NOTES 11.3

Chapter 11 – Matter & Energy in the Environment
Lesson 3 – Energy in Ecosystems

How does energy move in ecosystems?

When you see a picture of an ecosystem, it often looks quiet & peaceful. However, ecosystems are actually full of movement & each movement requires ENERGY!

- Energy is required for growth & development – we get it from the sun.
- Unlike carbon & oxygen, energy DOES NOT cycle through ecosystems – it flows in 1 direction.
- Energy cannot be created nor destroyed, only changed in form – the law of conservation of energy.

Organisms in an environment are either – producers, consumers or decomposers

Producers

- autotrophs
- living things that make their own food through photosynthesis
- grasses, trees, plants, algae
- bacteria can be photoautotrophs – use photosynthesis to make food
- bacteria can be chemoautotrophs – use chemosynthesis to make food by using inorganic compounds – hydrogen & sulfur + thermal heat

Consumers

- heterotrophs
- living things that DO NOT make their own food & must obtain it
- classified by what type of food they eat – carnivores, herbivores, omnivores

carnivores

- ONLY eat other animals
- examples - lions, polar bears, hawks, frogs, salmon, & spiders

herbivores

- consume producers such as plants or algae
- necessary link between producers and other consumers
- examples - deer, rabbits, and mice

omnivores

- consume BOTH plants and animals
- examples - humans, pigs, brown bears, gulls, crows, and some species of fish

Decomposers

- break down dead organisms & wastes - putting inorganic molecules back into the environment
- stability of decomposers is essential to every ecosystem
- classified by the type of organic matter they break down – scavengers, detritivores, & saprotrophs

scavengers

- consume the soft tissues of dead animals
- examples - vultures, raccoons, and blowflies

detritivores

- consume detritus - the dead leaves, animal poop, and other organic debris in soil or at the bottom of a body of water
- examples – on land - earthworms, millipedes, and dung beetles
- examples - in water - "bottom feeders" such as sea cucumbers and catfish

saprotrophs

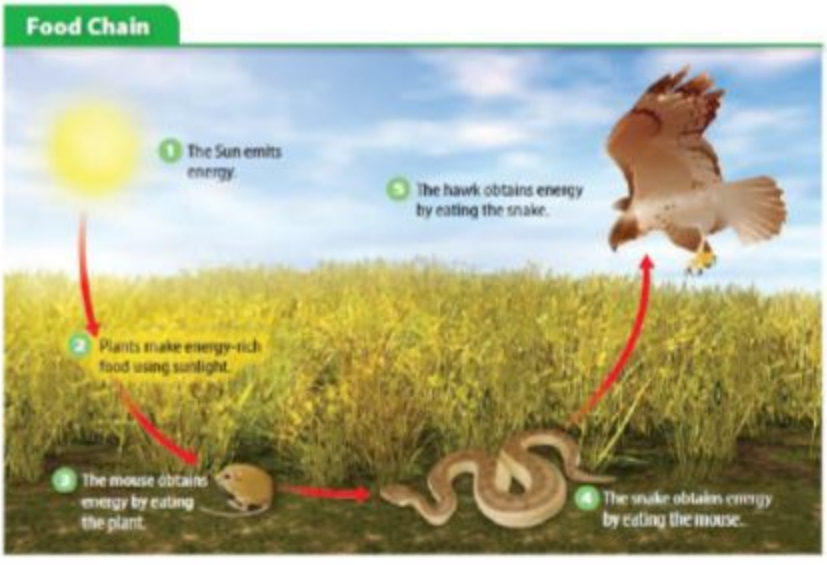
- feed on any remaining organic matter that is left after other decomposers do their work
- examples - fungi, bacteria, and single-celled protozoa
- Fungi are the only organisms that can decompose wood.

Modeling Energy in Ecosystems

Energy –

- does not cycle through ecosystems → energy flows through ecosystems
- can be stored as chemical energy
- in a **Food chain** arrows → show transfer of energy

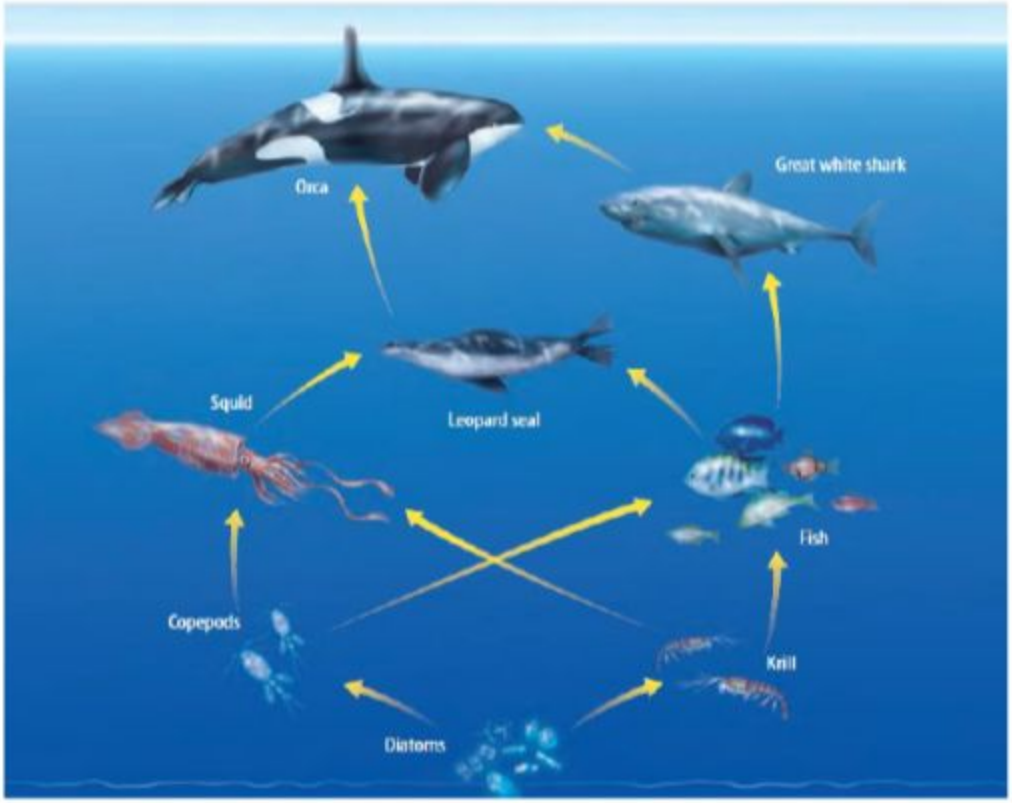
Q: What is a food chain?
A: a model that shows how energy flows in an ecosystem



Food Webs

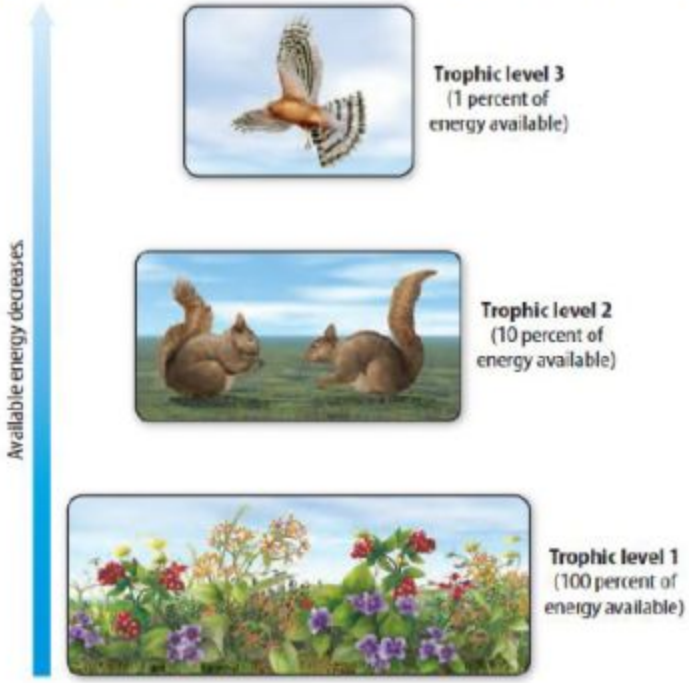
Food Webs show many overlapping food chains.

Q: What is a food web?
A: a model of energy transfer that shows how food chains in a community are interconnected



Energy Pyramids

Food chains and food webs show how energy moves in an ecosystem but they don't show how the amount of energy in an ecosystem changes. This is shown in an **Energy Pyramids**



Q: What is an energy pyramid?
A: a model used to show the amount of energy available in each step of a food chain

- Steps are called trophic levels
- producers are at the bottom
- consumers that eat producers are middle level
- consumers who eat other consumers are at the top level
- energy DECREASES as you move up a energy pyramid