

Warm Up

- What process do plants use to make sugar?
- What is chemosynthesis?
- What is transpiration?

Check your answers:

- What process do plants use to make sugar?
 - photosynthesis
- What is chemosynthesis?
 - Organisms use inorganic substances to make sugar and oxygen
- What is transpiration?
 - What moves in through the roots and evaporates through the leaves into the air.



Ecology

{Living World



Studying Our Living Planet

- The **biosphere** consists of all life on Earth and all parts of the Earth in which life exists, including land, water, and the atmosphere.



These are the actual 7 Characteristics of all life: Write them down in your notebook.

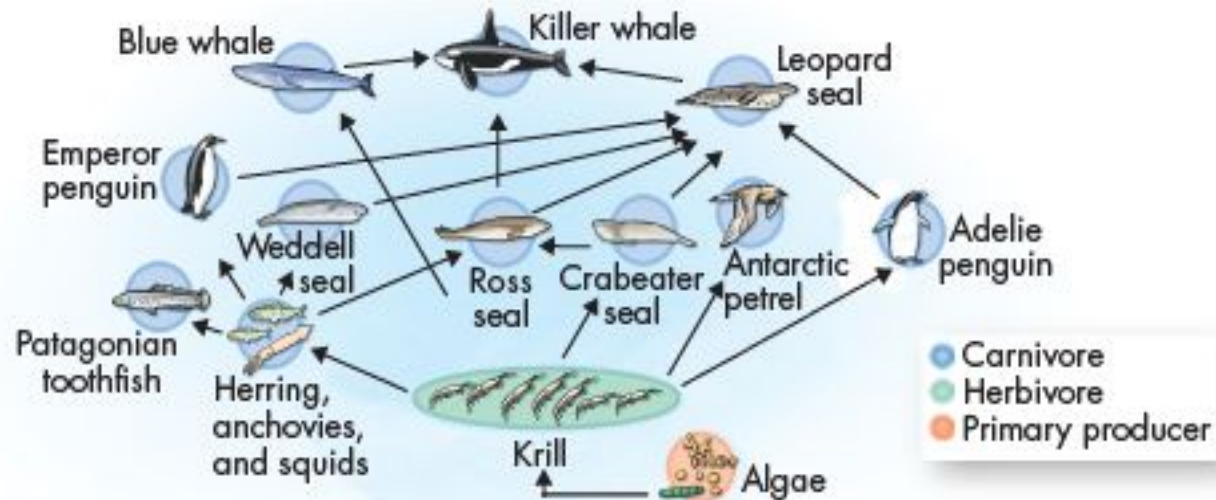
1. All living things are composed of cells
2. All living things have levels of organization
3. All living things use energy
4. All living things respond to their environment
5. All living things grow
6. All living things reproduce
7. All living things evolve and change over time

Warmup:

1. Which characteristics on your poster were missing or were not correct?
2. Why were yours wrong?

The Science of Ecology

- **Ecology** is the scientific study of interactions among and between organisms and their physical environment.
- Interactions within the biosphere produce a web of interdependence between organisms and the environments in which they live.



Levels of Organization

Levels of Organization

Galaxies > **Universe**

Solar Systems

Earth

Biosphere

Biomes

Ecosystems

Communities

Populations

Organisms

Organs

Tissues

Cells

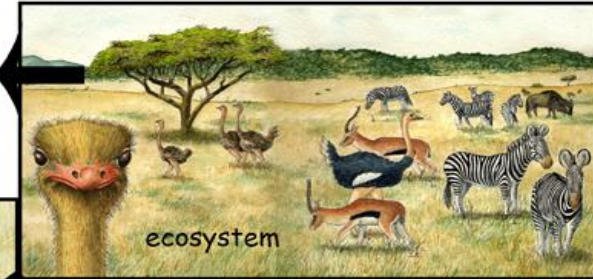
Protoplasm

Atoms > Molecules

Ecology
Organizing Living
Things in their
Environments

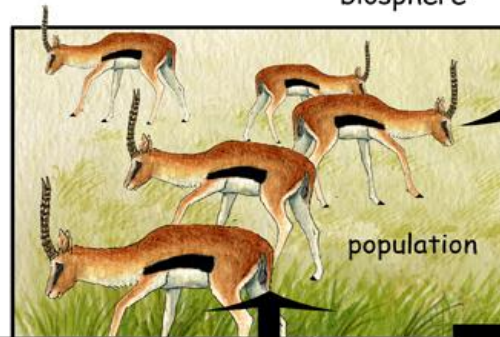


biosphere

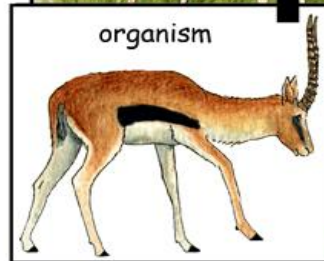


ecosystem

A **community** together with the non-living environment (air, water, etc.) is an **ecosystem**. All the ecosystems on Earth make up the **biosphere**.



population



organism

Individual living things are called **organisms**. Many organisms of one species living in one area is called a **population**. Many different populations living in one area is a **community**.



community

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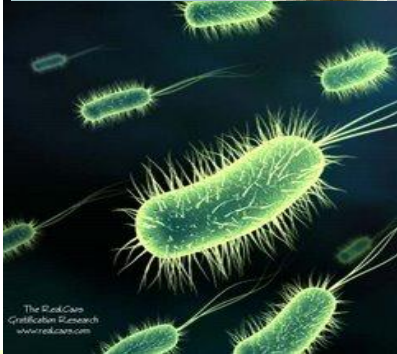
Levels of Organization

- **Population**—a group of individuals that belong to the same species and live in the same area



Levels of Organization

Community—an assemblage of different populations that live together in a defined area



Levels of Organization

- **Biome**—a group of ecosystems that share similar climates and typical organisms



Levels of Organization

- **Biosphere**—our entire planet, with all its organisms and physical environments

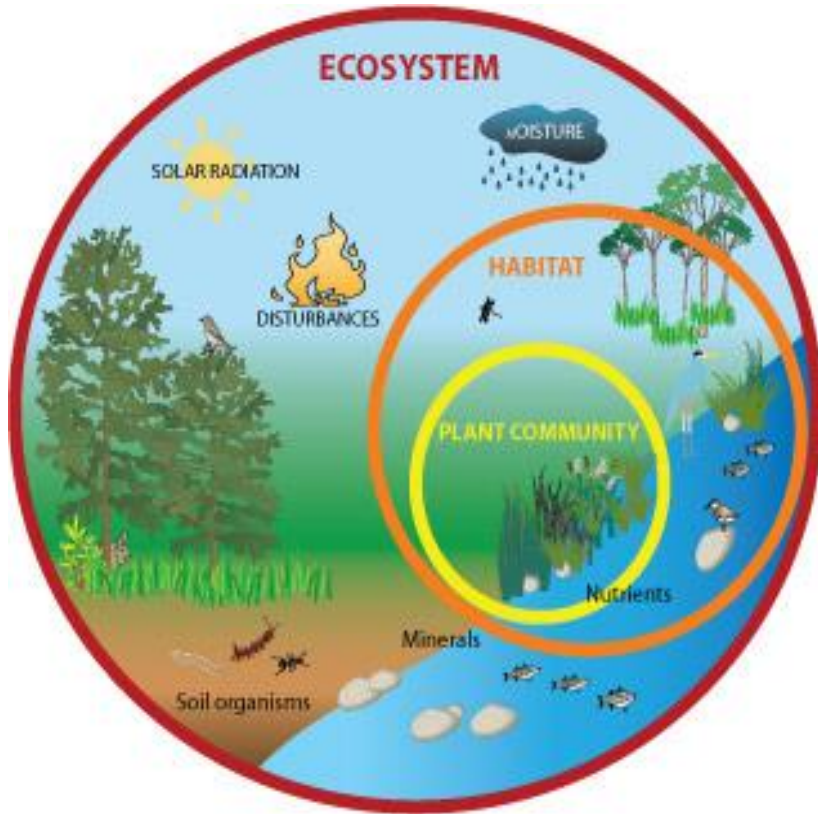


Ecology is:

- A) the study of environmental pollution and overpopulation.
- B) the study of relationships between organisms and their environment.
- C) the attempt to control environmental pollution and overpopulation.
- D) another name for the science of biology.

Ecosystems

- The biosphere's systems are called **ECOSYSTEMS**.



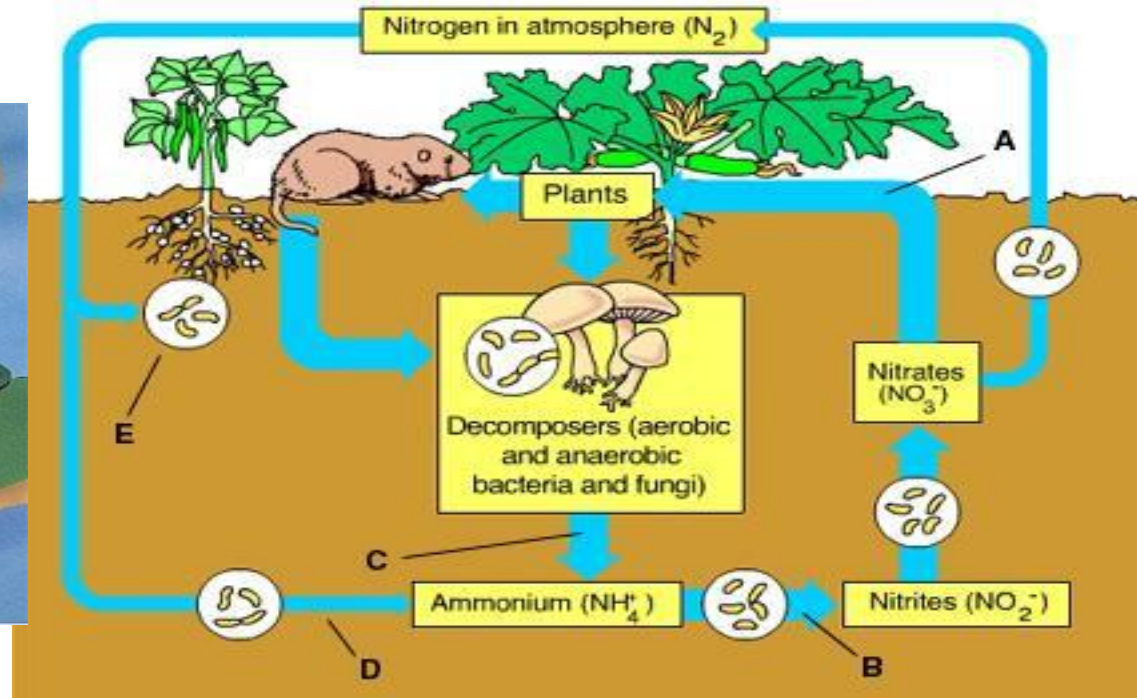
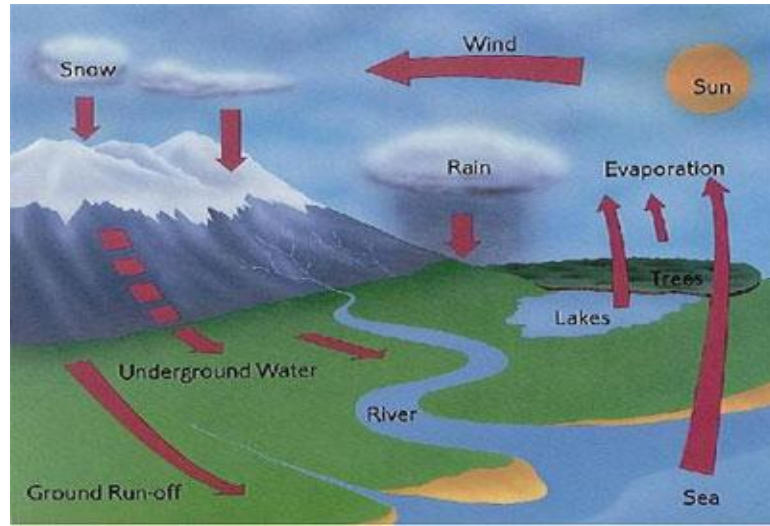
Levels of Organization

- **Ecosystem**—all the organisms that live in a place, together with their physical environment



Ecosystems

- All ecosystems must have a constant source of energy (usually the sun) and cycles or systems to reuse raw materials. Examples are the water, nitrogen and carbon cycles.



What is a population?

- A) A group of individuals of the same species that live in the same ecosystem
- B) All the abiotic parts of the environment
- C) The total number of different species in any one area
- D) Air, water, soil, or climate

Biotic and Abiotic Factors

- The biological (living) influences on organisms are called biotic factors.
- Physical (nonliving) components of an ecosystem are called abiotic factors.

Biotic Factors

- A **biotic factor** is any living part of the environment with which an organism might interact, including animals, plants, mushrooms and bacteria.



Abiotic Factors

- An **abiotic factor** is any nonliving part of the environment, such as sunlight, heat, precipitation, humidity, wind or water currents, soil type, etc.



Each of the following is an abiotic factor in the environment EXCEPT

- A) plant life.
- B) soil type.
- C) rainfall.
- D) temperature.

Which is a biotic factor that affects the size of a population in a specific ecosystem?

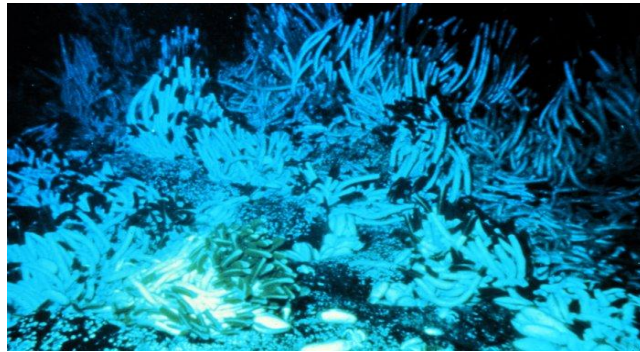
- A) average temperature of the ecosystem
- B) type of soil in the ecosystem
- C) number and kinds of predators in the ecosystem
- D) concentration of oxygen in the ecosystem

Primary Producers

- For most life on Earth, sunlight is the ultimate energy source.



- For some organisms, however, chemical energy stored in inorganic chemical compounds serves as the ultimate energy source for life processes.



Primary Producers

- Plants, algae, and certain bacteria can capture energy from sunlight or chemicals and convert it into forms that living cells can use.
- These organisms are called **autotrophs**.



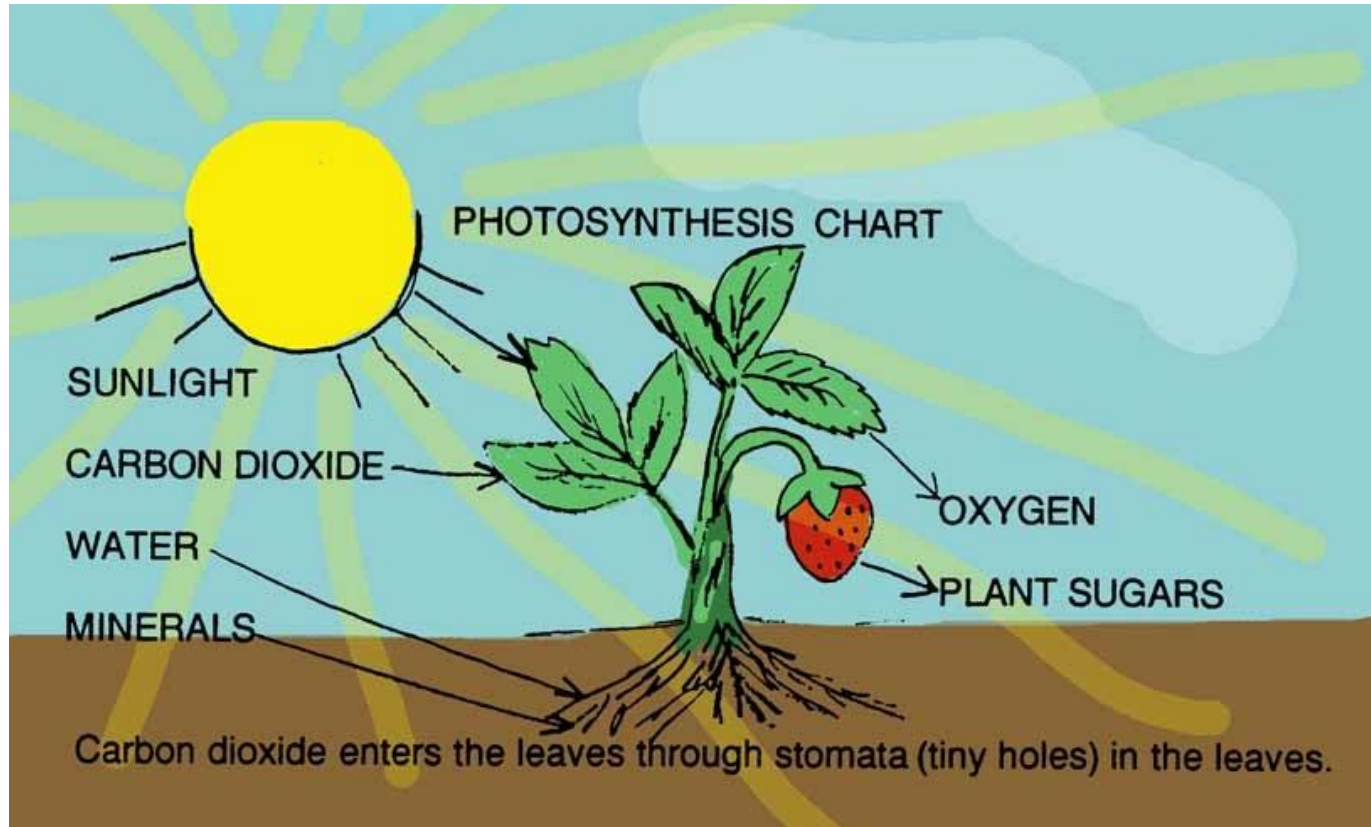
Primary Producers

- Autotrophs are also called **primary producers**.
- Primary producers harness solar energy through the process of photosynthesis.

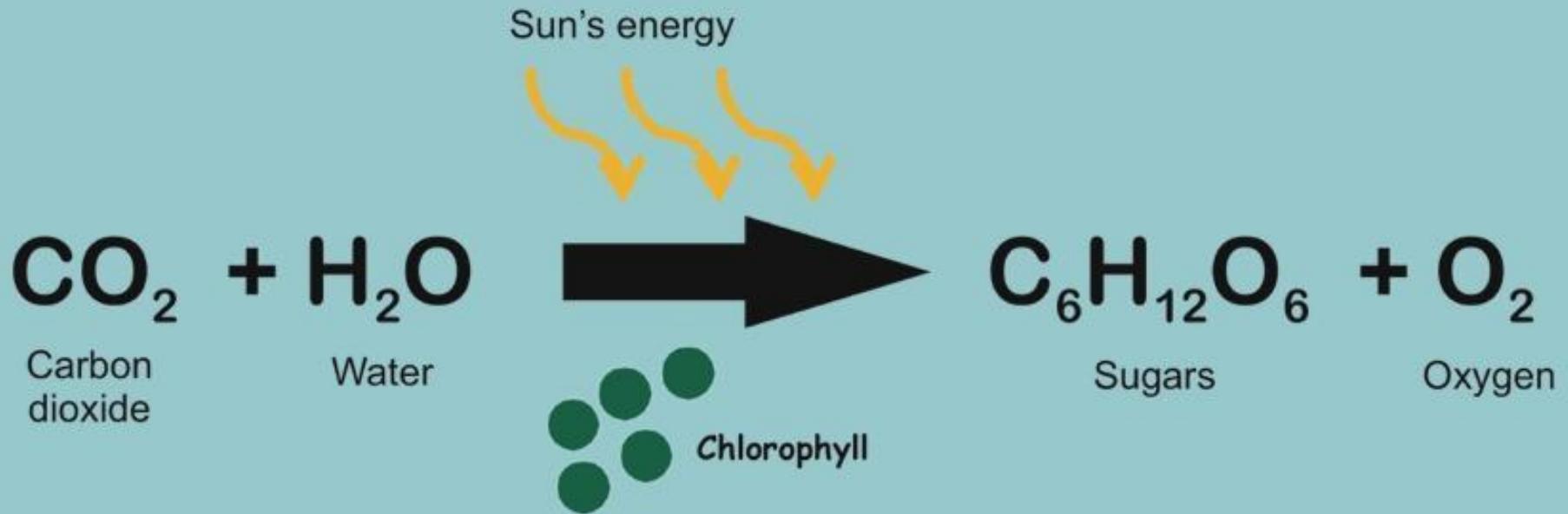


Primary Producers

The best-known and most common primary producers harness solar energy through the process of **photosynthesis**.



Photosynthesis Equation

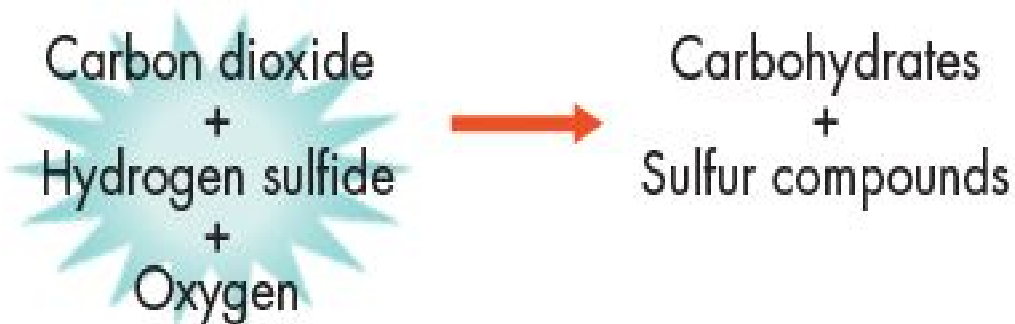


Life Without Light

- Deep-sea ecosystems depend on primary producers that harness chemical energy from inorganic molecules such as hydrogen sulfide.
- The use of chemical energy to produce carbohydrates is called **chemosynthesis**.

Chemosynthesis

Chemical Energy



Consumers

- Organisms that must acquire energy from other organisms by ingesting in some way are known as **heterotrophs**.
- Heterotrophs are also called **consumers**.



Types of Consumers

Carnivores kill and eat other animals.

What are other carnivores?



Types of Consumers



Scavengers, like a king vulture, are animals that consume the carcasses of other animals that have been killed by predators or have died of other causes.

What are other types of scavengers?

Types of Consumers

- **Decomposers**, such as bacteria and fungi, feed by chemically breaking down organic matter. The decay caused by decomposers is part of the process that produces detritus—small pieces of dead and decaying plant and animal remains.



Types of Consumers

- **Herbivores** obtain energy and nutrients by eating plant leaves, roots, seeds, or fruits.
- Common herbivores include cows, caterpillars, and deer.



Types of Consumers

- **Omnivores** are animals whose diets naturally include a variety of different foods that usually include both plants and animals. Humans, bears, and pigs are omnivores.



Types of Consumers

- **Detritivores**, like giant earthworms, feed on detritus particles (broken down organic material), often chewing or grinding them into smaller pieces.
- Detritivores commonly digest decomposers that live on, and in, detritus particles.



a(an)

- A) grass plant in a lawn.
- B) chicken raised on a farm.
- C) farmer who raises corn.
- D) earthworm in a cornfield.

How do most primary producers make their own food?

- A) By using light energy to make carbohydrates
- B) By using chemical energy to make carbohydrates
- C) By changing water into carbon dioxide
- D) By breaking down remains to make carbon dioxide

A bird stalks, kills, and then eats an insect. Based on its behavior, which pair of ecological terms describes the bird?

- A) herbivore, decomposer
- B) producer, heterotroph
- C) carnivore, consumer
- D) autotroph, herbivore

A word that means the same thing as *consumer* is

A) producer.

B) autotroph.

C) heterotroph.

D) carbohydrate.

Food Chain

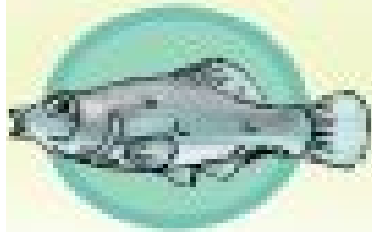
What is being eaten



Herbivore



Carnivore



Flagfish



Largemouth bass



Anhinga

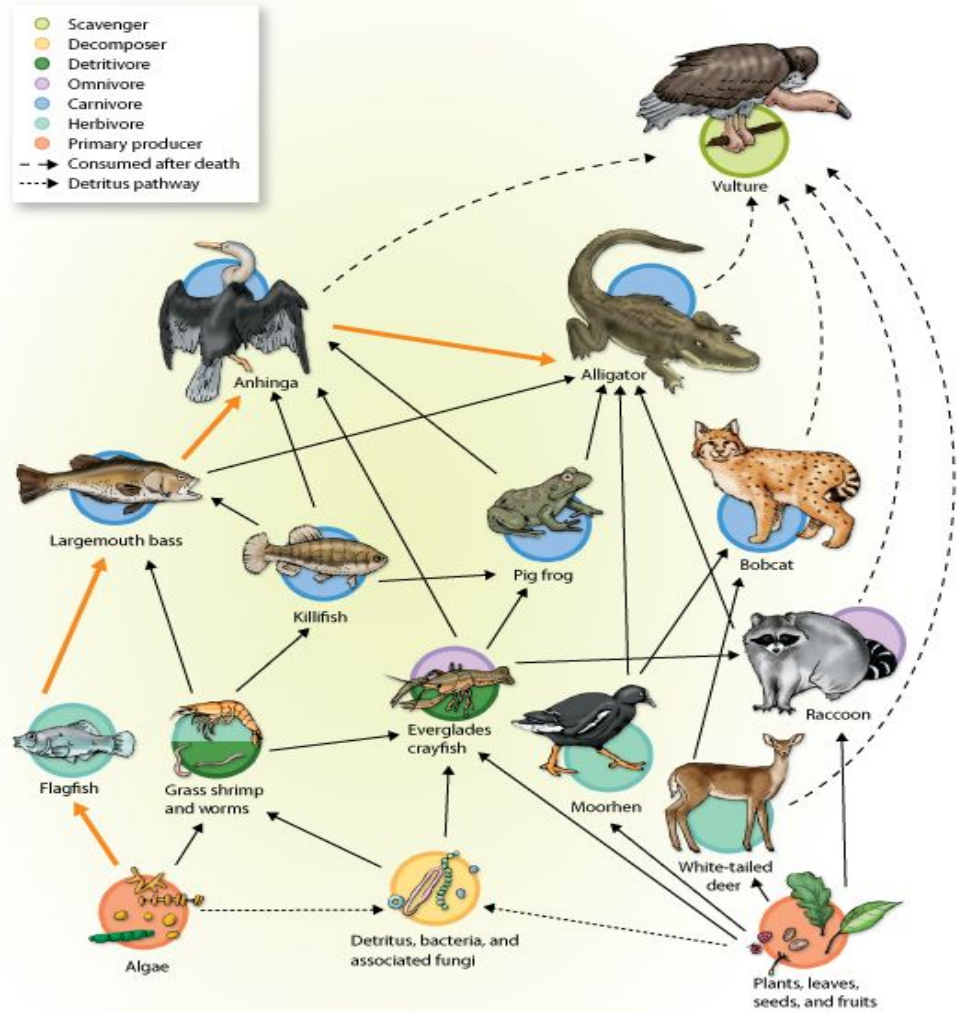
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Food Chains

- Energy flows through an ecosystem in a one-way stream, from primary producers to various consumers.
- Notice that arrows depict energy flow.

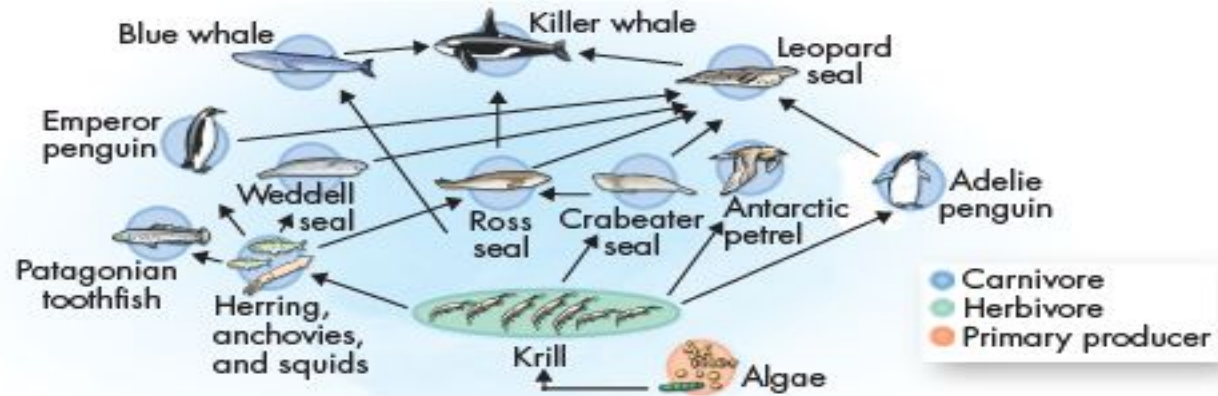


• Food Web



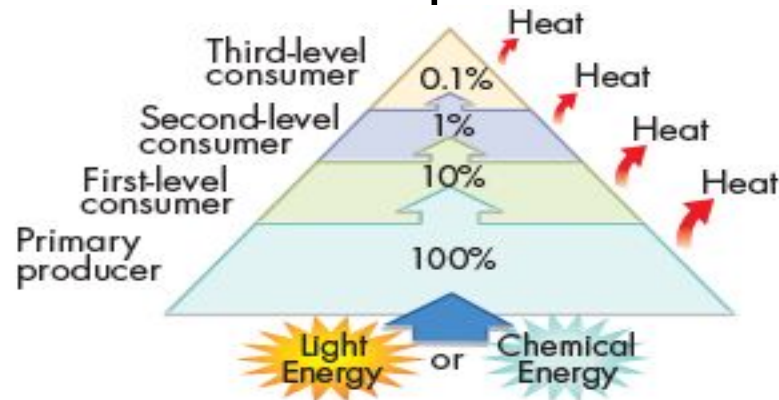
Food Webs and Disturbances

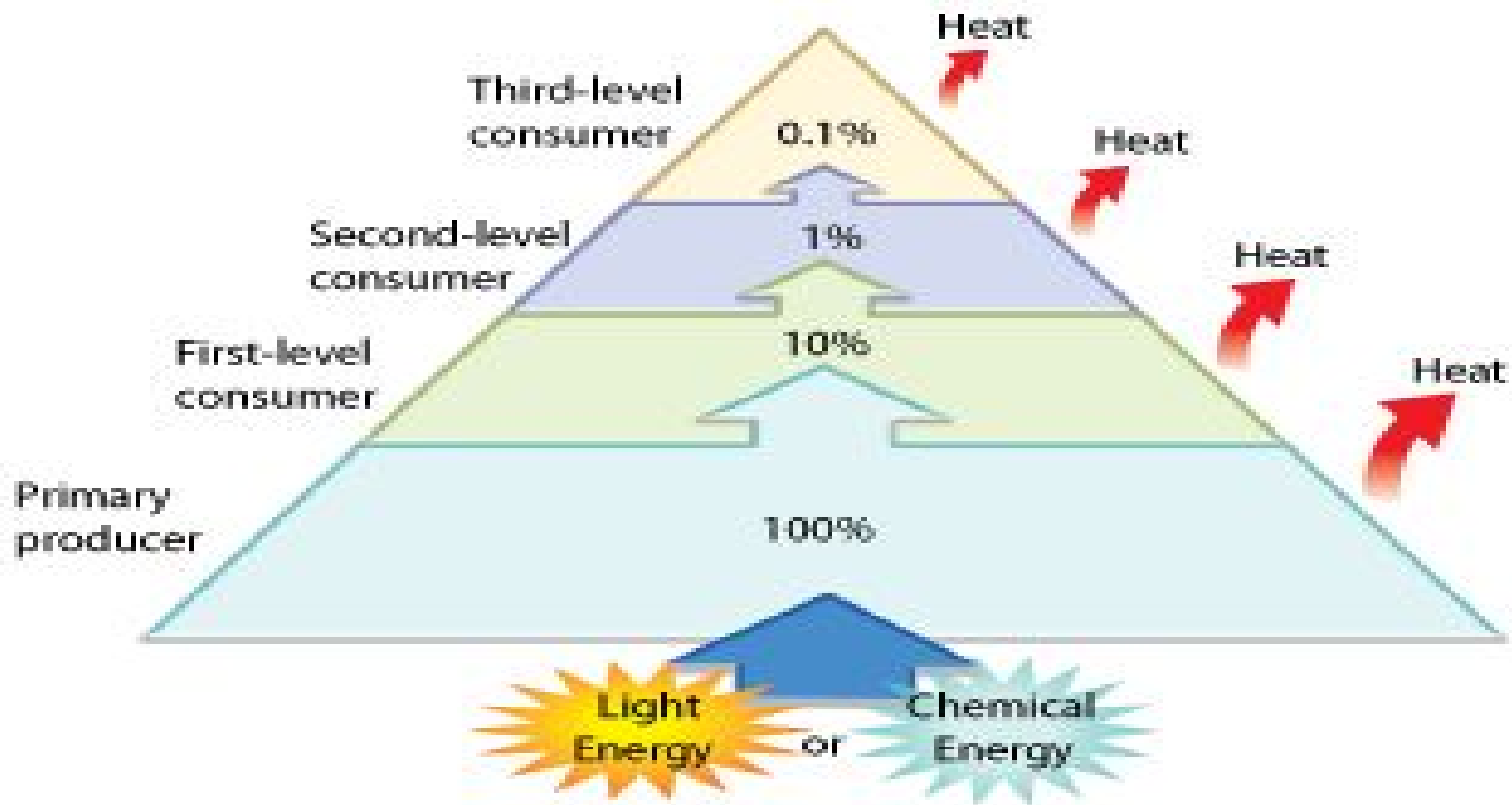
- When disturbances to food webs happen, their effects can be dramatic.
- Given the structure of this food web, a drop in the krill population can cause drops in the populations of all other members of the food web shown.



Trophic Levels and Ecological Pyramids

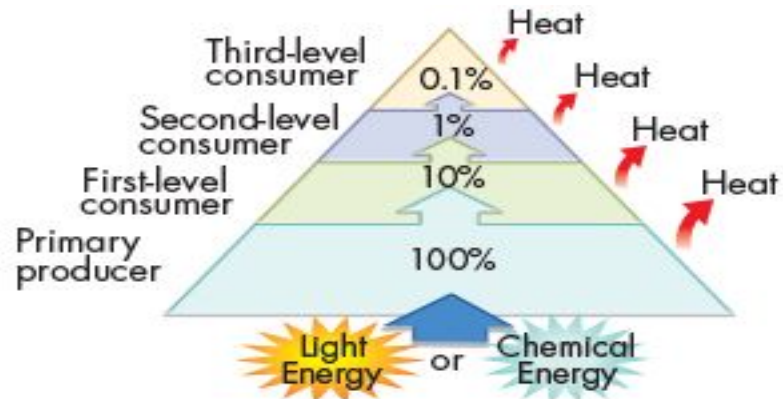
- Each step in a food chain or food web is called a **trophic level**.
- Primary producers always make up the first trophic level.
- Various consumers occupy every other level. Some examples are shown.





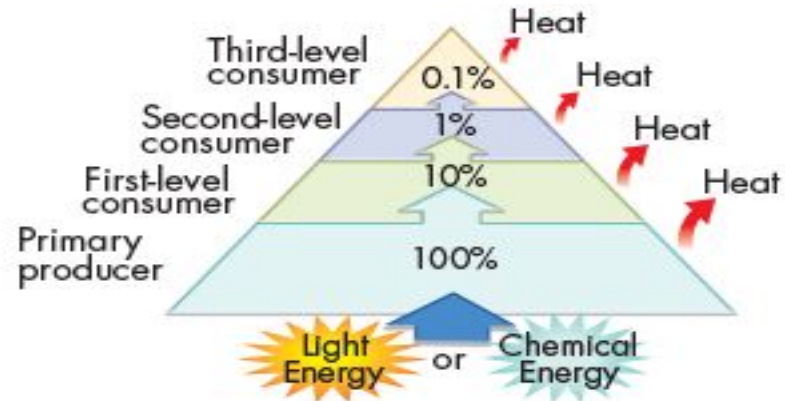
Pyramids of Energy

- Organisms expend much of the energy they acquire on life processes, such as respiration, movement, growth, and reproduction.
- Most of the remaining energy is released into the environment as heat—a byproduct of these activities.



Pyramids of Energy

- On average, about 10 percent of the energy available within one trophic level is transferred to the next trophic level.



Pyramids of Biomass and Numbers

- The total amount of living tissue within a given trophic level is called its **biomass**.
- The amount of biomass a given trophic level can support is determined, in part, by the amount of energy available.



Only 10 percent of the energy stored in an organism can be passed on to the next trophic level. Of the remaining energy, some is used for the organism's life processes, and the rest is

- A) used in reproduction.
- B) stored as body tissue.
- C) stored as fat.
- D) eliminated as heat.

Most of the energy that supports life on Earth comes from

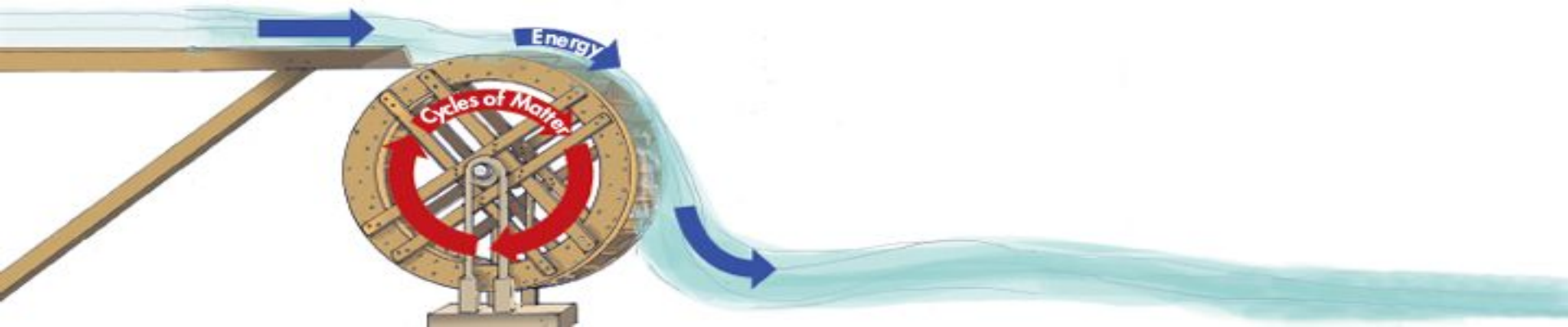
- A) animals.
- B) protein.
- C) chemicals.
- D) sunlight.

What is at the base of all ecological pyramids?

- A) consumers
- B) decomposers
- C) producers
- D) scavengers

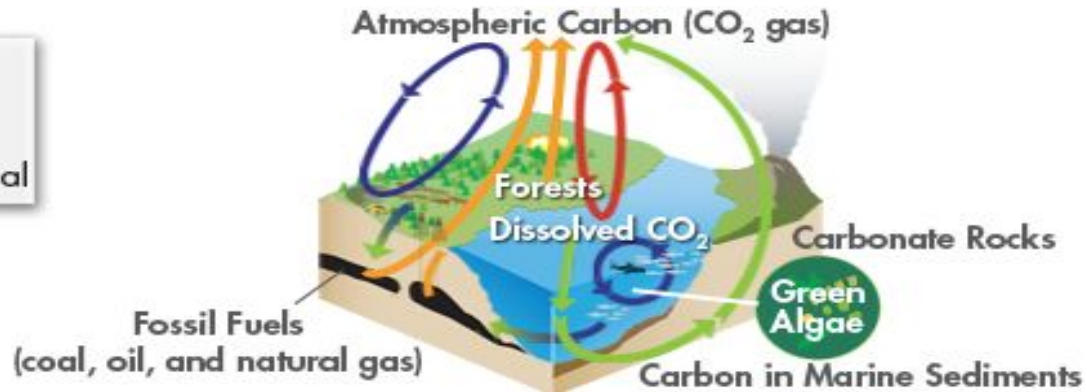
Recycling in the Biosphere

- Unlike the one-way flow of energy, matter is recycled within and between ecosystems.



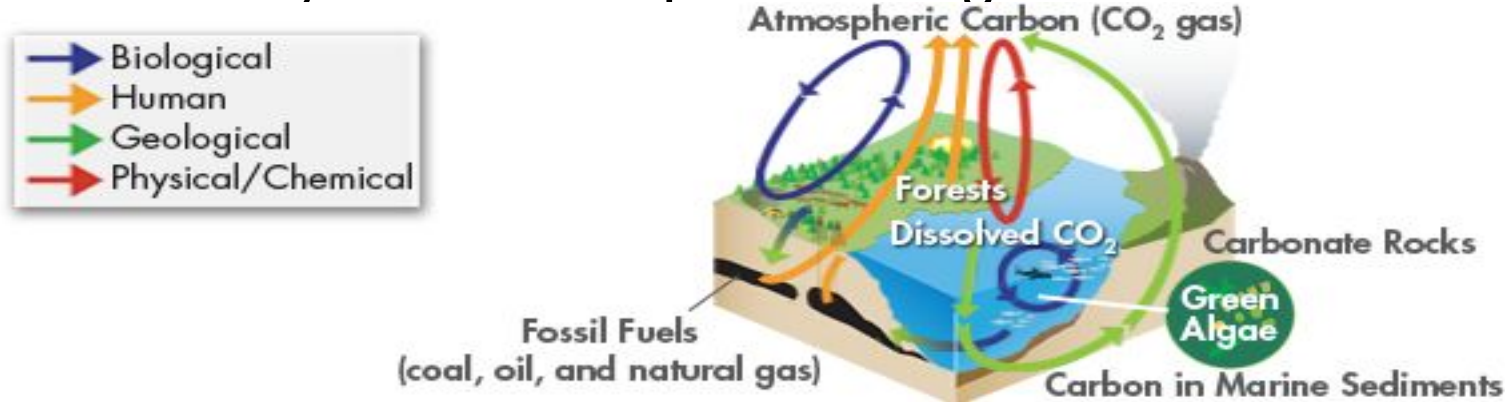
Carbon Cycle

- Carbon is a major component of all organic compounds, including carbohydrates, lipids, proteins, and nucleic acids.



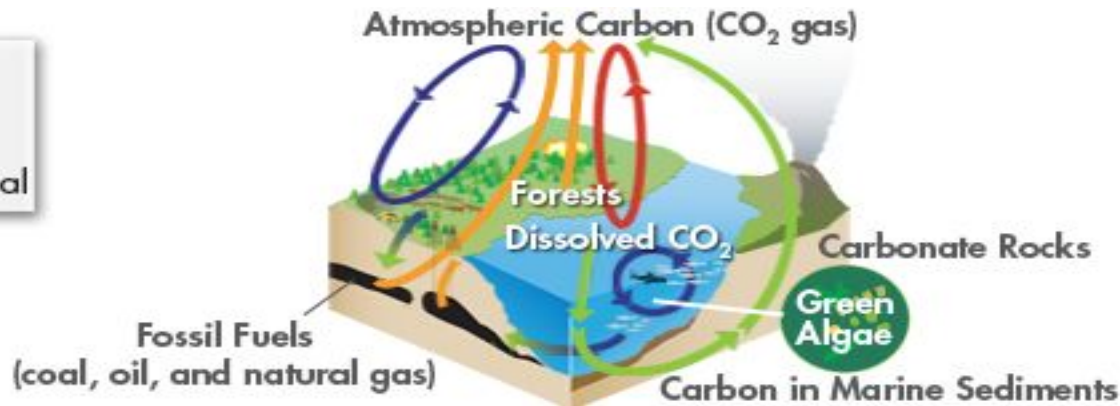
Carbon Cycle

- Carbon dioxide is continually exchanged through chemical and physical processes between the atmosphere and oceans.
- Plants take in carbon dioxide during photosynthesis and use the carbon to build carbohydrates.
- Carbohydrates then pass through food webs to consumers.



Carbon Cycle

- Organisms release carbon in the form of carbon dioxide gas by respiration.
- Geologic forces can turn accumulated carbon into carbon-containing rocks or fossil fuels.



Carbon Cycle

- Carbon dioxide is released into the atmosphere by volcanic activity or by human activities, such as the burning of fossil fuels and the clearing and burning of forests.

