a balanced system where plants are more plentiful than plant-eaters, plant-eaters more plentiful than predators. The students can select which plant-eaters and predators will be in their groups (e.g. deer are plant-eaters and cougars are predators).
 - Each group selects hand-signals that will differentiate them from the other groups. For example, the plants may want to hold their hands out to their sides to represent leaves, the plant-eaters (deer) may hold their hands on their heads to represent antlers and the predators (cougars) may hold their hands up like paws

with the claws showing.

- The predators try to tag the plant-eaters who try to tag the plants. Since predators decompose when they die and become fertilizer, the plants try to tag the predators. Once you are tagged, you turn into whatever tagged you. After a period of time, stop the game and see how many plants, plant-eaters and predators are left. Play should resume but should be stopped a few times before the end to determine what has happened and why.
- After playing a few rounds of the game, select one of the plants to re-enter the game as a human. The rules for the human are different. The human can tag anyone, but no one can tag the human. Each time the human tags someone, they become another human. See how long it takes before all players have been changed into humans.
- End with a discussion. Some questions might include: What happens to the plants and plant-eaters if many of the predators have been caught? What happens to the plants if many of them have been caught? What happens when humans use too much of the food chain? How can we keep that from happening? Ask students to record what happened in their science notebooks, including an illustration of the food chain they represented.

Related Reading

- ***Food Chain Frenzy*** by Anne Capeci (Scholastic, 2004)
This book which is part of the Magic School Bus series, follows Arnold and Janet through a food-chain adventure.
- ***Pass the Energy, Please!*** by Barbara Shaw McKinney and Chad Wallace (Dawn Publications, 2000)
Each of nature's creatures "passes the energy" in its own unique way. In this upbeat rhyming story, the food chain connects herbivores, carnivores, insects and plants together in a fascinating circle of players. All beings on Earth - from the anchovy to the zooplankton - depend upon the green plant, which is the hero of the story.
- ***What Are Food Chains and Webs?*** by Bobbie Kalman (Crabtree Publishing Company, 1998)
A simple introduction to food chains and webs, featuring both herbivores and carnivores and discussing energy, food production and decomposition in various ecosystems.

Internet Sites

http://www.ecokids.ca/pub/eco_info/topics/frogs/chain_reaction/

Earth Day Canada, Eco-Kids. Interactive food chain game.

http://www.harcourtschool.com/activity/food/food_menu.html

Harcourt School Publishers. Fun With Food Webs, interactive game of matching animals to their position in one of three food webs.

<http://interactivesites.weebly.com/food-chains.html>

Weebly's Interactive Sites for Education, links to interactive sites on Food Chains.

<http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.htm>

Sheppard Software's interactive food chain game.

http://teacher.scholastic.com/activities/explorer/ecosystems/be_an_explorer/map/foodweb_play.htm

Scholastic's interactive food web for more advanced students.

<https://www.youtube.com/watch?v=MUKs9o1s8h8>

Fabulous Food Chains: Crash Course Kids #7.1, video on food chains and how the energy from the Sun flows between living things in an ecosystem.

Food Chain Gangs

Florida NGSS Standards & Related Subject Common Core

			.1	.2	.3	.4	.5	.6	.7	.8
Grade 3										
Interdependence	Big Idea 17	SC.3.L.17		X						
Grade 4										
The Role of Theories, Laws, Hypotheses, and Models	Big Idea 3	SC.4.N.3	X							
Interdependence	Big Idea 17	SC.4.L.17		X	X	X				
Grade 5										
Diversity & Evolution of Living Organisms	Big Idea 15	SC.5.L.15	X							
Interdependence	Big Idea 17	SC.5.L.17	X							

Third Grade Benchmarks

Science–Big Idea 17: Interdependence

- SC.3.L.17.2 - Recognize that plants use energy from the Sun, air, and water to make their own food.

Fourth Grade Benchmarks

Science–Big Idea 3: The Role of Theories, Laws, Hypotheses, and Models

- SC.4.N.3.1 - Explain that models can be three dimensional, two dimensional, an explanation in your mind or a computer model.

Science–Big Idea 17: Interdependence

- SC.4.L.17.2 - Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them.
- SC.4.L.17.3 - Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.
- SC.4.L.17.4 - Recognize ways plants and animals, including humans, can impact the environment.

Fifth Grade Benchmarks

Science–Big Idea 15: Diversity and Evolution of Living Organisms

- SC.5.L.15.1 - Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.

Science--Big Idea 17: Interdependence

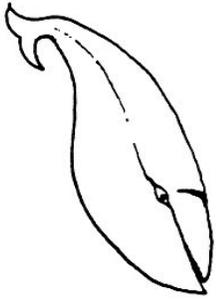
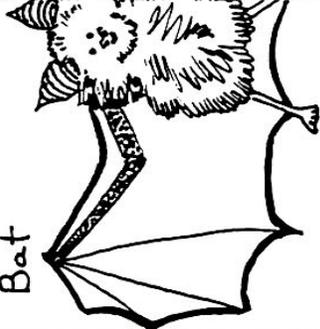
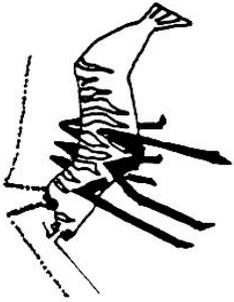
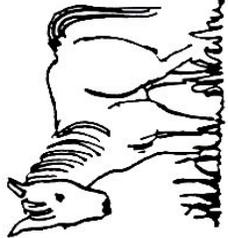
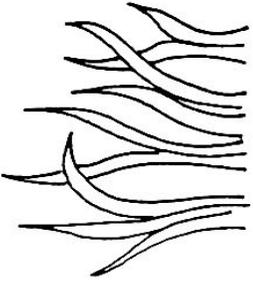
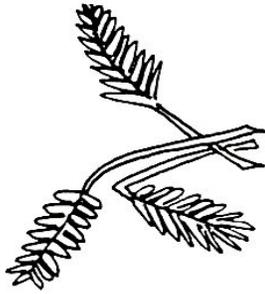
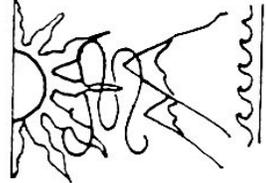
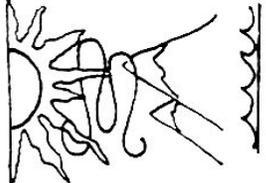
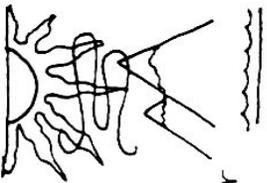
- SC.5.L.17.1 - Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycle variations, animal behaviors and physical characteristics.

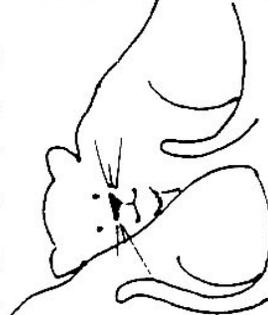
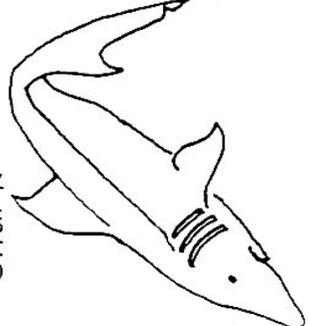
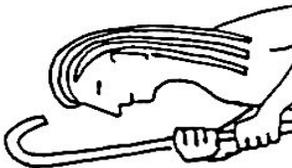
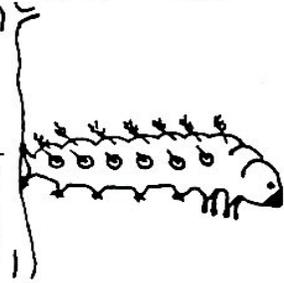
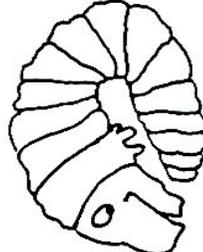
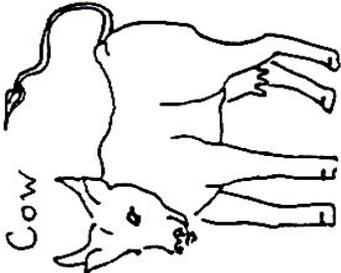
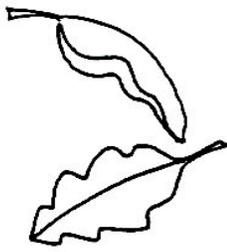
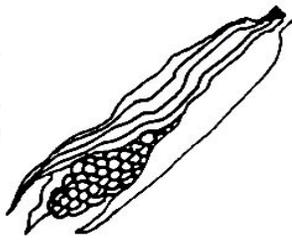
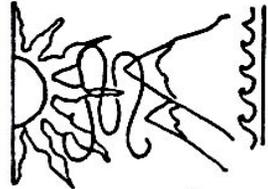
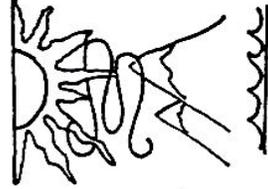
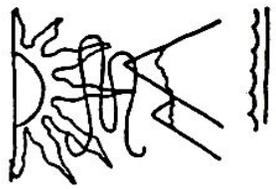
National Next Generation Science Standards**Fifth Grade Standards****Science--Energy**

- 5-PS3-1 - Use models to describe that energy in animals' food was once energy from the sun.

Science--Ecosystems: Interactions, Energy and Dynamics

- 5-LS2-1 - Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

<p>Whale</p> 	<p>Bat</p> 	<p>Coyote</p> 
<p>Fish</p> 	<p>Mosquito</p> 	<p>Rat</p> 
<p>Shrimp</p> 	<p>Horse</p> 	<p>Grasshopper</p> 
<p>Phytoplankton</p> 	<p>Grass</p> 	<p>Wheat</p> 
<p>Sun Air Soil Water</p> 	<p>Sun Air Soil Water</p> 	<p>Sun Air Soil Water</p> 

<p>Hawk</p> 	<p>Mountain Lion</p> 	<p>Shark</p> 
<p>Bird</p> 	<p>Raccoon</p> 	<p>Human</p> 
<p>Caterpillar</p> 	<p>Grubs</p> 	<p>Cow</p> 
<p>Leaves</p> 	<p>Plants</p> 	<p>Corn</p> 
 <p>Sun Air Soil Water</p>	 <p>Sun Air Soil Water</p>	 <p>Sun Air Soil Water</p>

Food Chain Gangs

1. List the food chain that your group made when you were given your first food chain card.

2. How many food chains could you and your partner put together when you each had five food chain cards? _____

3. List the food chain that you feel was the best one. _____

4. Explain a food chain using yourself and your lunch in the chain. _____

5. What happens to the rest of the chain if insecticides, pollution, or extinction wipes out one “link” of the chain? _____
