Flow of Matter & Energy Through Trophic Levels

9D Analyze the flow of matter and energy through different trophic levels and between organisms and the physical environment.

12E Investigate and explain the interactions in an ecosystem including food chains, food webs, and food pyramids.
Transfer of Materials and Energy in an Ecosystem

- Energy moves through an ecosystem in only one direction and then is lost.
- Materials are recycled through the ecosystem. (oxygen, carbon, nitrogen, water, and etc.)
- **Food chain** – shows one possible pathway for energy and materials through an ecosystem.
Transfer of Materials and Energy in an Ecosystem

- **Food web** – shows **many** pathways for energy and materials through an ecosystem.
Trophic level – is represented by each organism in a food chain.

10% rule – only 10% of the available energy in one trophic level is transferred to the next trophic level. The rest of the energy is lost as heat or used by each organism to carry on life processes.
**VOCABULARY**

- **Producer** – Makes its own **food**. (plants)
- **Consumer** – Must get its food from another **organisms**. (humans)
- **Autotroph** – **Producers**
- **Heterotroph** – **Consumers**
VOCABULARY

- **Biotic** – Is or was _**alive**_.
- **Abiotic** – was never alive. (rocks, dirt, air)
- **Herbivores** – Eats _**plants**_.
- **Carnivores** – Eats _**meat**_.
- **Omnivore** – Eats _**plants** and **meat**_.
- **Decomposers** – bacteria and fungi that break down _**dead**_ plants and animals.
Carrying Capacity

- Carrying capacity is the **size** of the population that can be maintained over a long period of time in an ecosystem.
- Carrying capacity is limited by **resources** such as food and water.
1. The diagram represents different levels of a marine food pyramid. Between which two levels is the greatest amount of energy transferred?

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B. S and R  
C. T and S  
D. U and T
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A. The direction of population migration
B. Differences in dietary habits
C. Progressively smaller organisms
D. The direction of energy flow
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B. The flow of necessary nutrients would be disrupted.
C. The ability of plants to complete photosynthesis would be increased.
D. The infiltration of water into the ground would be halted.
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7. About 10% of the energy at one trophic level is passed to the next level. What usually happens to the energy that is not passed to the next trophic level or used to carry out life processes?

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B. One pond with 300 producers and one snake
C. An 11,000 m³ lake with 75 fish and one alligator
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