

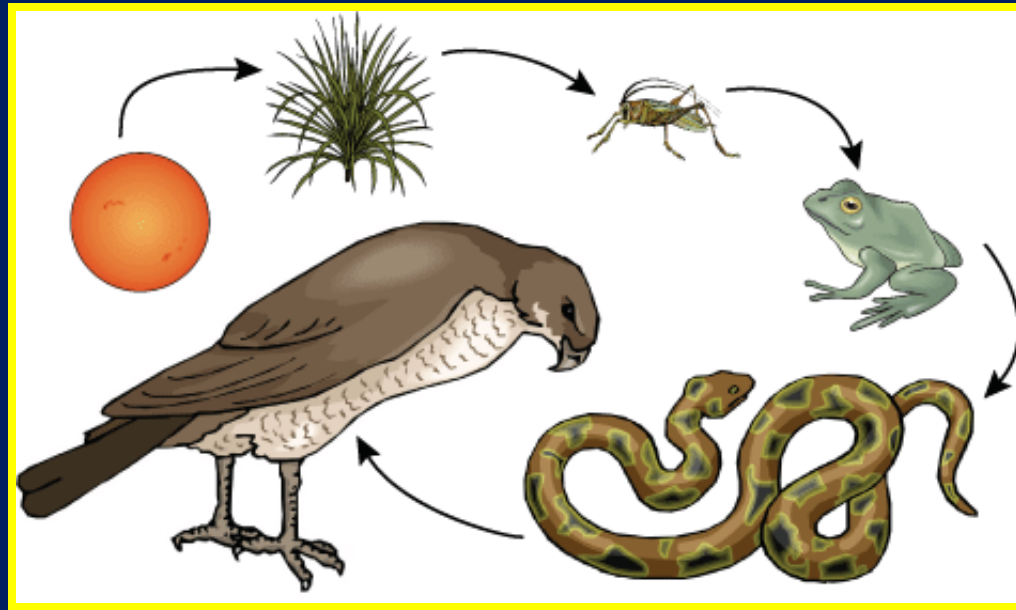
Flow of Energy in Ecosystems



Clarifying Objective 2.1.1: Analyze the flow of energy and cycling of matter through ecosystems relating the significance of each to maintaining the health and sustainability of an ecosystem.

Energy

All organisms need energy to maintain their health, growth, reproduction, and homeostasis.



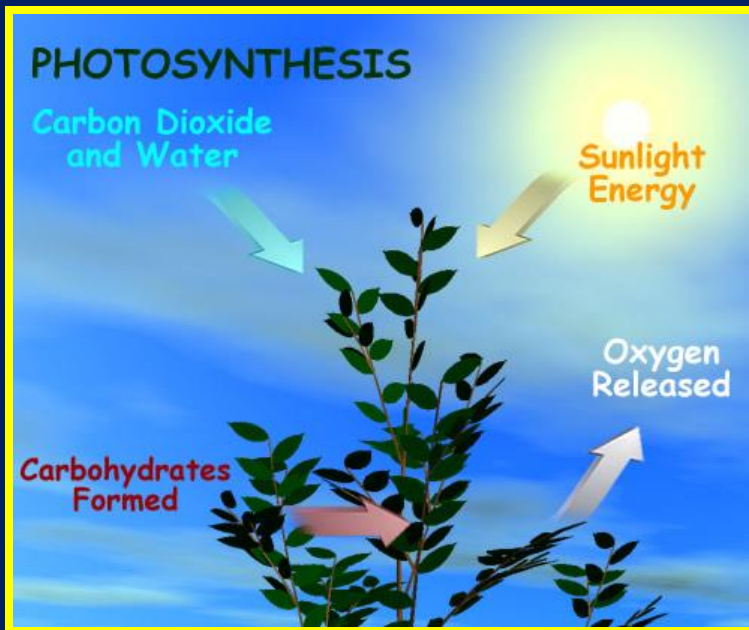
Law of Conservation of Energy

Energy cannot be created nor destroyed, only transferred.

Radiant Energy



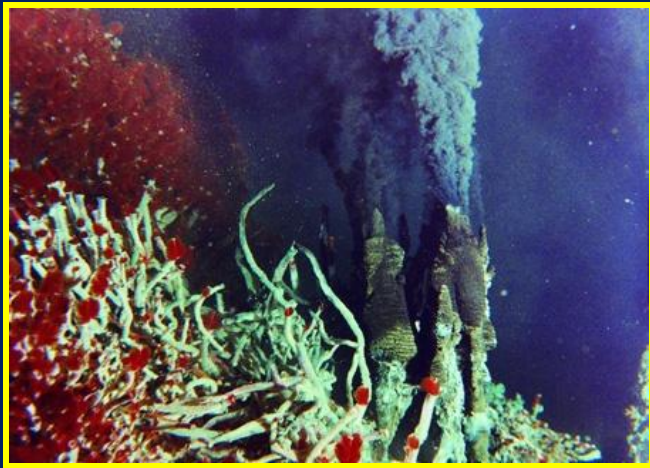
The energy in most ecosystems enters as radiation from the Sun



Plants, algae, and some bacteria use photosynthesis to convert radiant energy into food.

Chemical Energy

In ecosystems, where there is no sunlight, bacteria use the heat energy and inorganic chemicals to produce food during a process called chemosynthesis.



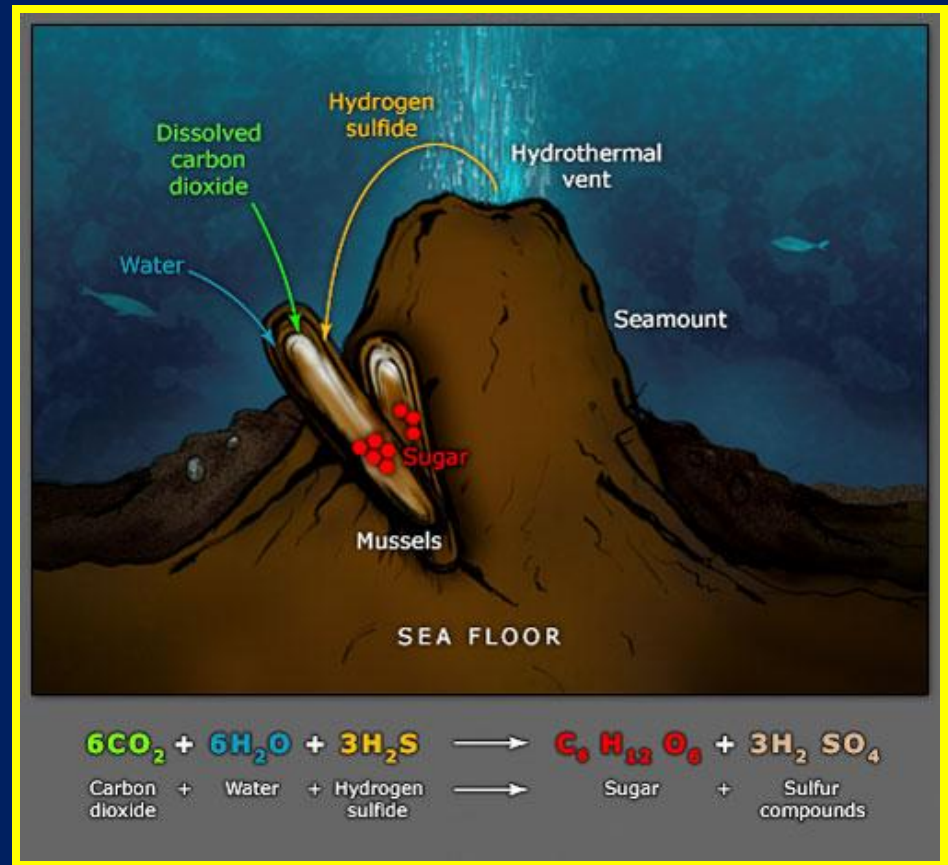
Hydrothermal Vent



Bacteria

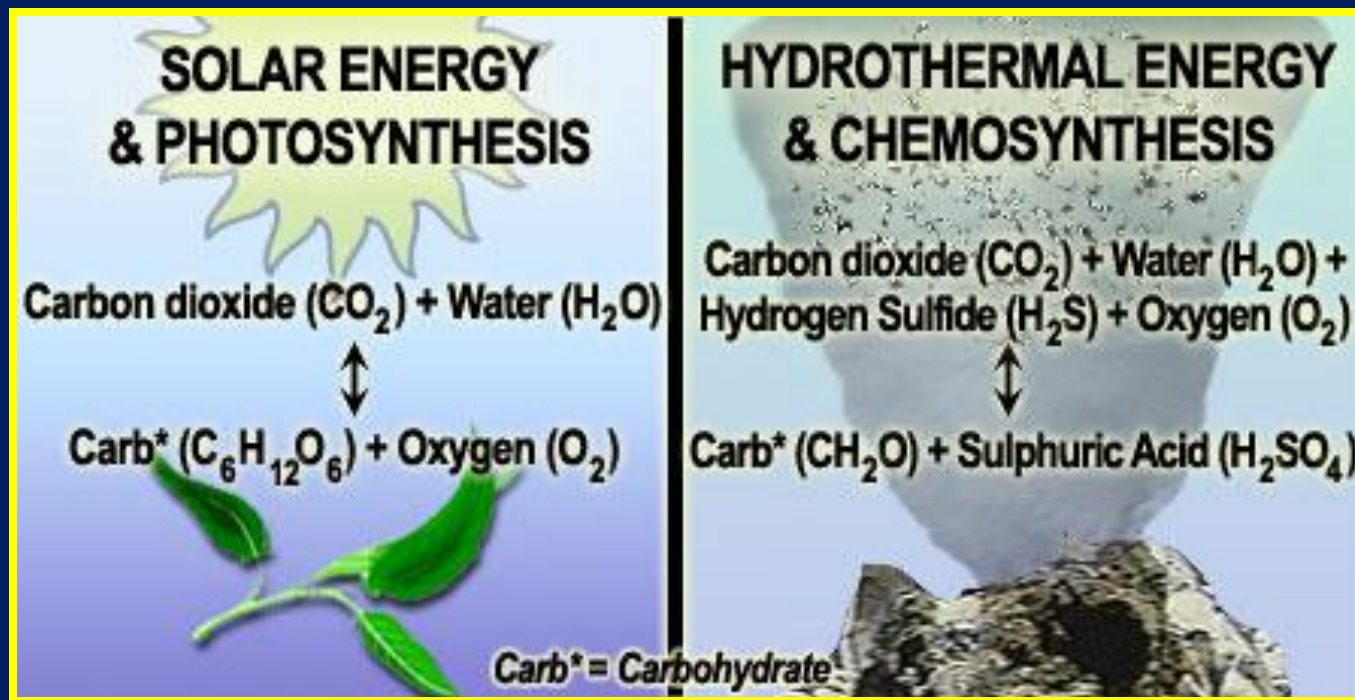


Mussels



Autotrophs and Producers

Organisms capable of producing their own food are called autotrophs or producers



Auto means Own

Troph means Food

Heterotrophs and Consumers

Heterotrophs or consumers must obtain energy from the food they consume or eat



Types of Heterotrophs



Herbivores eat only plants

Carnivores eat other animals



Omnivores eat both plants
and animals



Types of Heterotrophs

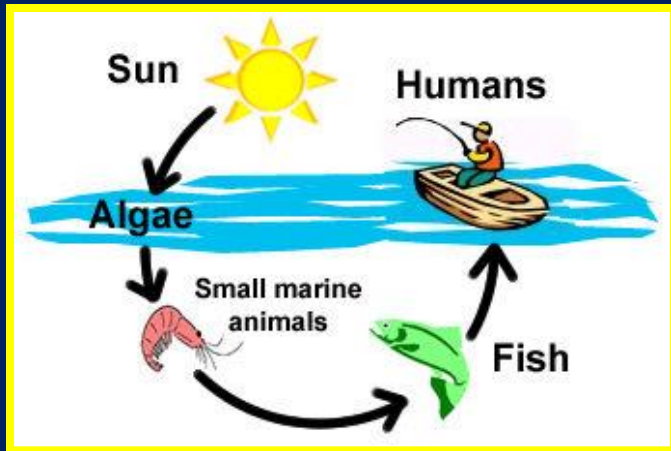


Detritivores eat plant wastes such as leaf litter, and dead branches.

Decomposers play an important role in the ecosystem because they recycle the nutrients back into the soil.



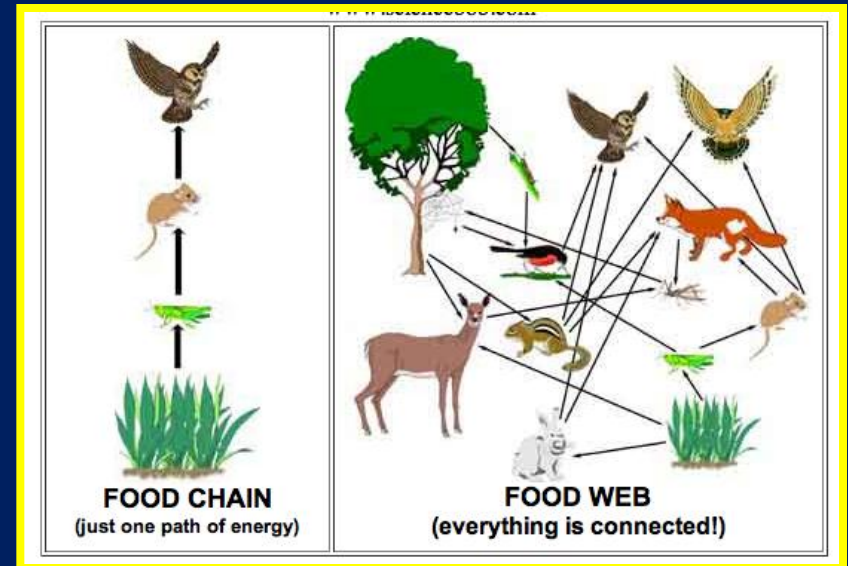
Food Chains



Food Chains are models used to show the direction matter and energy flow through an ecosystem.

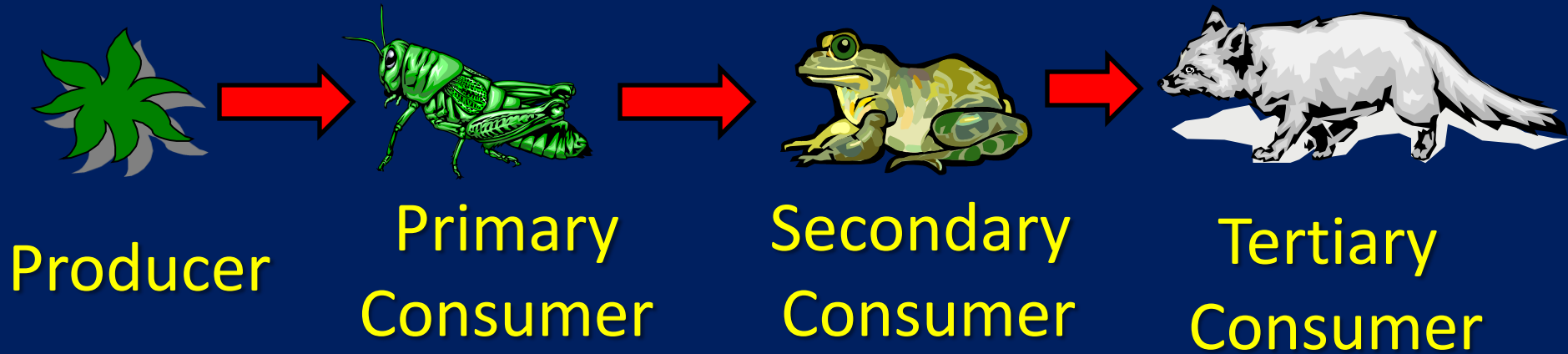
Arrows point to where the energy goes

Food Webs are interconnected food chains and are more realistic



Trophic Levels

Trophic Levels refer to each step in the transfer of energy.



Trophic Levels and Food Webs

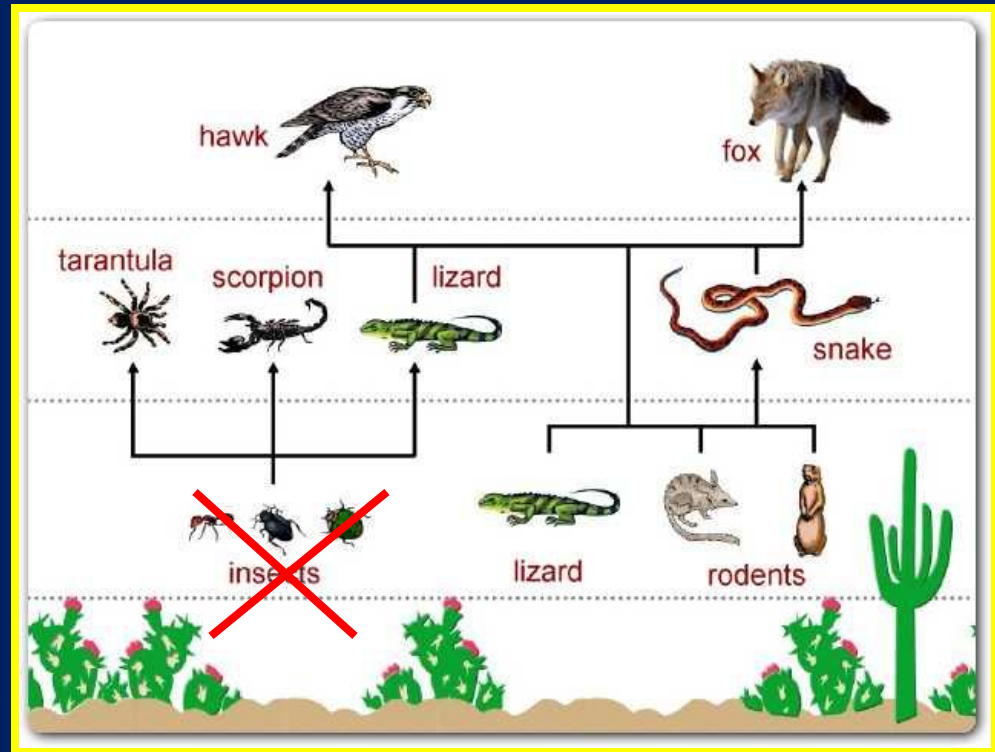
Any change to a trophic level will affect all the other trophic levels.

Tertiary Consumers

Secondary Consumers

Primary Consumers

Producers



Removing the insects would decrease the amount of higher consumers but increase the producers.

Energy Transfer

During energy transfers, not all the energy in one trophic level is passed up to the next trophic level.



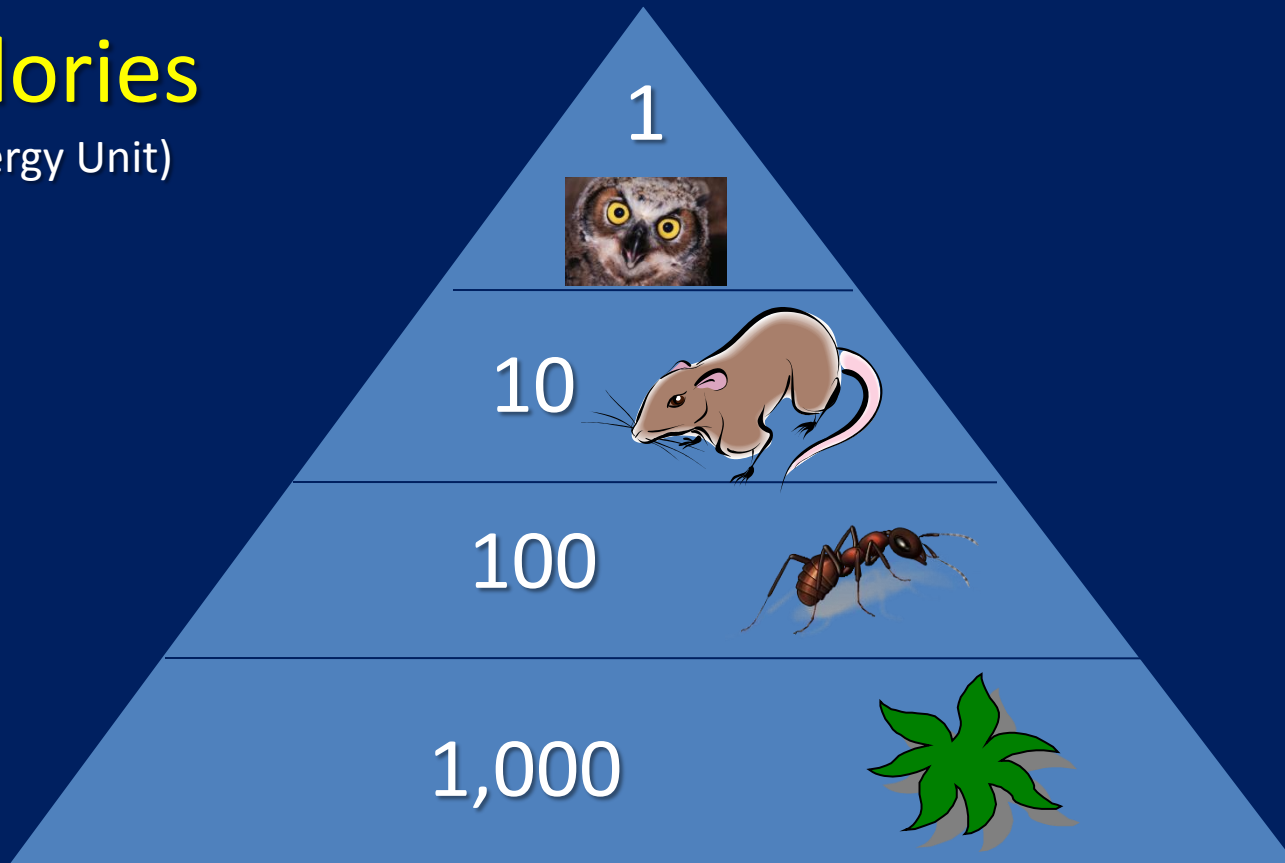
Some energy is stored in indigestible parts of the organism, and some energy is changed in unusable heat energy.

Ten Percent Law

Ten Percent Law states that only 10% of the energy in one trophic level is passed on to the next trophic level.

Calories

(Energy Unit)



Ecological Pyramid

Since there is less energy on higher trophic levels, there are also less organisms and less biomass.

Calories

Number of
Organisms

Biomass

