



Objectives

- ✿ Define ecology.
- ✿ Define and identify ecosystems, biotic factors and abiotic factors.
- ✿ Describe how energy flows through an environment.



Ecology

- ✿ **Ecology** is defined as the study of the interactions between organisms and the living and non-living components in its environment.
- ✿ Living components in an environment are called **biotic factors**.
- ✿ Non-living components in an environment are called **abiotic factors**.



Interdependence

- ✿ As we have already learned, organisms are dependent on each other, as well as their environment for survival.
- ✿ List the BIOTIC factors on which we depend...
- ✿ List the ABIOTIC factors on which we depend...



Ecological Organization

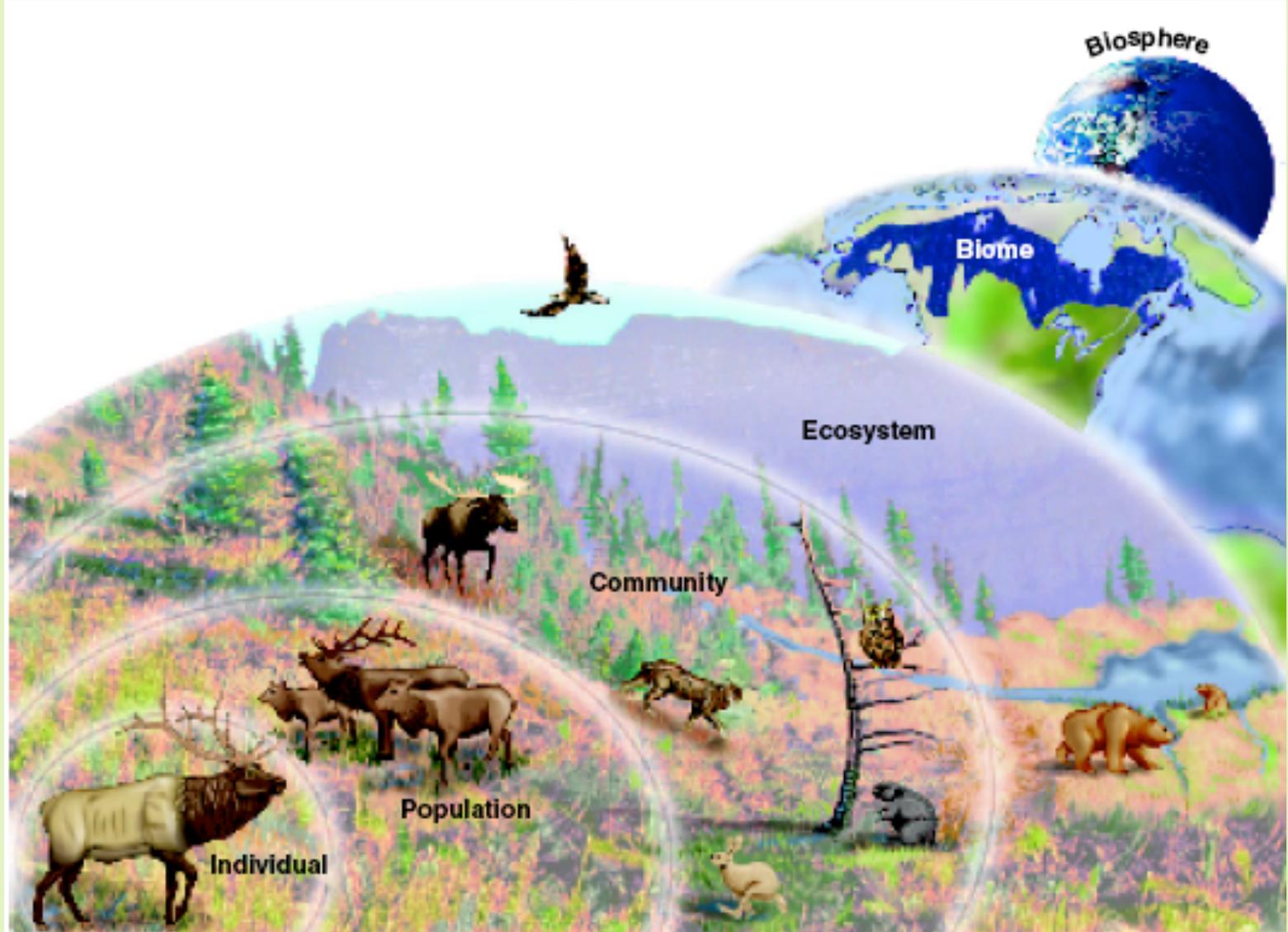
- ✿ The study of ecology starts with the **organism**, or individual.
- ✿ Many individuals of the same species in the same area is called a **population**.
- ✿ Multiple populations that share the same area for a **community**.



Ecological Organization (cont.)

- ✿ A community and the abiotic factors of an area is referred to as an **ecosystem**.
- ✿ Many ecosystems that share similar climate conditions and are within similar lines of longitude are called **biomes**.
- ✿ The entire span of “livable” space on the planet is called the biosphere.

Eco-Breakdown

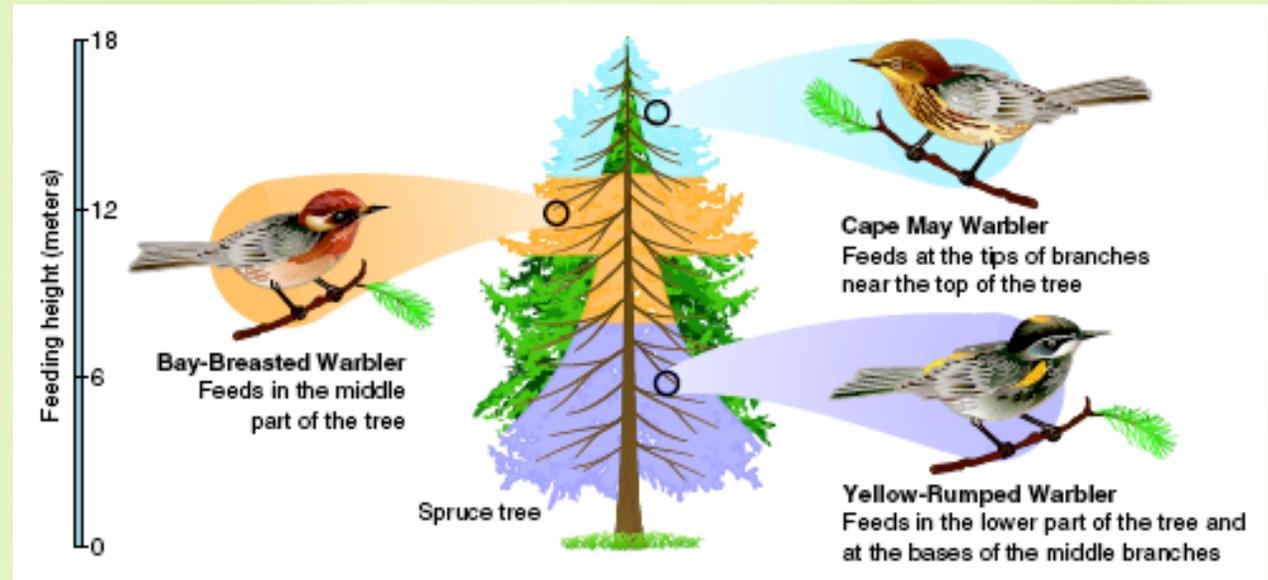




Habitat

- ✿ The **habitat** refers to the place where an organism lives.
- ✿ Most organisms require certain things to be present in their habitat in order to survive.
 - ✿ Food sources
 - ✿ Water
 - ✿ Shelter
 - ✿ Climate
 - ✿ etc.

Niche



- ❖ The combination of all of the biotic and abiotic factors that an organism uses in its habitat is called a **niche**.
- ❖ **Generalists** can adapt to many different niches.
- ❖ **Specialists** require very specific niches to survive.



Roleplay

- ✿ Every organism has a role to play in their environment.
 - ✿ **Autotrophs** (Producers) are organisms who are able to produce their own energy without directly depending on another organism (photosynthesis or chemosynthesis).
 - ✿ **Heterotrophs** (Consumers) are organisms that depend directly on autotrophs or other heterotrophs for energy.



Heterotrophs

✿ Heterotrophs can be divided into 3 categories:

- ✿ **Herbivores** are organisms that depend directly on plants for their energy.
- ✿ **Carnivores** are organisms that depend on other consumers for their energy.
- ✿ **Omnivores** are organisms that can get energy directly from both producers and consumers.

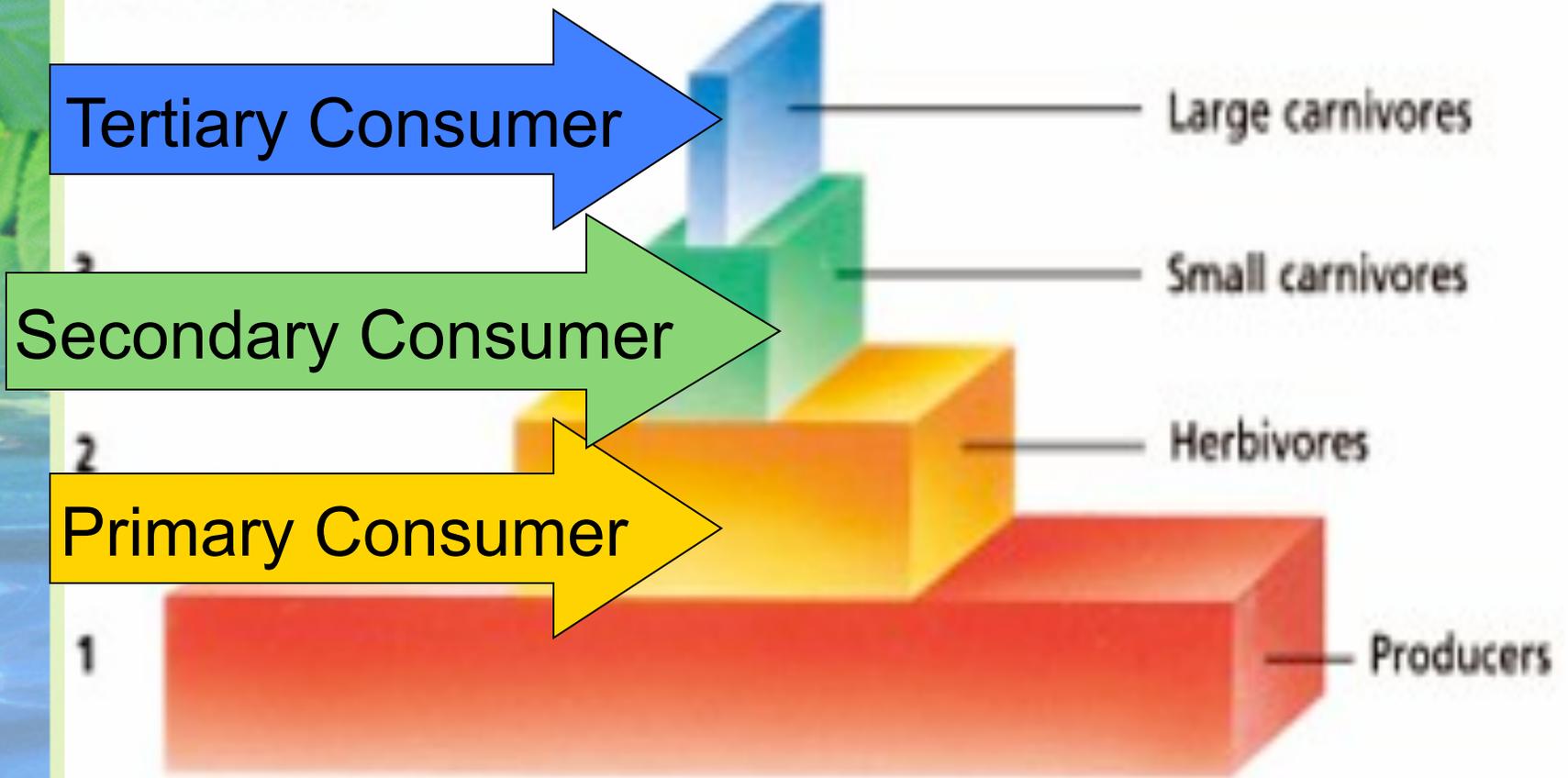


Trophic Levels

- ✿ When an organism consumes another organism, energy is exchanged.
- ✿ Some of that energy is useful energy (about 10%). The rest is wasted energy.
- ✿ Each time an organism consumes another it is called a **trophic level**.
- ✿ As we ascend trophic levels, the amount of original energy decreases.

Trophic Levels (cont.)

TROPHIC LEVELS

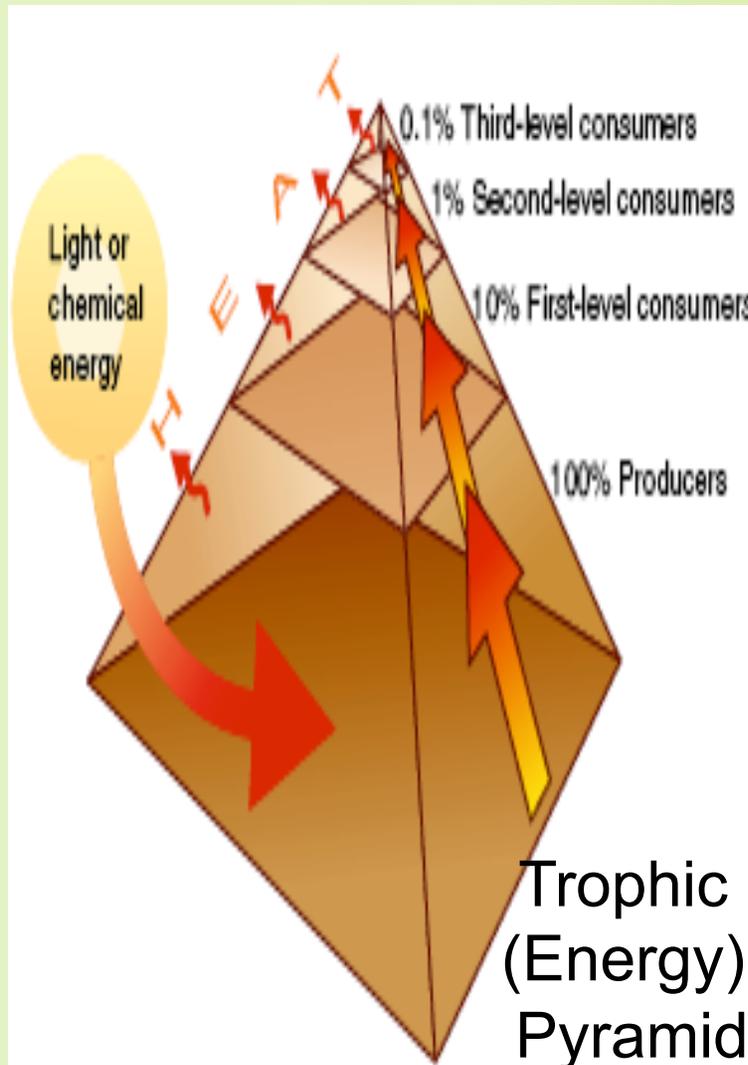




Energy vs. Matter

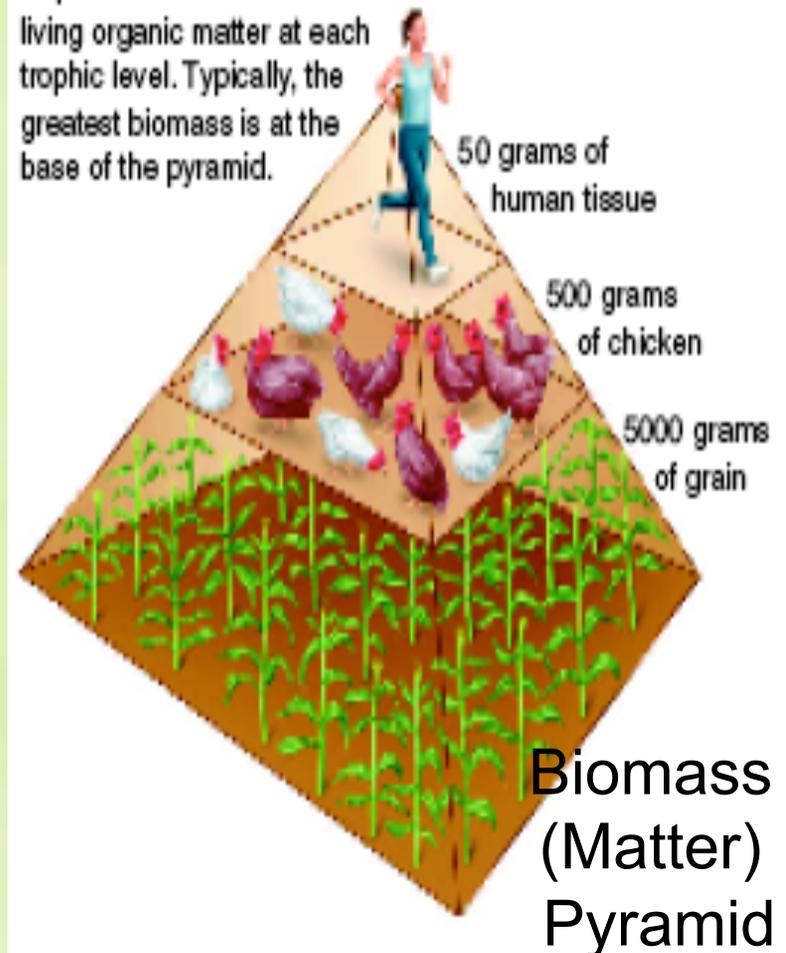
- ✿ Energy can only flow in one direction in an ecosystem.
- ✿ Matter, however, can flow in many directions.
- ✿ When organisms consume another organism, both matter and energy are transferred.
- ✿ The energy is used by the receiving organism, but the matter will be returned to the ecosystem through either death or waste.

Pyramid Diagrams



Biomass Pyramid

Represents the amount of living organic matter at each trophic level. Typically, the greatest biomass is at the base of the pyramid.

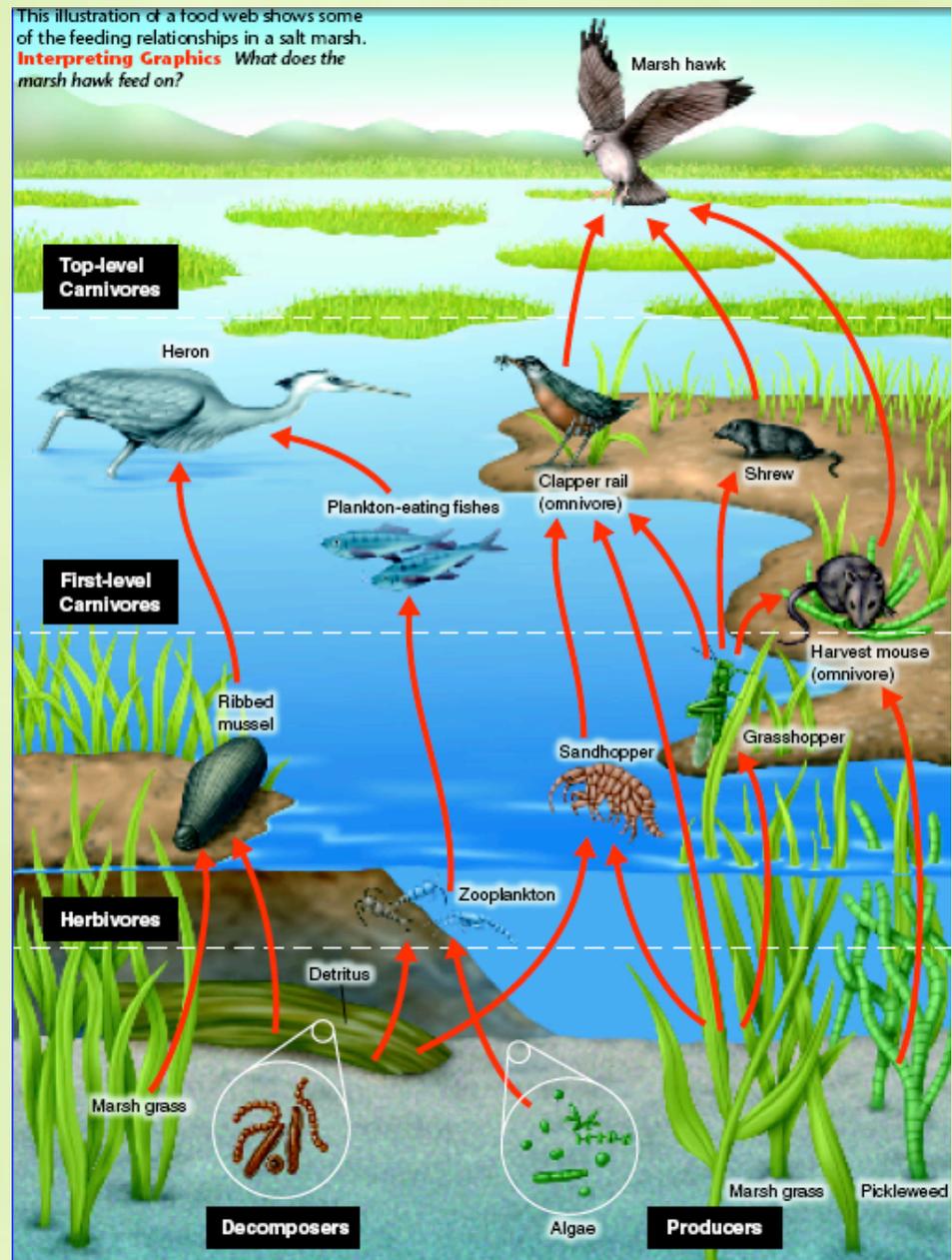




Food Chains & Food Webs

- ✿ Ecologists use **food chains** to show a single line of energy flow.
- ✿ Ecologists use **food webs** to show multiple lines of energy flow.
- ✿ Food webs are made up of multiple food chains.
- ✿ Arrows show the flow of energy (not which organism eats another.)

Food Webs



Food Web Practice





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