



At Home Science Fun with Food Chains

This science observation can be done at your home. Examine the ecosystems in your backyard and chart the food webs you see.

What You'll Need:

- Pencil
- Paper
- Crayons, markers, or colored pencils

Food Web Introduction:

How do living things get their energy? From food! When an organism eats, it's taking in the energy from whatever it's consuming. That's how plants get their energy to grow and make fruits and flowers, and animals get their energy to move. All the organisms in an ecosystem are connected to one another because of this flow of energy. We can call it a food chain because like the links in a chain, they all work together to connect the ecosystem. Here's how we describe the different parts of a food chain:

Producers: These are plants! Plants are autotrophs and get their energy from the sun and from nutrients in the soil. They can make their own energy which is why you'll never see plants eating a pizza. Ex: Trees, flowers, grass

Primary Consumers: These are herbivores, or animals that only eat plants. They get their energy from eating lots of plants. Ex: squirrels, chipmunks, rabbits, deer, insects

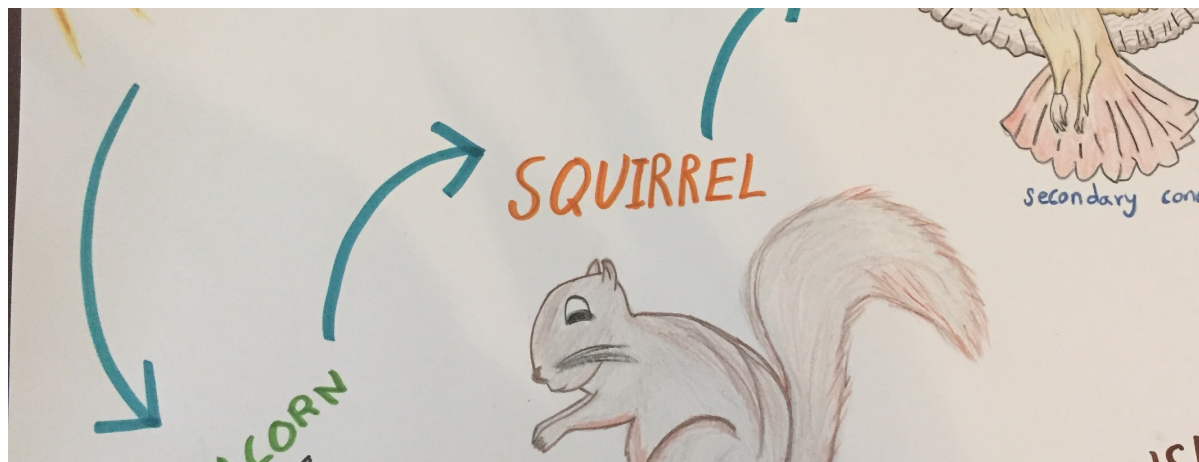
Secondary Consumers: These are carnivores, or animals that eat other animals. Ex: Hawks, snakes, songbirds, frogs, owls, lizards

Decomposers: Decomposers, or detritivores, are the most important members of the food chain because these organisms break down organic matter and return the energy and nutrients into the soil so the cycle can continue. Ex: worms, mushrooms, bacteria

Note: Some animals can have multiple roles in a food chain. For example, some turtles eat plants, some eat fish and bugs, and some species eat both plants and animals. If you encounter an animal and aren't sure what it eats, make an educated guess based on the location and size of the animal. You can always research what something eats online too!

How to Get Started:

1. Take time to sit outside in your yard or take a safe walk around the neighborhood. Bring your pen and paper with you.
2. Write down any organisms you see and what role they play in the food chain. Feel free to include animals you hear, even if you can't see them.
3. Continue to make observations for a few days, notice if you see mostly the same types of organisms or if you spot anything new.
4. Time to get creative and draw out your food chain! Pick some or all of the organisms you saw to draw. Draw arrows to represent the flow of energy in a food chain. Remember, energy moves *from* the organism getting eaten *to* the organism doing the eating. Use your favorite medium, draw, paint, sketch, photograph, or sculpt your food chain.



Rain Plan:

1. If the weather isn't suitable for being outside, create a food web using the food in the house!
2. What part of the food web would fruits and vegetables be? What about meats like ham, or beef? Do you have any secondary consumers in your house (like cats and dogs)? What about humans?
3. Trace the food chain of one of your meals for a few days Ex: sun → orange (producer) → human (consumer)

Another option: Cut out pictures from old magazines/newspapers of different producers, consumers, and decomposers and create your own food chain (it's okay if it contains animals not in the same ecosystem)

Diving Deeper

Food Chains of the World

_____ Now that you've created a food chain for your backyard, create one for organisms you would find in the following ecosystems: ocean, rainforest, desert, and

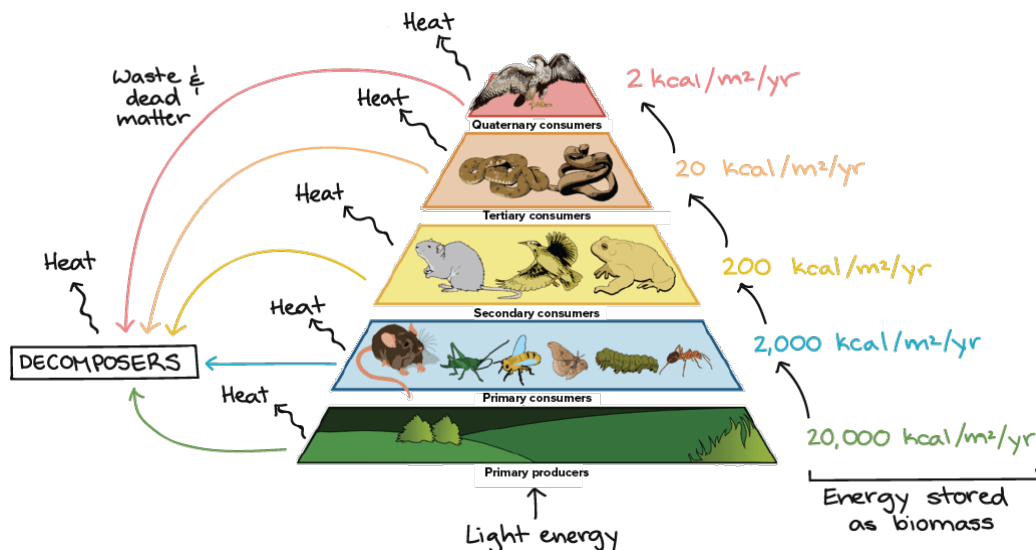
arctic. If you're feeling extra creative, draw and color your different ecosystems. Compare the producers, consumers, and decomposers of each food chain.

Ecosystems in Balance

Food chains work because each organism is an important piece in the link. Imagine what would happen to a chain link fence if a piece breaks- the fence won't stay held together. Similarly, if an ecosystem loses an organism every other organism will be affected. For example, trees provide homes and food for lots of different animals (including humans!). If all the trees disappeared, what would the world be like? Pick an organism in your food web and use your creativity to draw a picture, write a story, or make a short play/video about a fantasy world where that organism is extinct. How do you solve the problem?

The 10% Rule

Each group of organisms belongs to a trophic level. You can think of it as levels of a pyramid. That's why you've heard that humans are at the "top of the food chain". You've probably also heard the word calories. Calories (kcal) is the measure of how much energy is stored as biomass in an organism in an ecosystem. Not all of the energy is transferred between organisms during consumption. Actually, only 10% of the energy is absorbed in a food chain because some of the energy is transferred as heat or leaves the body as bathroom waste. **So here's a math challenge for you:** Knowing that only 10% of energy is transferred between trophic levels, if a dragonfly has 5,725 kcal stored, calculate how much energy would be absorbed by a frog that eats it, and how much energy would be absorbed by a crane that eats the frog.



Decomposer Dig

Decomposers are so important because without them, the food chain would just end once organisms die. Decomposers are special because they can turn dead organisms into nutrients for healthy soil so plants can grow big and tall. Some decomposers we can't see, like microbacteria, but some we see all the time. Spend

some time in your yard or in a safe space outside where you can dig in the soil. You may want to bring pencil and paper. Look for the following decomposers, and record how many you see:

Earthworms



Slugs and Snails



Mushrooms



Millipedes and Centipedes



Roly Poly



Beetles



Additional Resources

[What is a Food Chain?](#)

[Food Webs](#)

[Food Chain Challenge](#)

[Food Chain song](#)

[In Depth with National Geographic](#)

Standards Covered in this Lesson

S4L1. Obtain, evaluate, and communicate information about the roles of organisms and the flow of energy within an ecosystem.

a. Develop a model to describe the roles of producers, consumers, and decomposers in a community. (Clarification statement: Students are not expected to identify the different types of consumers – herbivores, carnivores, omnivores and scavengers.)

b. Develop simple models to illustrate the flow of energy through a food web/food chain beginning with sunlight and including producers, consumers, and decomposers.

c. Design a scenario to demonstrate the effect of a change on an ecosystem. (Clarification statement: Include living and non-living factors in the scenario.)

d. Use printed and digital data to develop a model illustrating and describing changes to the flow of energy in an ecosystem when plants or animals become scarce, extinct or overabundant.

S5L4. Obtain, evaluate, and communicate information about how microorganisms benefit or harm larger organisms. (Clarification statement: Possible microorganisms could include Tardigrades, Lactobacillus, Probiotics, Rotifers, Salmonella, Clostridium botulinum (Botox), E-coli, Algae, etc. Students are not expected to know these specific microorganisms. The list is provided to give teachers examples.)

a. Construct an argument using scientific evidence to support a claim that some microorganisms are beneficial.

S7L1. Obtain, evaluate, and communicate information to investigate the diversity of living organisms and how they can be compared scientifically.

a. Develop and defend a model that categorizes organisms based on common characteristics.

S7L4. Obtain, evaluate, and communicate information to examine the interdependence of organisms with one another and their environments.

a. Construct an explanation for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem. (Clarification statement: The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.)

d. Ask questions to gather and synthesize information from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rainforest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine).

SEC1. Obtain, evaluate, and communicate information on how biotic and abiotic factors interact to influence the distribution of species and the diversity of life on Earth.

a. Develop a model describing the organizational structure of a habitat within an ecosystem

SEC3. Obtain, evaluate, and communicate information to construct explanations of community interactions.

b. Obtain, evaluate, and communicate information about various ecological niches within habitats and determine how interactions between species lead to resource partitioning.

VAK.CR.1 Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning.

b. Produce visual images using observation, experience, and imagination using a variety of art materials.

VA1.CR.1 Engage in the creative process to generate and visualize ideas by using subject matter and symbols to communicate meaning.

b. Generate visual images in response to open ended prompts, themes, and narratives.

VA2.CR.2, VA3.CR.2, VA4.CR.2, VA5.CR.2, Create works of art based on selected themes.

a. Create works of art to express individual ideas, thoughts, and feelings from memory, imagination, and observation.

VA6.CR.2, VA7.CR.1, VA8.CR.2 Choose from a range of materials and/or methods of traditional and contemporary artistic practices to plan and create works of art.

a. Produce original two-dimensional works of art using a variety of media (e.g. pencil, marker, pastel, paint, printmaking materials, collage materials, media arts)