Topical Facts Sheet—Energy Flow

**Energy Flow**—The sun is the sole source of Earth’s energy dating back to billions of years ago (photosynthesis)

\[ 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{sunlight & chlorophyll} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \]

In the equation above, carbon dioxide and water (with sunlight as an energy source) combine to manufacture sugar \( \text{C}_6\text{H}_{12}\text{O}_6 \) and oxygen \( \text{O}_2 \)

2 Main Types organisms on Earth

**Producers**—any organism that can make glucose during photosynthesis (trees, plants, grass, algae, plankton)

**Consumers**—organisms that cannot use the sun to transform energy (can’t use sun for food)

Use cellular respiration to process glucose for energy

*Almost all energy consumed by an organism is used for survival, reproduction or other living processes (both producers and consumers)*

**Types of Consumers**

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**Primary consumers**

--always herbivores (plant eaters; grazers)

Ex: deer, rabbits, squirrels, sheep

--most consumed energy used for staying alive

--most consumed energy used for mechanical energy and body heat

--left over energy is what is available for other consumers to eat (secondary consumers)

**Secondary consumers**

--may be carnivores (meat eaters)

--may be omnivores (eat many types of food)

Ex: lions, tigers, wolves, bears

-- most consumed energy used for mechanical energy and body heat ) if they make their own heat)

**Tertiary consumer**

--eats secondary consumers

--most often carnivores

Ex: sharks, owls, eagles, alligators

-- most consumed energy used for mechanical energy and body heat (if they make their own heat)
**Predators:** consumers that hunt and kill other animals—and eat them

**Prey:** the animals that are hunted and killed—and eaten

**Scavengers:** Consumers that eat other consumers that have already died Ex: vultures, crabs, crows, flies

**Decomposers:** break down dead or dying materials (fallen trees, leaves, dead animals)

Ex: all bacteria, worms, all fungi (mushrooms)
**Food webs:** food chains that are interconnected in a living system

--show multiple feeding relationships between various organisms

--the larger the food web, the more sustainable the living system

--notice how predators have multiple prey and vice versa
**Energy pyramids:**

--show the amount of energy available at each level of a food chain (trophic levels)

--show how much energy is required to support a trophic level

--follows the "rule of 10" or the "10% rule"

--the diagram below shows how moving up the pyramid reduces the available energy by factors of 10

1000 plant like organisms (producers) will feed 100 bunnies (primary consumer)

100 bunnies (primary consumer) will feed 10 snakes (secondary consumer)

10 snakes (secondary consumer) will feed 1 hawk (tertiary consumer)