Feeding Relationships and trophic levels
Life in an ecosystem requires a source of energy.
Producers provide energy for other organisms in an ecosystem.

- Producers get their energy from non-living resources.
- Producers are also called autotrophs because they make their own food.
Almost all producers obtain energy from sunlight.

- Photosynthesis in most producers uses sunlight as an energy source.
- Chemosynthesis in prokaryote producers uses chemicals as an energy source.

\[
\text{carbon dioxide + water + hydrogen sulfide + oxygen} \\
\rightarrow \text{sugar + sulfuric acid}
\]
Producers provide energy for other organisms in an ecosystem.

- Consumers are organisms that get their energy by eating other living or once-living resources.
- Consumers are also called heterotrophs because they feed off of different things.
Types of consumers

• Herbivores eat plants like grass (cows, insects, horses etc.)

• Omnivores eat animal meat and plants (bears, humans etc.)

• Carnivores eat only animal meat
– Detritivores eat dead organic matter.
– Decomposers are detritivores that break down organic matter into simpler compounds.
Think–Pair–Share

• Think about these words:
  – Heterotroph
  – Autotroph
  – Chemotroph

• What does the suffix *TROPH* mean?
• Specialists are consumers that primarily eat one specific organism or a very small number of organisms.
• Generalists are consumers that have a varying diet.
Think–Pair–Share

• Think of an example of a specialist.
• Think of an example of a generalist.

• Are specialists or generalists more likely to survive a change in the environment? Why?
Food chains and food webs model the flow of energy in an ecosystem.
A food chain is a model that shows a sequence of feeding relationships.

- A food chain links species by their feeding relationships.
- A food chain follows the flow of energy between one producer and a single chain of consumers within an ecosystem.
A food web shows a complex network of feeding relationships.

- An organism may have multiple feeding relationships in an ecosystem.
- A food web emphasizes complicated feeding relationships and energy flow in an ecosystem.
ECOSYSTEM ENERGY FLOW is modeled in

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Trophic levels are the nourishment levels in a food chain.

- Producers are usually plants or algae
- Primary consumers are herbivores that eat producers.
- Secondary consumers are carnivores that eat herbivores/primary consumers.
- Tertiary consumers are carnivores that eat secondary consumers.
- Quaternary consumers eat tertiary consumers.
Pyramids model the distribution of energy and matter in an ecosystem.
An energy pyramid shows the distribution of energy among trophic levels.

- Energy pyramids compare energy used by producers and organisms on other trophic levels.
- Between each tier of an energy pyramid, up to 90 percent of the energy is lost into the atmosphere as heat.
- Only 10 percent of the energy at each tier is transferred from one trophic level to the next.
Other pyramid models illustrate an ecosystem’s biomass and distribution of organisms.

- **Biomass** is a measure of the total dry mass of organisms in a given area.
Think‐Pair‐Share

• What is something else in society that we arrange into pyramids?
• Why do we this?
• A pyramid of numbers shows the numbers of individual organisms at each trophic level in an ecosystem.

• A vast number of producers are required to support even a few top level consumers.
Coral Reef Ecology—Coral are animals too!

- Coral are Carnivorous—2ndary consumers!