

Parts of a Food Chain

Georgia Standards of Excellence:

- **S4L1.** Obtain, evaluate, and communicate information about the roles of organisms and the flow of energy within an ecosystem.
 - **c.** Design a scenario to demonstrate the effect of a change on an ecosystem. (Clarification statement: Include living and nonliving 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.

Next Generation Science Standards:

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

Learning Objective:

- Students will conduct research to create a food chain from a specific environment.
- Students will hypothesize what will happen if one element of their food chain is removed.

Essential Question:

- What impacts can be observed through the removal of one element in a food chain?

Key Vocabulary:

- Producer
- Consumer
- Herbivore
- Carnivore
- Omnivore
- Decomposer
- Food web
- Food chain
- Autotroph
- Photosynthesis
- Extinction

Materials:

- Access to computers or encyclopedias
- Paper
- Scissors
- Glue
- Pencils
- Markers, colored pencils
- Lined paper
- Yard sticks or paint sticks



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Background Information:

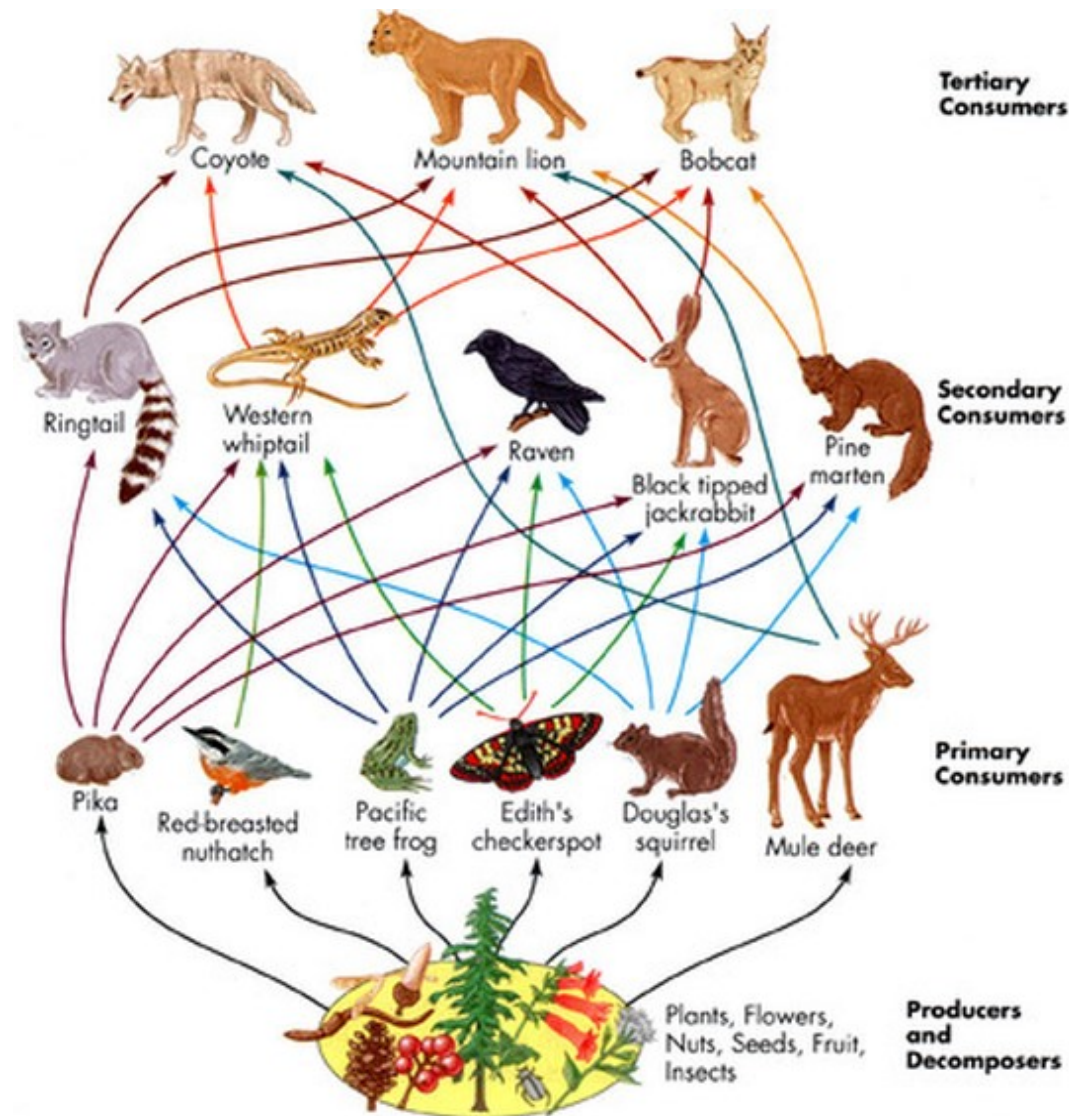
- **Trophic levels** are the order the organism is placed on the food chain. These levels are divided into producers (first), consumers (second, third and fourth) and decomposers (fifth).
- The sun is the origin of all life on earth, as the **autotrophs**, or **producers**, take energy from it and turn that energy into their own source of energy. All autotrophs or producers transition it into usable energy through photosynthesis.
 - **Photosynthesis** is the process of plants taking energy from the sun to convert into their nutrients and energy.
- **Autotroph/Producers** are the first of the trophic levels. These organisms use energy in the environment to convert into their nutrients, such as energy from the sun. They do not depend on other organisms for their nutrients.
- **Consumers** are the second, third and fourth on the trophic levels. These organisms cannot produce their own food or nutrients and must obtain them from other organisms. There are different levels and different diets for consumers.
- **Primary consumers** are second on the trophic level. These consumers eat only plants and are called herbivores because of their plant/producer exclusive diet.
- **Secondary consumers** are third on the trophic level. These consumers predate upon herbivores. For example, a snake consuming a mouse. These consumers can be carnivores (only consuming meat) or omnivores (consuming both plants and meat)
- **Tertiary consumers** are fourth on the trophic level. These consumers hunt the secondary consumers. For example, an eagle consuming the snake that consumed the mouse. These consumers can be carnivores or omnivores as well.



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Background Information cont.:

- **Decomposers** are organisms that consume no longer living plant and animal remains, break down their substance and returning the stored energy to the environment.
- If one level of the trophic pyramid is removed, it will have consequences for the entire food web. For example, kelp is a producer, sea urchins consume the kelp and sea otters consume the sea urchins. If the sea otters drop in population or go extinct, there wouldn't be a consumer to maintain the balance of sea urchins. Therefore, sea urchins would grow in numbers and consume too much of the kelp, thus causing the endangerment of kelp.
- **Extinction** is the dying out of an entire species population. This can be caused by predation, environmental factors or genetic factors.
- A **Food Chain** is one connection of relationships in an ecosystem, and a **Food Web** is all of those chains in the ecosystem connected together.

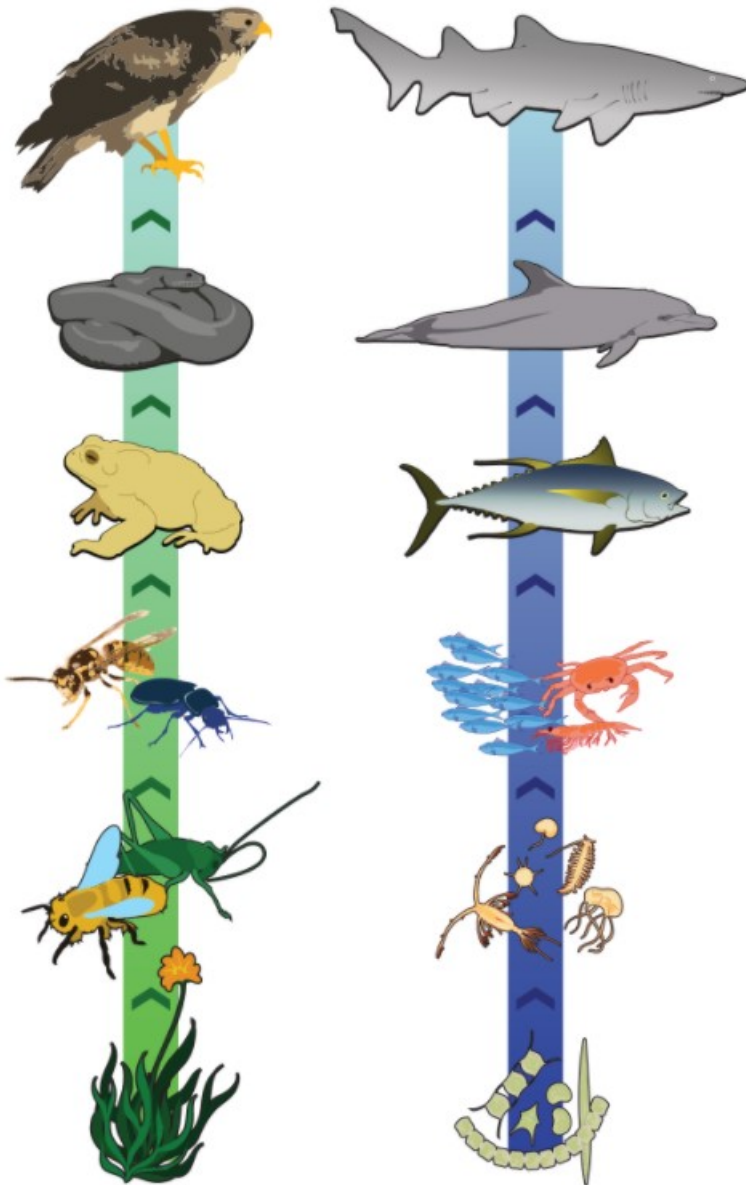


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Activity Instructions:

- Students will choose an aquatic ecosystem to research and build a food chain. Examples: Coral reef, Arctic, River/Freshwater, Open ocean
- Their food chains should include the following:
 - The sun
 - An autotroph
 - Primary consumer
 - Secondary consumer
 - Tertiary consumer
 - Decomposer
- Students will need research organisms that work together on a food chain for their chosen ecosystems.
- Once they have conducted research, students will write on their lined report paper which ecosystem and which organisms in that ecosystem they have chosen. They will need to label their organisms' trophic levels and diets next to these organisms (ex: secondary consumer, omnivore).
- Next, students will draw or print pictures of each organism on their food chain and adhere them in order of trophic level on a paintstick or yardstick to look like the examples on the next page (*These examples do not include the sun or decomposers. Students projects should include these elements*):
 - Students may elect to paint or decorate their yard sticks as well.
- Students will then conduct their last portion of research in order to hypothesize what will happen to the ecosystem if one of their organisms is removed from the food chain.
 - This will require students to research and investigate not just the trophic level of the organism in its ecosystem, but it's behavioral relationship with other organisms.
 - This information will be written on their lined report paper.

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Evaluate:

- Students will present their projects to the class, being sure to mention the different trophic levels, what kinds of consumers they chose and what would happen to the other organisms if an element from the food chain was removed.
- When students are done with their presentations, groups students together based on the ecosystem they studied. This grouping will take the food chains and form them into a food web!

References:

National Geographic Society. "Food Web." National Geographic Society. October 09, 2012. Accessed May 17, 2019. <https://www.nationalgeographic.org/encyclopedia/food-web/>.

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Gittleman, John L. "Extinction." Encyclopædia Britannica. February 05, 2019. Accessed May 17, 2019. <https://www.britannica.com/science/extinction-biology>.