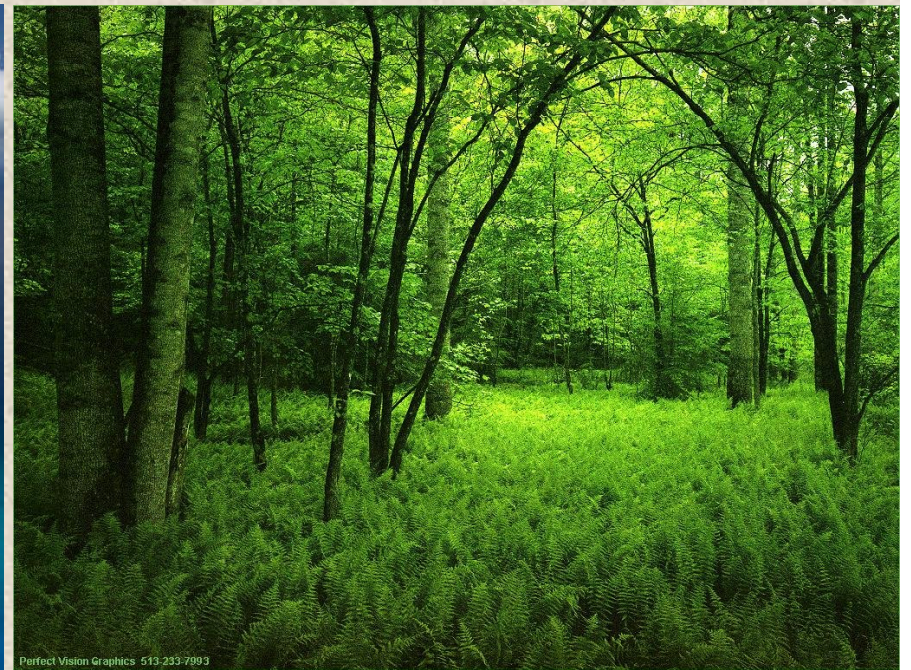


Ecology: The Study of Ecosystems



Close your eyes and
imagine you are visiting
this Meadow, Island or
Forest



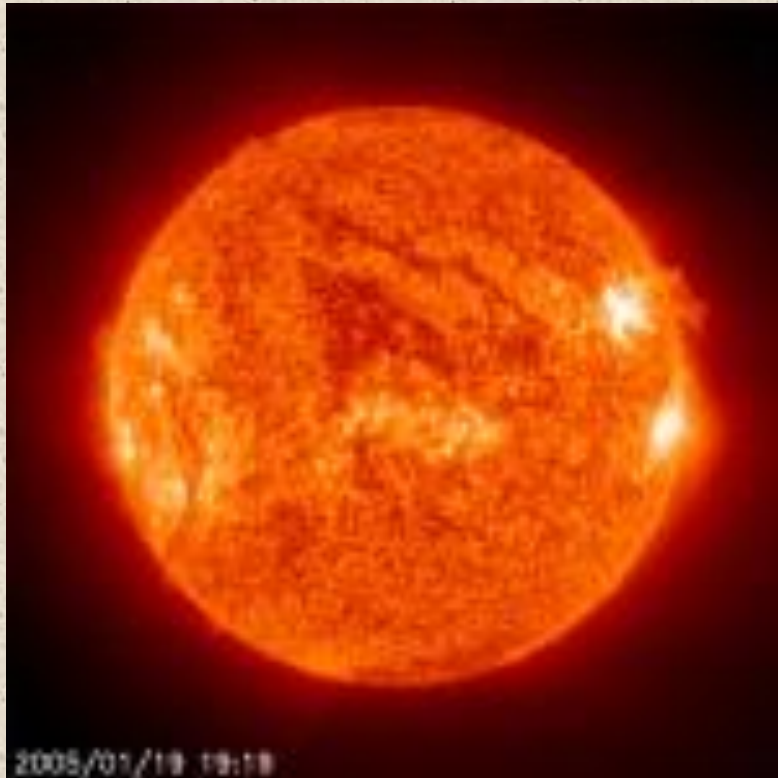
Make a list of 5-10 things
you see, hear, and smell

Mark which are alive, and
which are not

What is an Ecosystem?

- An ecosystem includes all the living and non-living things in a given area
- **B**iotic Factors: Living Things (**Bio** = Alive)
 - Examples: (from your list!)
- **A**biotic Factors: Non-Living Things (**A** = without; **Bio** = Alive)
 - Examples: (from your list!)

How does the ecosystem get energy?



Autotrophs

- **Auto** = Self; **Troph** = to feed
- Living things that can make their own food
- Green Plants have “chlorophyll” are able to convert the sun’s energy to chemical energy (food) = photosynthesis
- **Autotrophs** are also known as “Producers” because they produce the energy for the ecosystem

How do the rest of us get energy?



We've got to EAT!!!

- **Heterotrophs**: **Hetero** = Other; **Troph** = To Eat
- **Heterotrophs** are NOT able to make their own energy; we must eat other living things for energy
- **Heterotrophs** are “Consumers” because they consume other living things for energy
- But what kind of living things do we eat???

Herbivores

- Eat only **plants!!!**



Carnivores

- Eat only **meat**



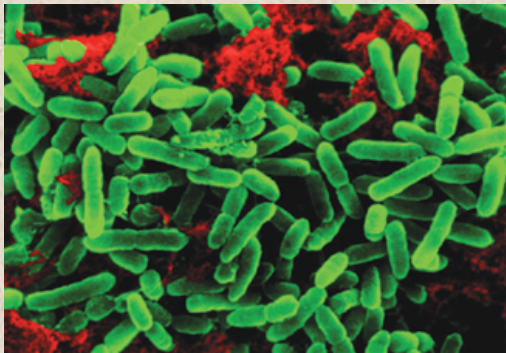
Omnivores

- Eat both plant and animal material



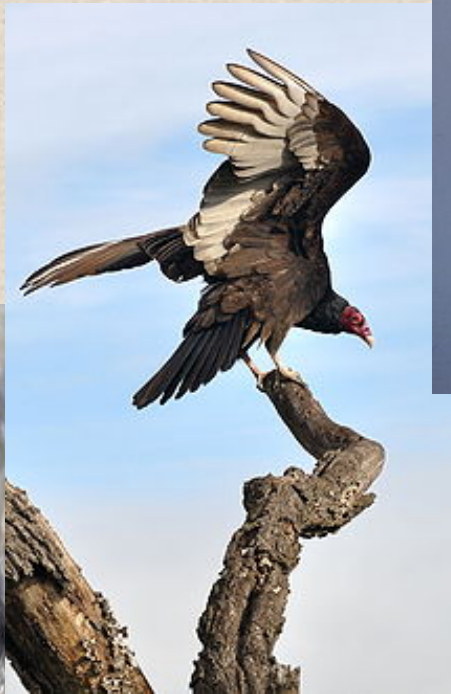
Is there another type of feeder?

- Decomposers: Live off of dead living things and wastes

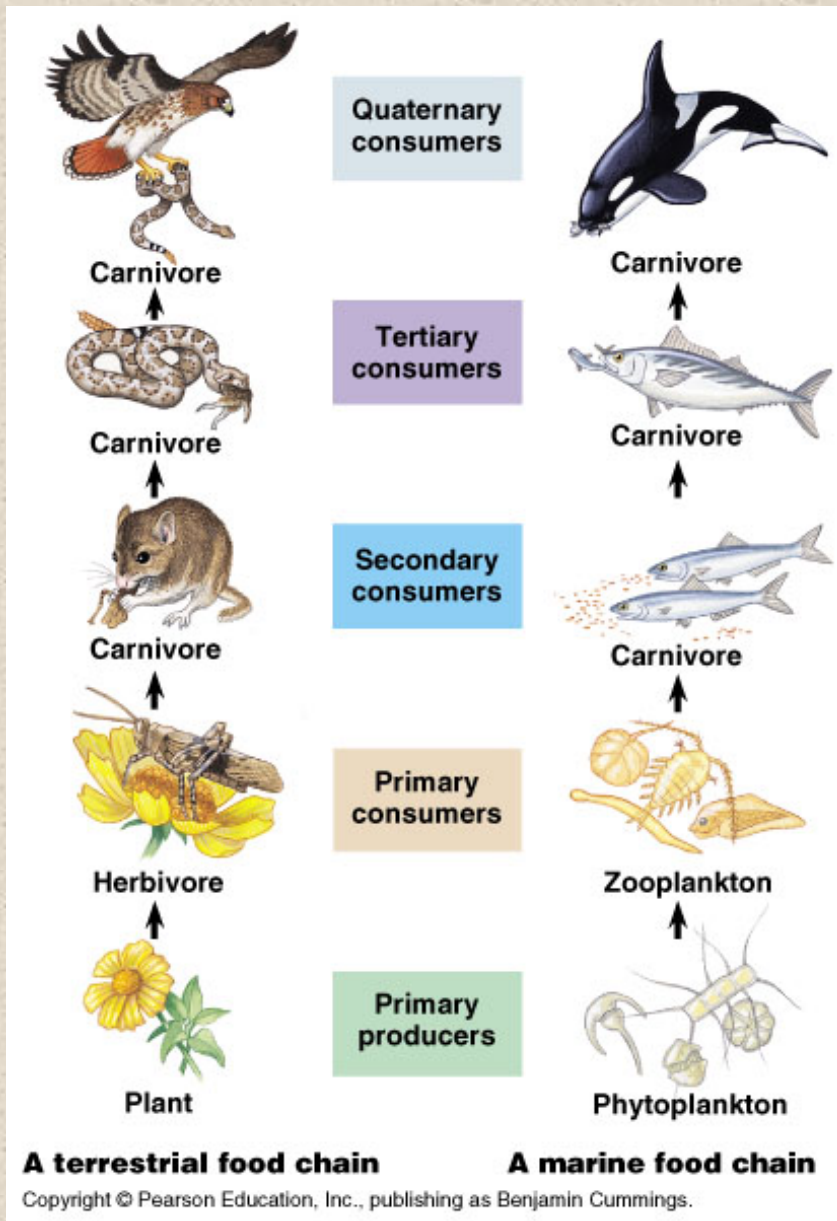


Scavengers

- Consumers that eat animals that are already dead



How can we organize the different types of feeders?

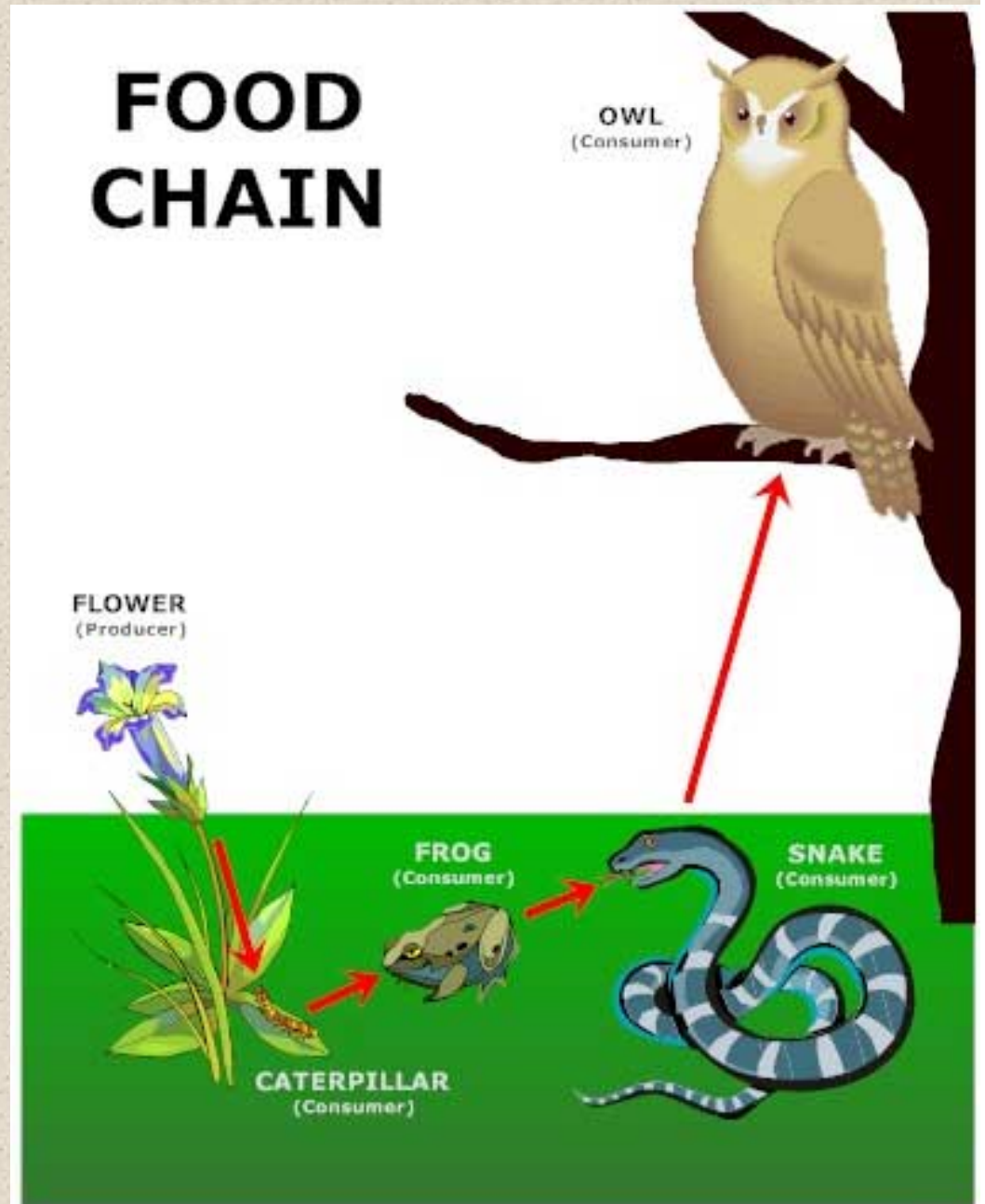


Trophic Levels -

A name for the feeding levels within a food chain

Simplest Food Chain

Is this realistic?



Food Webs

- Many interconnected food chains within an ecosystem
- Can be very complicated
- More Realistic than Food Chains!

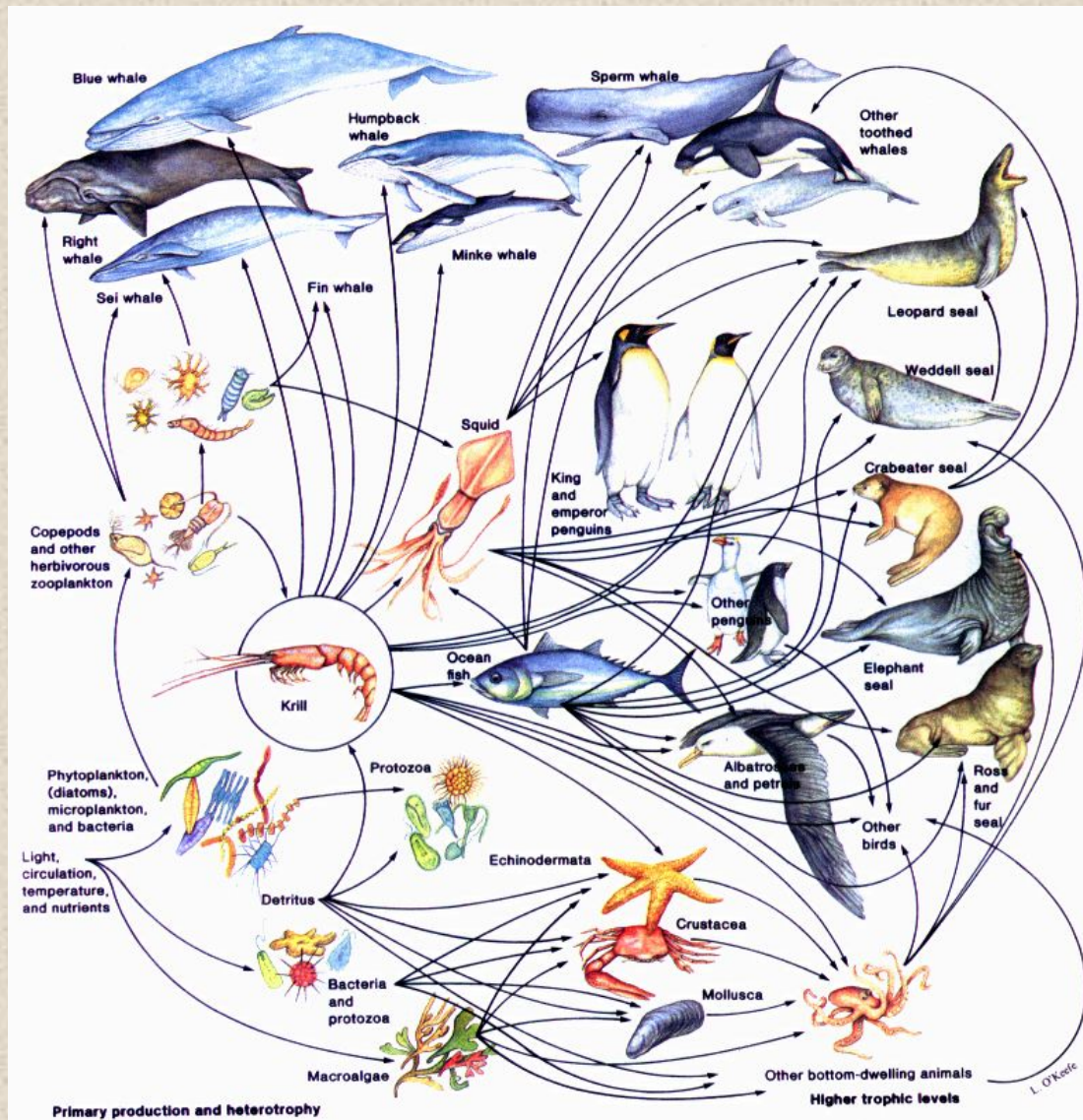
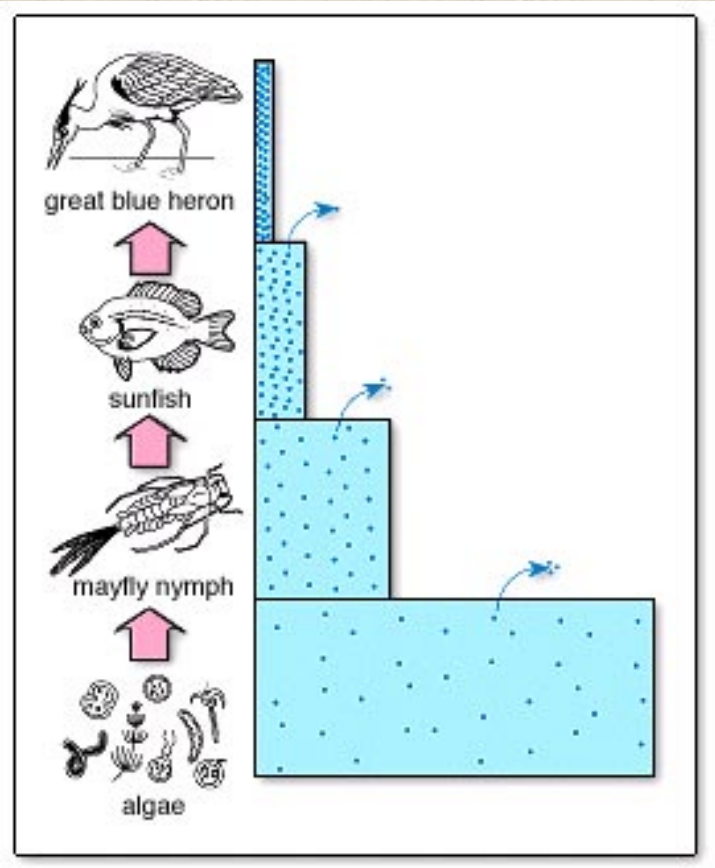


FIGURE 15.3 Food Webs. An Antarctic food web. Small crustaceans called krill support nearly all life in Antarctica. Krill are eaten by 6 species of baleen whales, 20 species of squid, over 100 species of fish, 35 species of birds, and 7 species of seals. Krill feed on algae, protozoa, other small crustaceans, and various larvae.



Where does the poison come from?



Biomagnification...

There is 10 times the poison as you go up each level of the food chain!

- <https://www.youtube.com/watch?v=E5P-UoKLxIA&feature=related>

ONLY eat 2 fish from the SF Bay **PER MONTH**

(Office of Environmental Health Hazard Assessment)

Consumption of Bay Area fish should be limited to:

Adults



Children
under 6 yrs



Pregnant
women



*= One fish represents one meal (8 ounces) per month
This does not apply to salmon, anchovies, herring and smelt*

Cycles in Nature



Matter can never be created or destroyed.
So, it must be recycled!

Matter is recycled

How is matter recycled?

- Matter moves from the producers, to the consumers, through the food web
- After the individual dies, the matter is broken down by decomposers to primary nutrients
- Cycle starts over again when nutrients are taken up by producers

What about energy???

- Review: Where does the energy come from???
- Energy moves through the food chain, but it is NOT Recycled

Where does the energy go?

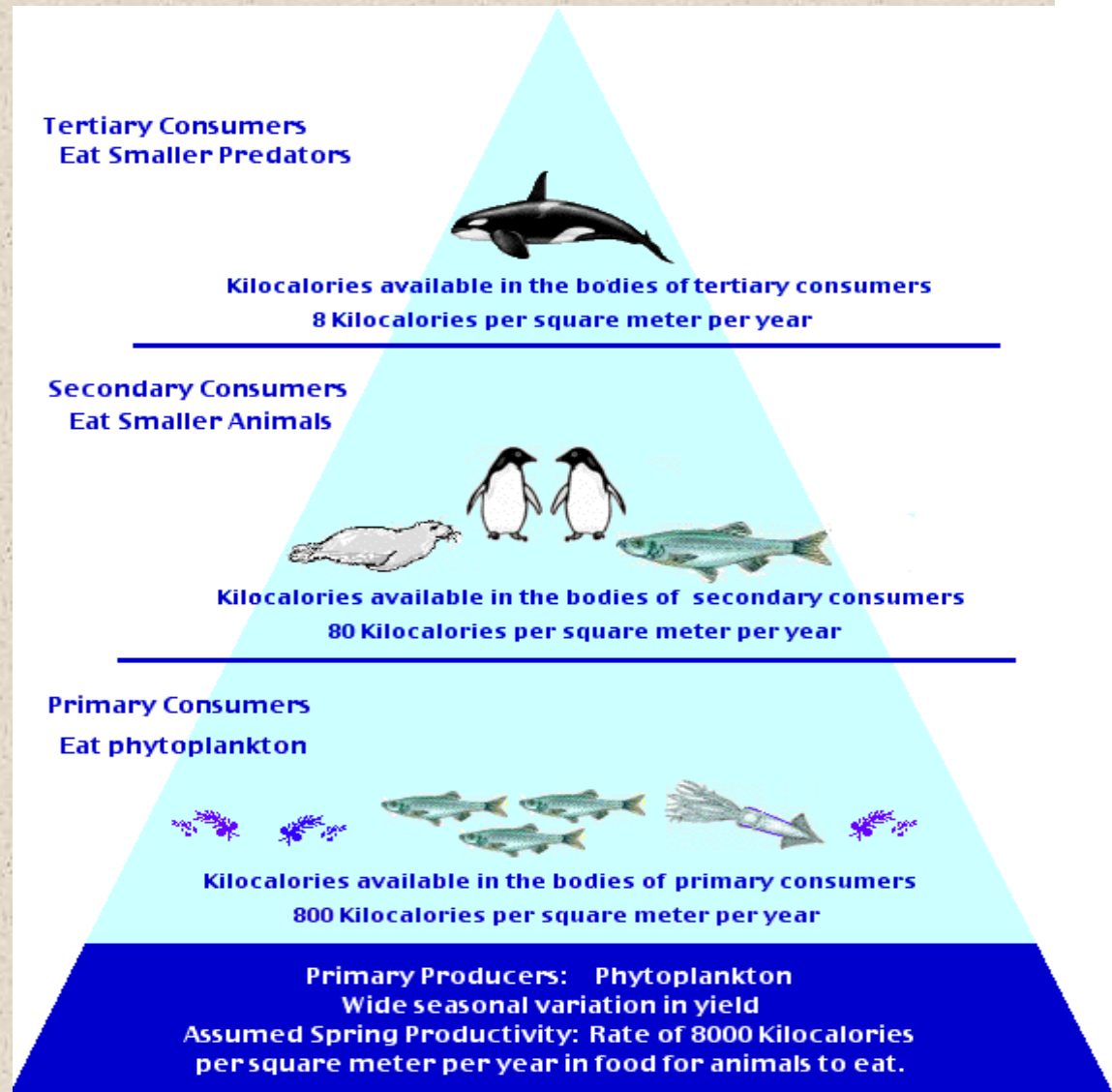
- Most of the energy at each trophic level is **used** by the living things for hunting, eating, growing, reproducing etc...
- Some is **lost** as HEAT

The Law of 10%

- At each trophic level, 90% of the energy is used.
- Only 10% of the energy at each level is available to the next trophic level (when they get EATEN!)

Energy Pyramid

- As you move UP the Energy Pyramid (at each trophic level), the amount of energy **decreases**
- Do Primary OR Tertiary Consumers get more energy from their food?
- Why?



What does this mean for higher level consumers?

- There's less energy in the food they eat!
- This means there are
 - MORE producers and lower level consumers
 - are FEWER higher level consumers
- Think BIG: What will happen to an ecosystem if all of the producers are killed? (Think deforestation, forest fire, drought, etc)

Quick Review:

1. What only eats plants?
2. Who always starts a food chain?
3. Who eats plants AND animals?
4. Who only eats animals?
5. How is a Food Web different from a Food Chain?

Quick Review...

6. Who eats EVERYBODY when they're dead?
7. What do we call producers (like plants) who make their own food?
8. What is the other name for consumers?
9. What is the name for living things in the environment?
10. What is the name for non-living things in the environment?