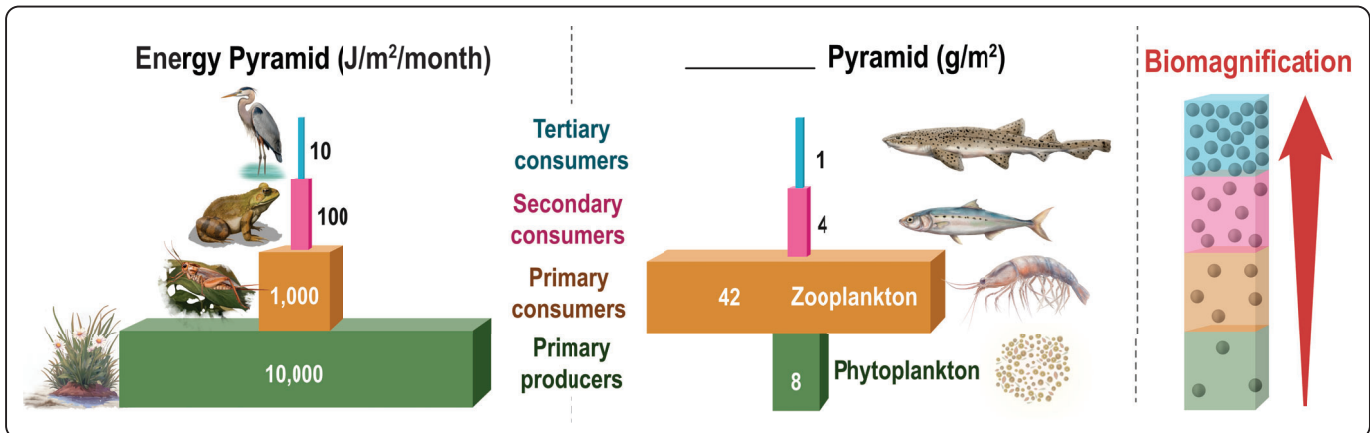


TOPIC: ENERGY & BIOMASS PYRAMIDS

- ◆ Ecosystem structure & trophic efficiency can be visually represented in an *energy* or *biomass* _____.
- Energy pyramids always _____ but biomass pyramids can be upright, _____, or diamond.
- ◆ Trophic efficiencies are generally low (averaging ~____%) for several reasons, including:
 - Incomplete Ingestion.
 - Metabolism & Cellular Respiration.
 - Incomplete Digestion.
 - Heat Loss.



- ◆ **Biomagnification:** process of pollutants becoming _____ concentrated as they move up the food chain.

EXAMPLE

Why is it more energy-efficient for humans to eat a plant-based diet (acting as a primary consumer) rather than eating meat (acting as a secondary/tertiary consumer)?

- Humans can obtain more energy from the same mass of plants than they can from meat.
- A given amount of solar energy can produce far more plant biomass than animal biomass.
- Animal-based products are more expensive.
- All of the above.

TOPIC: ENERGY & BIOMASS PYRAMIDS

PRACTICE

True or false: Most of an ecosystem's net primary productivity is ultimately used for the growth of primary consumers within the ecosystem.

- a) True because this is the only food source available to primary consumers.
- b) True because primary consumers are the most efficient organisms at converting their food into biomass.
- c) False because primary consumers consume most of the plant matter, but don't convert most of it to biomass.
- d) False because primary consumers don't consume most of the plant matter, & they do not convert most of the food they ingest into biomass.

PRACTICE

Which of the following is a reason that such a small fraction of the energy that reaches the Earth as solar radiation ends up at the top of the food chain?

- a) Plants only absorb a very small fraction of the total solar energy that reaches Earth.
- b) Lots of energy is dissipated as heat at all trophic levels.
- c) Incomplete ingestion – consumers do not eat all the food available to them.
- d) All of the above.

PRACTICE

Due to biomagnification, there are certain species with a high concentration of heavy metals (e.g., mercury), leading to dietary advisories for vulnerable demographics (e.g., pregnant women and young children) to avoid these species. Given that these advisories are often most critical for species at the top of long marine food chains, which species would this advice most likely apply to?

- a) Cows (primary consumers, primarily eat grass).
- b) Shrimp (secondary consumers, feed on zooplankton).
- c) Alligators (secondary/tertiary consumers, feed on many species).
- d) Tuna (top predators, feed on predatory fish & invertebrates).