**Topic II: Understanding the Biosphere and Energy Flow**

*Earth- I can explain how energy flows through the biosphere and how abiotic and biotic factors influence biodiversity and organisms at different trophic levels.*

**Ecology** is the study of the interactions between living organisms, including humans, and their environment; it seeks to understand the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between plants and animals and the world around them.

**In an Ecosystem**  *View – Ecology Intro Video (by teacher’s pet)*

Living things are affected by interactions between with other living organisms and non-living things co-existing in a specific area.  
  
 **Biotic** (living parts of the environment) –   
  
  **Abiotic**- (non-living parts of an environment) –   
 **Energy Flow through Ecosystems**

Every organism needs to obtain energy to live. For example, plants get energy from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, some animals eat plants, and some animals eat other animals.

Diagram

Description automatically generatedA food chain is a series of steps where organisms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by eating and being eaten.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Energy  \_\_\_\_\_\_\_\_\_\_ | P\_\_\_\_\_\_\_\_\_\_\_\_\_ | Herbivore Primary \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Predator and/or\_\_\_\_\_\_\_ Om\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Consumer | Predator C\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Tertiary  Consumer | D\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Direction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Moves**

**Energy flow in a Food Chain**

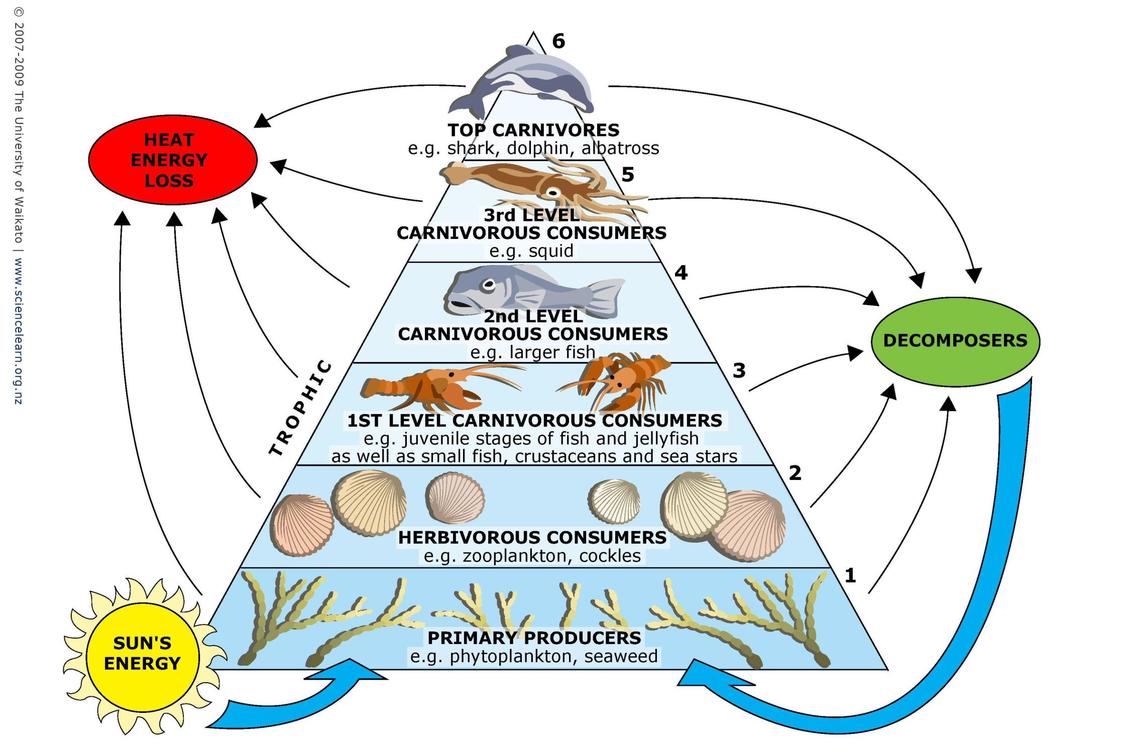
The food chain starts with the primary energy source, usually the \_\_\_\_\_\_\_\_\_\_\_\_.

The next step in the chain is an organism that makes its own food from an energy source. These kinds of organisms are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or autotrophs. In most ecosystems green plants and some kinds of single-celled living things make their own food (sugar) from sunlight through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  
  
Organisms that cannot make their own food and must eat producers or other living things are called  
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or heterotrophs.

When any organism dies, it is eventually eaten by **detritivores or scavengers**  (such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) and /or broken down by **decomposers**(mostly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_). These organisms break down  
 dead organic material to get the energy they need to grow and reproduce.

**Trophic Levels:** The trophic level of an organism is the position it holds in a food chain.

1. **Primary producers** -organisms that make their own food from sunlight are the base of every food chain
2. **Primary consumers** are animals that eat primary producers; they are also called  
     **herbivores** (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_).
3. **Secondary consumers** eat primary consumers.   
   They are **carnivores** (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (consumers that eat both animals and plants).
4. **Tertiary consumers** eat secondary consumers.
5. **Quaternary consumers** eat tertiary consumers. Like an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Food chains "end" with top predators, animals that have little or no natural enemies.   
   Like a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

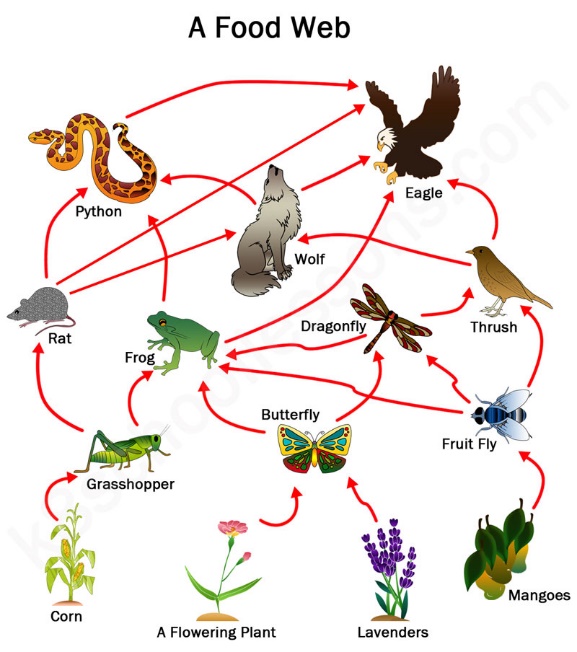
**Decomposers and Detritivores** feed on all dead organisms at each trophic level.

The arrows in a food chain show the flow of energy, from the sun to a top predator. As the energy flows from organism to organism, energy is \_\_\_\_\_\_\_\_\_\_\_at each step.

**Do card sort by trophic level!**

**View: How the Wolves Change Rivers:**[Video link](https://www.youtube.com/watch?v=ysa5OBhXz-Q)

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ weaves together two or more food chains within any given ecosystem. All organisms are connected to each other through their feeding relationships. So, if the population of one species is adversely affected this will affect the survival of other populations in that ecosystem.

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**Ecosystem Diversity:**  
In any food web, energy is lost each time one organism \_\_\_\_\_\_\_\_another. Because of this, there must be many more \_\_\_\_\_\_\_\_\_\_ than there are plant-eaters.

There are more producers than consumers, and more plant-eaters than meat-eaters.

Although there is intense competition between animals, there is also an interdependence. When \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ goes extinct, it can affect an entire food chain of other species and have unpredictable consequences.

* **Complete worksheets to review lesson concepts and terms!**