A Day in the Life of a New Mexico Food Web

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Goal

• Students will understand what a food web is, how various species fit into this important biological concept and, as some populations increase or decrease, how this can impact other species within the web.

Objectives

• Students understand the importance of food webs.
• Students will be able to define key vocabulary words such as herbivore, omnivore and carnivore.
• Students will be able to define autotroph and heterotroph.
• Students will know how drastic species population changes can impact the food web.
• Students will know that toxins accumulated within the food web can possibly affect many species over time.
Definitions

- **Autotroph** – organism capable of synthesizing its own food from inorganic material (e.g. plants photosynthesize their own food).

- **Bioaccumulation** – gradual accumulation of a substance, such as pesticides or other chemicals, in an organism.

- **Carnivore** – organism that eats mainly meat from other animals.

- **Decomposers** – organism that breaks down dead or decaying organisms or waste.

- **Detritivore** – organism that feeds on waste products or dead organic material (mostly animals).
Definitions

• **Food Chain** – is a linear network of links in a food web.

• **Food Web** – model depicting the many food chains linked together to show the relationship of organisms in the ecosystem.

• **Herbivore** – organism that eats only plants.

• **Heterotroph** – organism that cannot produce its own food.

• **Omnivore** – organism that eats plants and animals.

• **Primary Consumer** – organism that feeds on primary producers. Organisms here are herbivores.
Definitions

• **Producers** – organisms that make their own food.

• **Saprovore** – organisms that feed on dead organic matter (mostly fungi).

• **Secondary Consumer** – organism that feeds on primary consumers. Organisms here can be omnivores or carnivores.

• **Tertiary Consumer** – organism that feeds on primary or secondary consumers. Organisms here are usually carnivores, but can be omnivores.

• **Trophic level** – position an organism occupies in a food web.
Food Webs

• Food webs are found all around us in the world. It is very important to understand this key biological concept.

• Food webs show us how all species interact and how energy is transferred between trophic levels.

• Food chains are part of food webs; both are visual representatives of how organisms acquire their energy.
Food Webs

- The sun gives plants energy.
- Photosynthesis produces food for plants. Plants are autotrophs.
- As you move up a food web or chain, organisms consume other organisms to obtain their energy. These organisms are called heterotrophs.
Food Webs

• Deer browse on leaves, turkeys eat acorns and insects, black bears eat berries and elk, cougars eat deer and bighorn sheep. These are examples of other organisms consuming other organisms.
• Deer are herbivores, turkeys and bears are omnivores and cougars are carnivores.
Food Webs

• Decomposers are important as they break down dead material that plants use as food to obtain their nutrients.

• *Can you name some decomposers in nature?*
Hierarchy of a Food Web

• Examples of **producers** are trees, brush, flowers and grass.
• Examples of **primary consumers** would be elk, deer, grasshoppers and chipmunks.
• Examples of **secondary consumers** would be wild turkeys, lizards, foxes and coyotes.
• Examples of **tertiary consumers** would be cougars, black bears and bald eagles.
• Examples of **decomposers** would be maggots, earth worms and fungus.
As consumers and even producers die, they are broken down into nutrients by decomposers, which aid producers in growing.
Energy Transfer in a Food Web

• Only about 10% of energy is transferred between trophic levels. 90% is used by each trophic level for mechanical and heat processes.
• That is why when you look at a pyramid it is wider at the bottom than the top.
• There are more producers than herbivores, and more herbivores than omnivores/carnivores.
How Organisms make a living

- Heterotroph
- Heterotroph
- Heterotroph
- Autotroph
- Heterotroph
-vore in a Hierarchy

Usually carnivore, but can be omnivore

Omnivore or Carnivore

Herbivore

Autotroph

Saprovore or Detritivore
Examples of Organisms in a Food Web

Tertiary Consumers

Secondary Consumers
Coyote image credit: Office.com

Primary Consumers
Grasshopper image credit: Office.com

Producers
Producers Image credits: Office.com
Examples of Organisms in a Food Web

Tertiary Consumers

Secondary Consumers
Coyote image credit: Office.com

Primary Consumers
Grasshopper image credit: Office.com

Producers
Image credits: Office.com
Bioaccumulation (Biomagnification)

- When pesticides containing DDT were used, the chemicals entered the water system.
- All species in the system from plankton to fish accumulated DDT.
- This drastically impacted higher organisms on the food web such as bald eagles and ospreys when they fed on fish that had DDT.
Bioaccumulation (Biomagnification)

• Eagles would feed on fish and over time the accumulation of DDT infected fish meat eaten by eagles, impacting eagle populations.
• DDT affected bird egg development and egg shells were not developing correctly.
• Caused bald eagles populations to drastically decline.
Thank You!

Please plan on going hunting, fishing or trapping in the future and know that your purchase of a license for any of these activities helps fund wildlife and fisheries management in the Land of Enchantment!