

Energy Flow

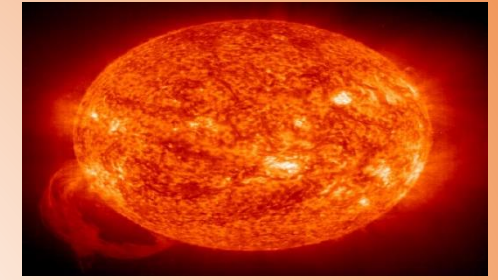
We've learned how energy gets into the cycle of life and used by organisms, but how does it move between living things?

How do you think it works?

How does an insect get energy?

How does a wolf get energy?

Sunlight is the *ultimate* energy source

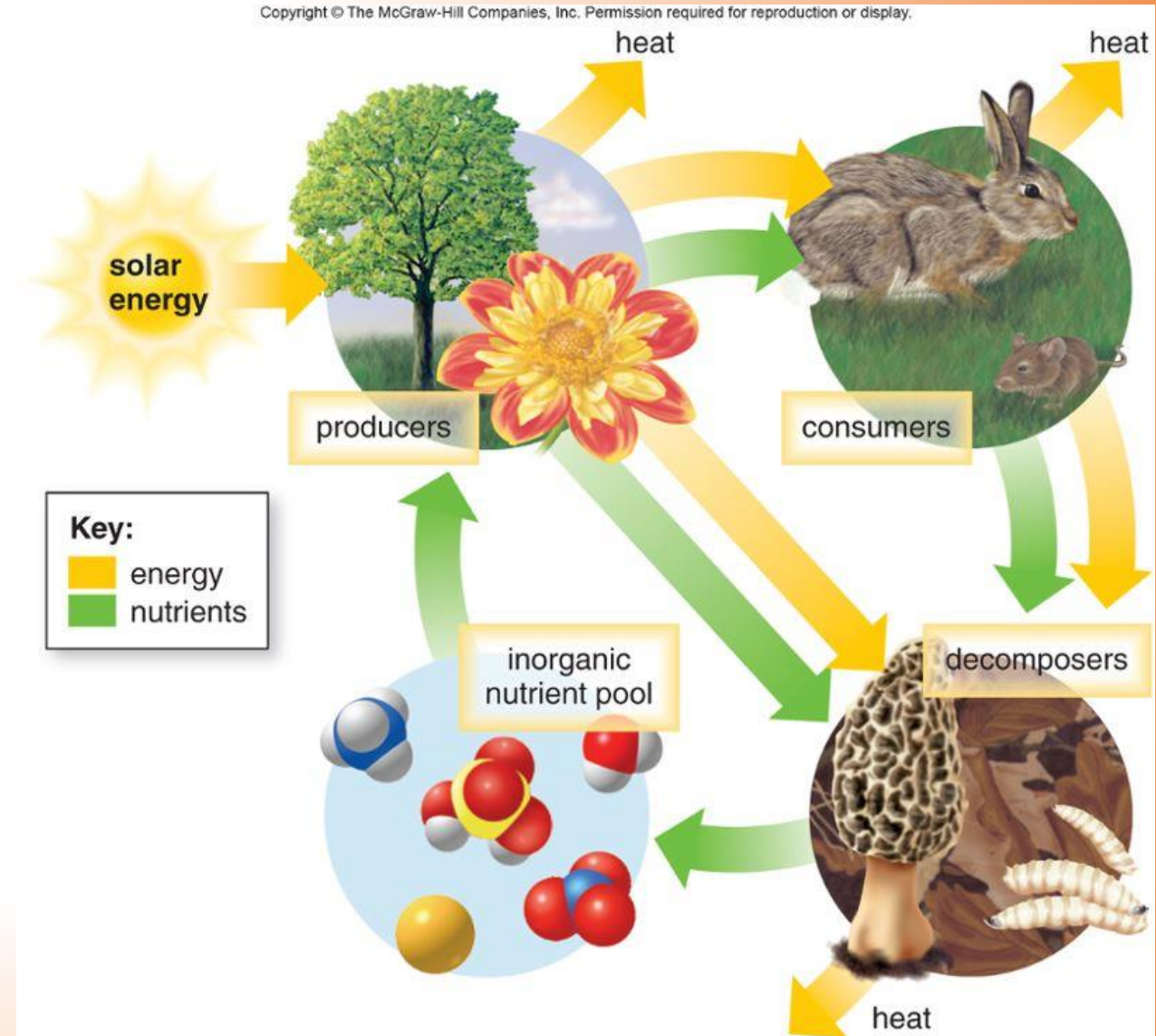


Consider This:

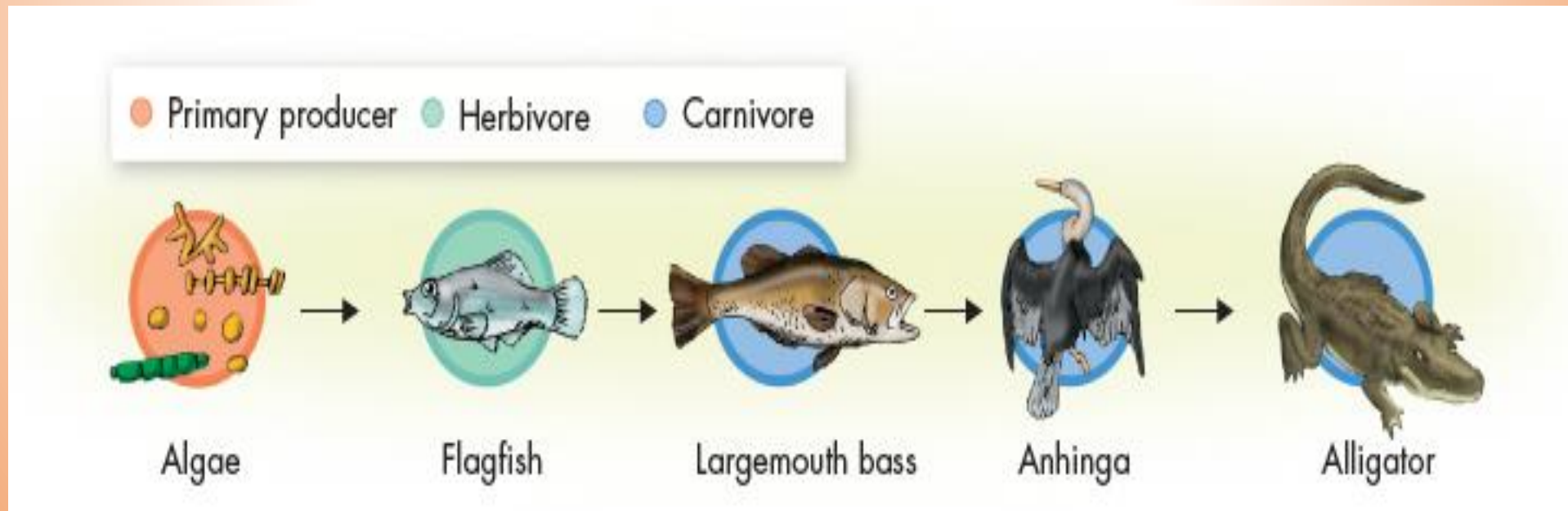
- Where does the electrical energy needed to power the lights in this room come from? What do you think?
- How it works:
 - Electricity is generated at a thermal power plant by burning coal.
 - What is coal? A fossil fuel!
 - Fossil fuels are literally highly pressurized remains of dinosaurs/ancient organisms
 - Where did the dinosaurs get their energy? Eating plants!
 - Where did the plants get their energy? The SUN!!!

Types of Organisms in an Ecosystem

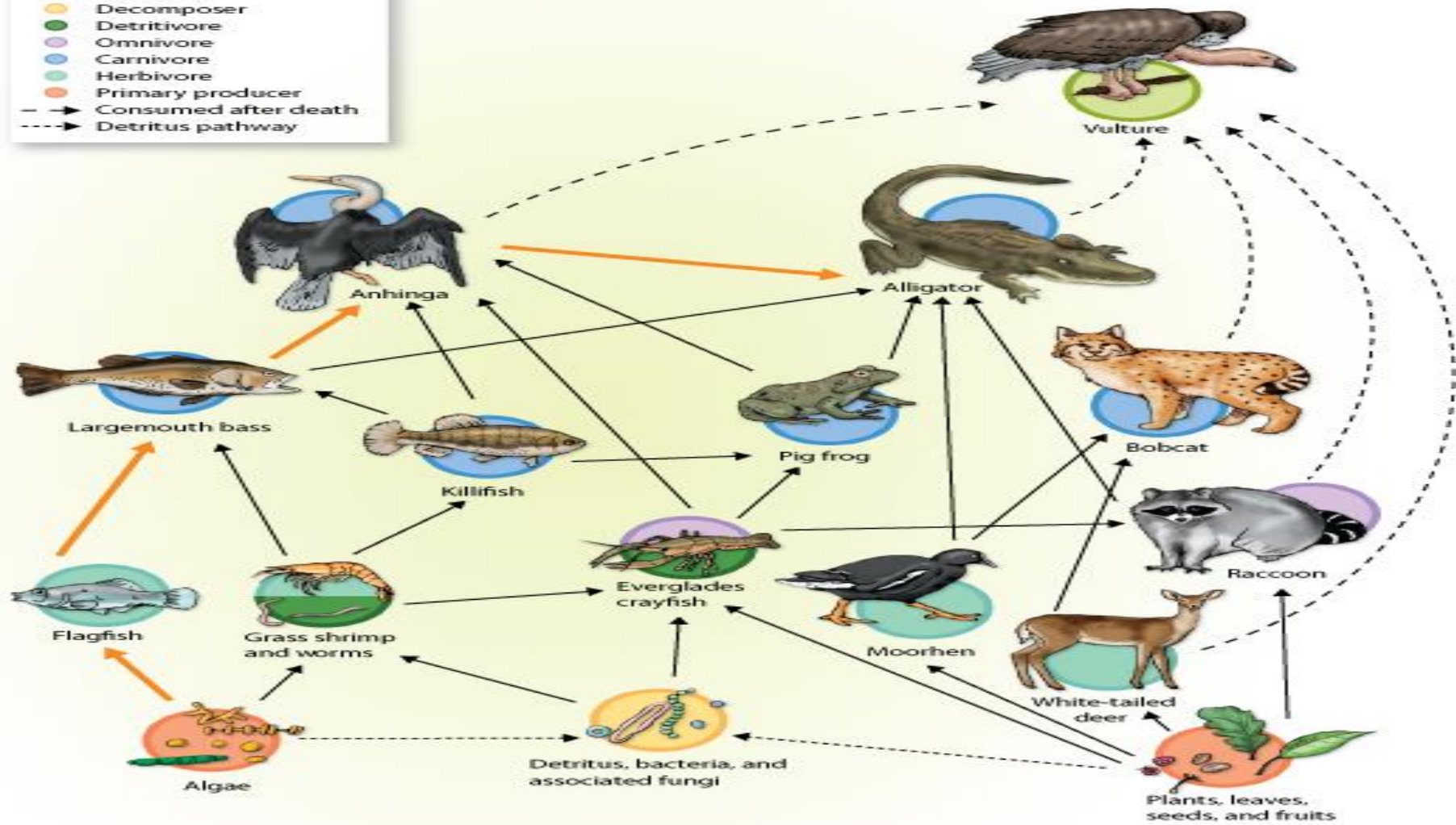
- **Producers** (autotroph)
- **Consumers** (heterotroph)
- **Decomposers**- Decomposers break down material and make it available for producers to use again. (Type of heterotroph)



- Energy flows in ***one*** direction in an ecosystem:
producers → consumers
- **food chain**- series of steps in which organisms transfer energy by eating & being eaten.
- **food web**- all food chains in an ecosystem

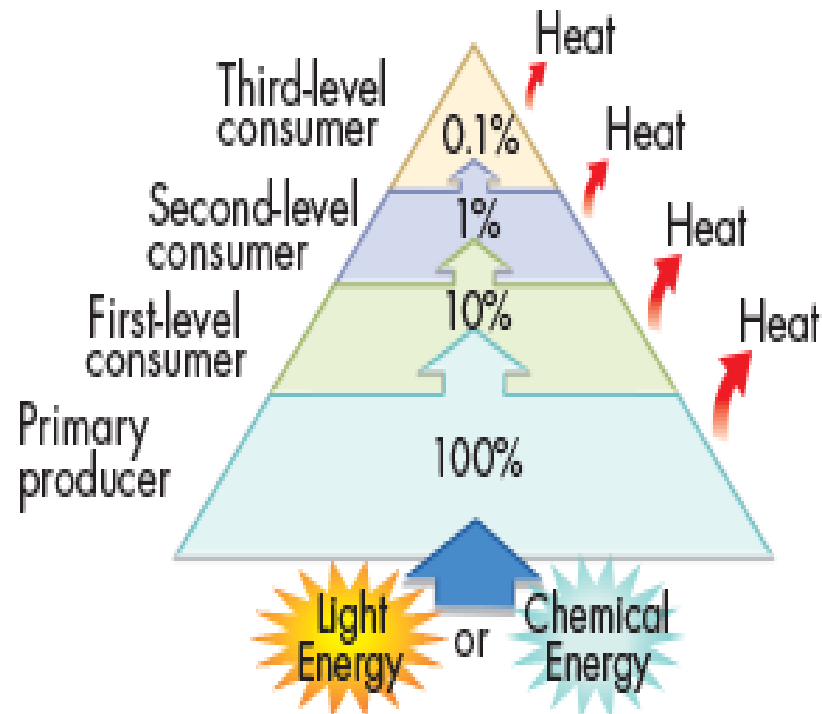


- Scavenger
- Decomposer
- Detritivore
- Omnivore
- Carnivore
- Herbivore
- Primary producer
- - -> Consumed after death
- - - -> Detritus pathway



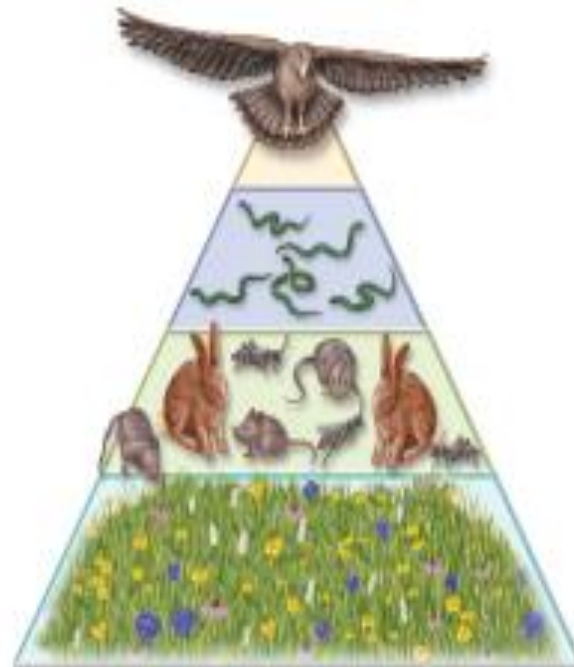
Pyramid of Energy:

- most of the energy used on life processes
- Remaining energy released as heat
- **ONLY 10%** of the energy available from 1 level is transferred to the next level.



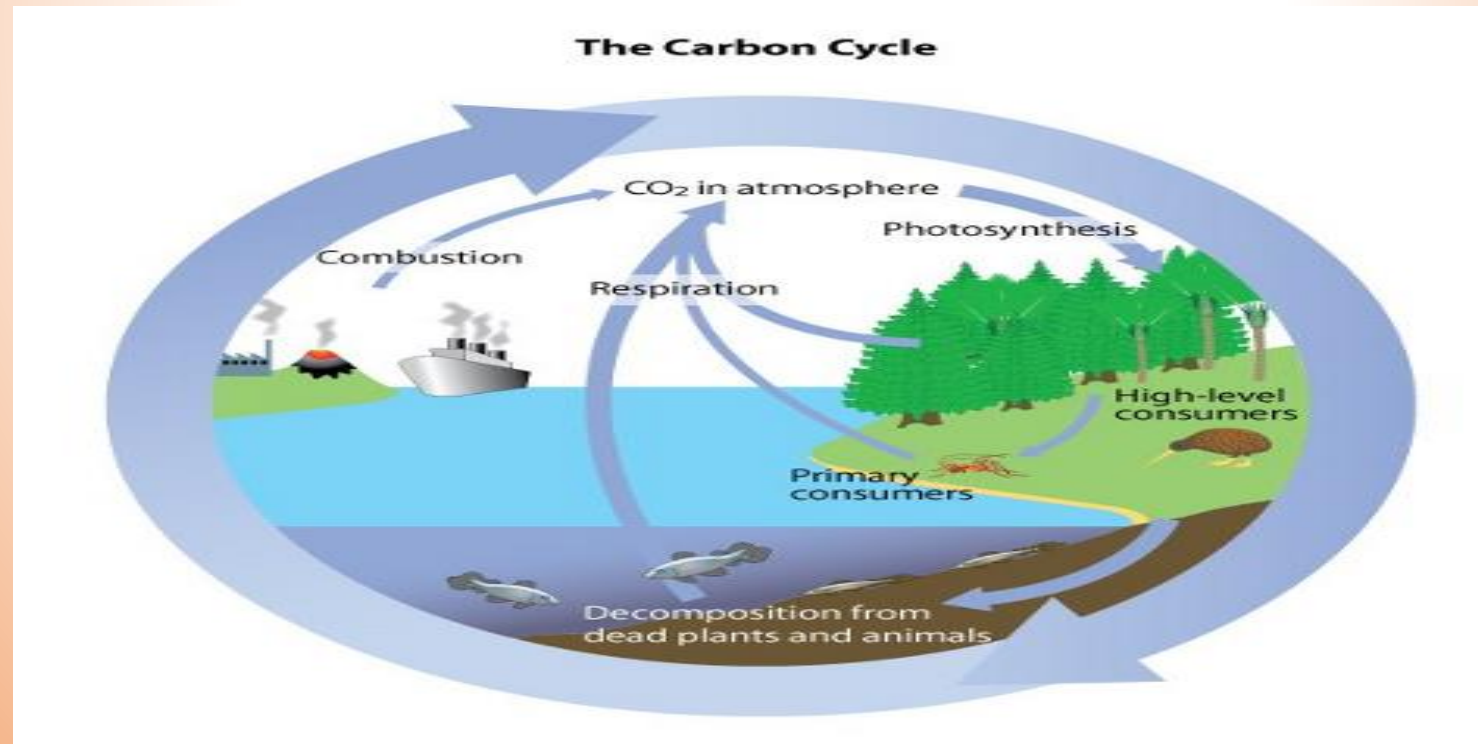
Pyramids of Biomass or Numbers:

- At times, consumers are smaller in size than the organisms they feed upon.
- Ex: many insects graze on 1 tree: lots of biomass, 1 organism.
- pyramid of numbers may be upside down



Nutrient Cycles

- **nutrients**- chemical substances organism needs to sustain life
- **limiting nutrient** -nutrient whose supply limits productivity because it is scarce or cycles slow



Unlike the 1-way flow of energy, matter (nutrients) are ***recycled*** within & between ecosystems.

- **biogeochemical cycles**- pass elements from 1 organism to another & through the Earth
 - Matter that is involved in ***biological*** processes, ***geological*** processes, & ***chemical*** processes.

The Carbon Cycle:

- Plants take in CO_2 , build carbohydrates, & pass it through food webs
- animals release CO_2 by respiration
- organisms die, decomposers break them down, & release C in environment
- Geologic forces turn C into fossil fuels/rock
- The Ocean absorbs a lot of the C in the atmosphere

The Carbon Cycle:

- C enters atmosphere by volcano & human- activity- burning of fossil fuels, forests

