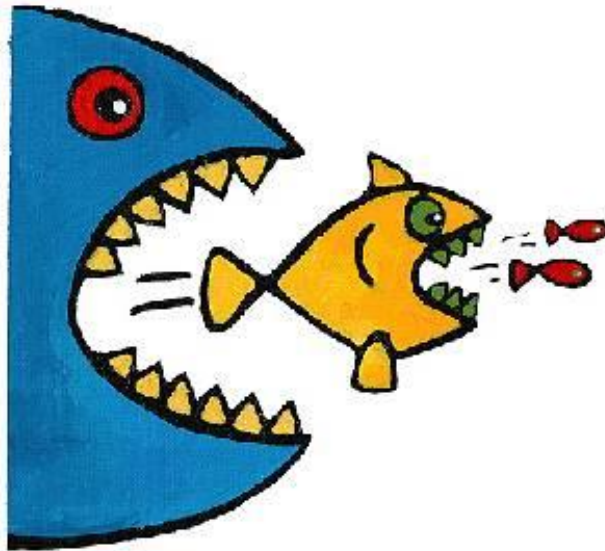


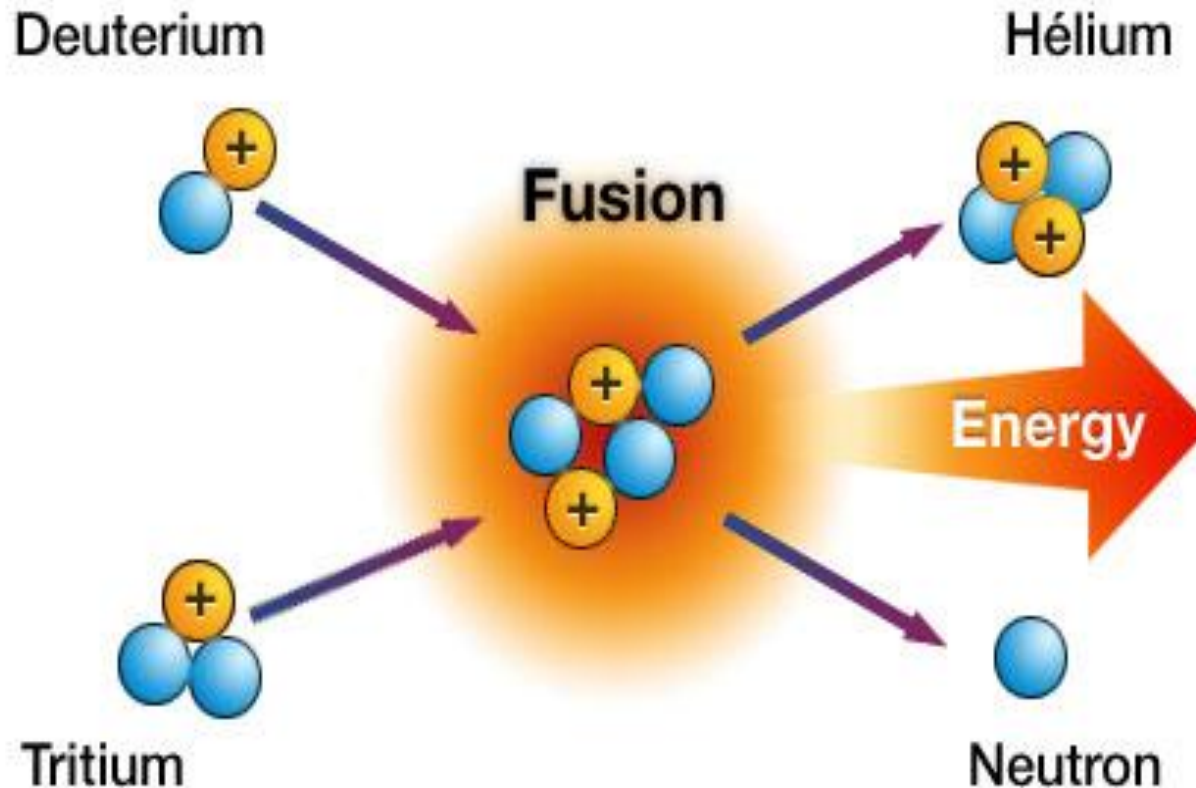
Ecological Communities



Section 3: Ecological Communities

- Explain the difference between producer and consumer.
- Explain the effect of inefficient energy transfer on community structure.
- **TERMS:** primary producer, photosynthesis, consumer, cellular respiration, herbivore, carnivore, omnivore, detritivore, decomposer, trophic level, food chain, biomass, food web, keystone species.

Life Depends on ENERGY, LOTS OF ENERGY...from the Sun



- Average Star
- 93 million miles away
- Nuclear Fusion
- No Sun, No Life

Life Depends on the Sun



ALL
organisms
need a
constant
supply of
energy or
they die

Why do
plants grow
upwards?

Life Depends on the Sun



Mmmm, solar energy tastes good!



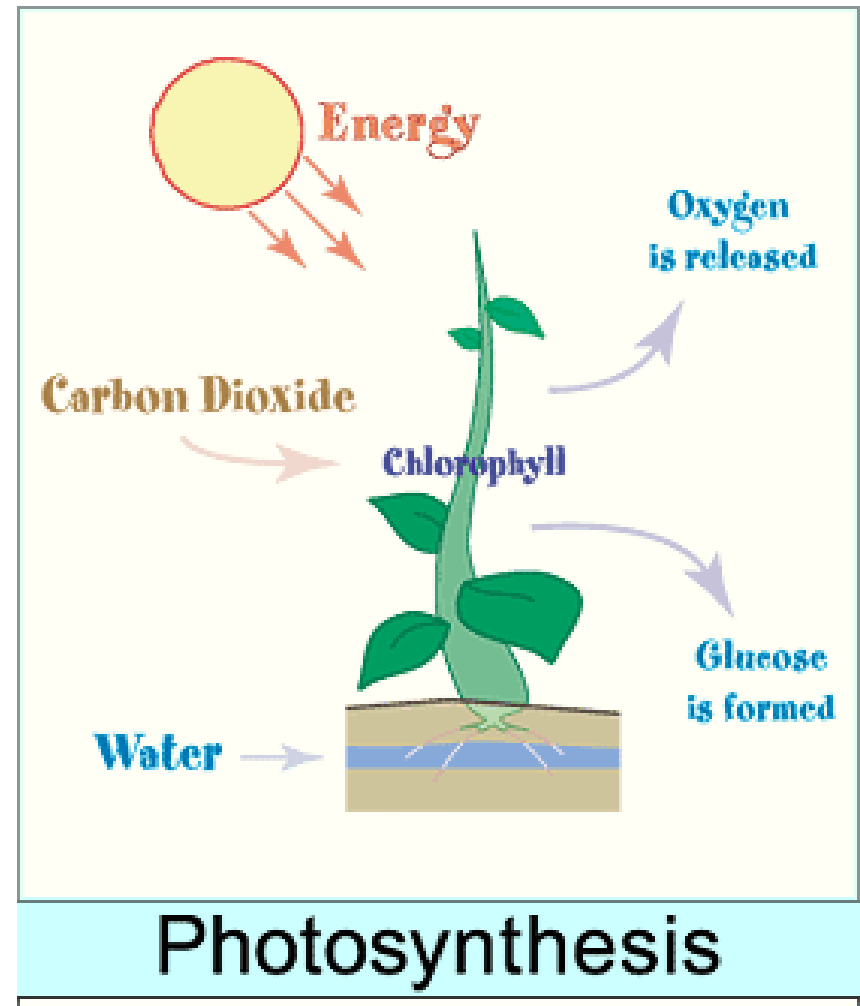
- The ultimate source of almost all energy for organisms is the SUN.
- What did you eat?
- Only some deep sea creatures do not get energy from sun

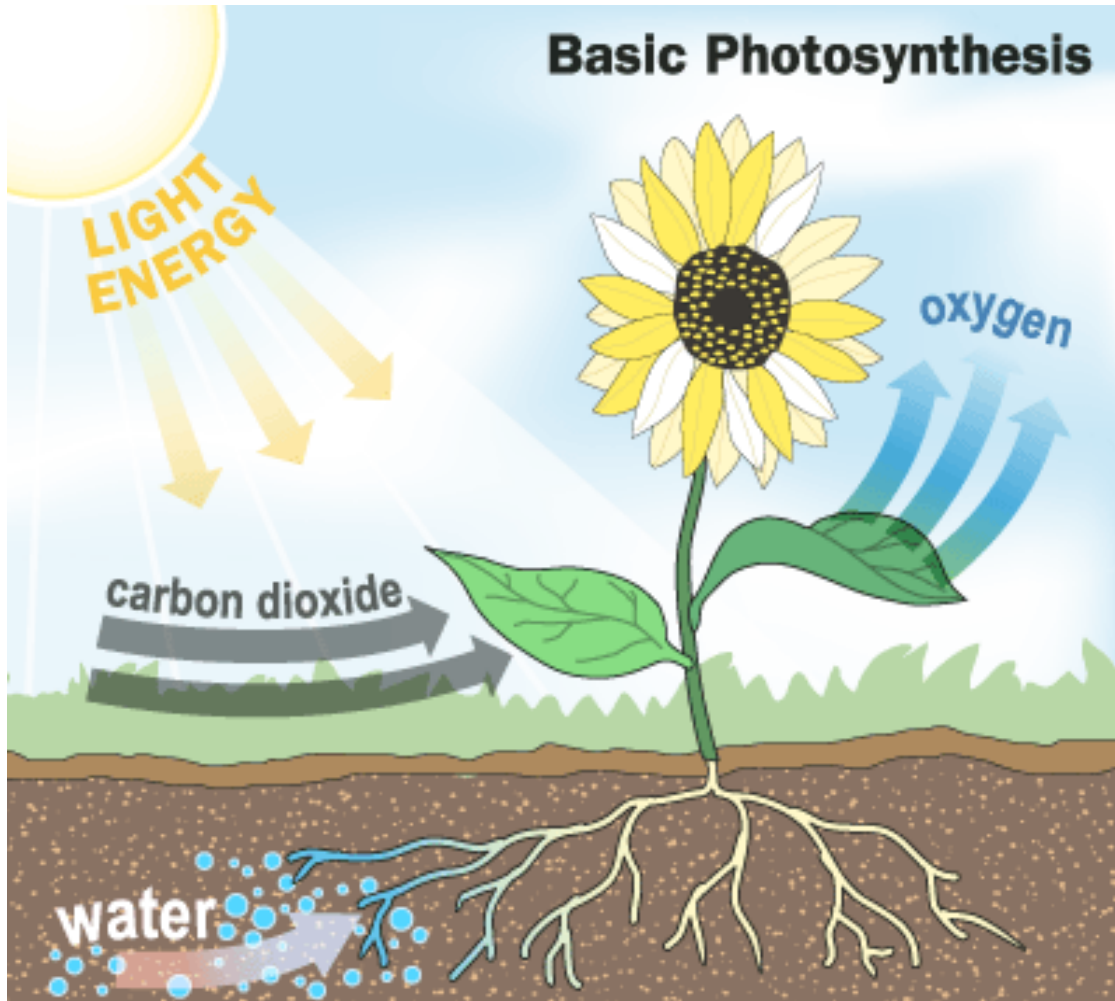
Energy from the Sun

■ Photosynthesis:
plants (primary
producers) use the
sun's energy, water
and CO₂, to make
energy.

■ Base of ALL food chains

■ Opposite of cellular respiration

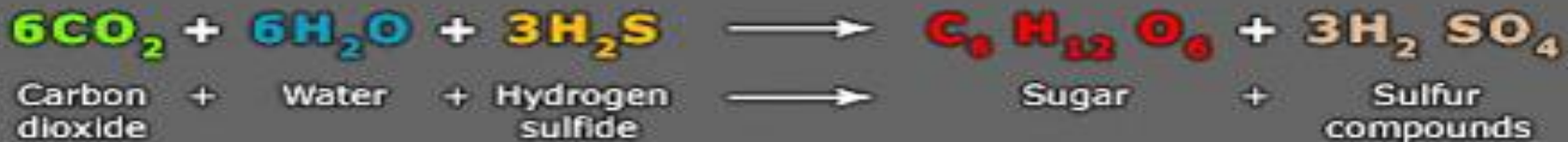
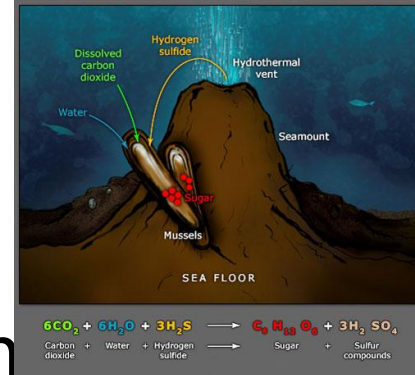




Almost all organisms depend either directly or indirectly on photosynthesis

Energy from Chemicals

- Not all communities powered by sun's energy
 - Ex: ocean floor
- Deep sea vents completely lack sunlight
- Primary producers use energy stored in bonds of hydrogen sulfide (H₂S) to convert carbon dioxide and water into sugars = chemosynthesis



Chemosynthesis- the use of energy released by inorganic chemical reactions to produce food.



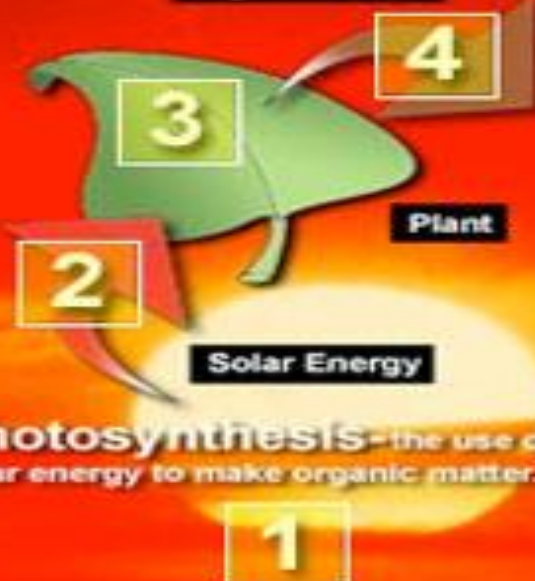
Hot water gushing from hydrothermal vents is saturated with dissolved chemicals.

Bacteria absorb hydrogen sulfide and carbon dioxide from vent water and oxygen from seawater.

The bacteria use energy released by oxidizing sulfur to make organic molecules.

The bacteria grow and reproduce, and are eaten or hosted as internal symbionts by other animals.

Organic Matter



Photosynthesis-the use of solar energy to make organic matter.

The sun gives off energy in the form of light.

Plants absorb sunlight, and take up water from the soil and carbon dioxide from the air.

The plants use solar energy to make organic molecules.

The plants grow and reproduce, and are eaten or hosted as internal symbionts by animals.

Chemosynthesis vs. Photosynthesis

Similarities

- Use water and carbon dioxide
- Produce sugar
- Make use of energy via the process of cellular respiration

Differences

- Different energy sources (sun versus energy in chemical bonds)
- Photosynthesis → only in chlorophyllated organisms, oxygen is formed as a byproduct
- Chemosynthesis → doesn't require solar energy, no pigment systems needed, energy released by oxidation of inorganic molecule. Then stored in organic

From Producer to Consumer

- Producer: an organism that makes its own food
- Plants
- Autotrophs, self-feeders
- Use sunlight
- Base of all food chains



From Producer to Consumer



- Consumer: gets its energy by eating producers or other consumers

- **Heterotrophs**

- Indirectly solar powered

Types of Consumers

- Herbivore: eats only producers (vegetarian)
- Cows, sheep, deer, grasshopper, mice, rabbits



Types of Consumers

- Carnivore: eats other consumers
- Lion, hawks, snakes, alligator, whales



Types of Consumers

- Omnivore: eats both producers and consumers
- Bears, pigs, raccoons and most humans

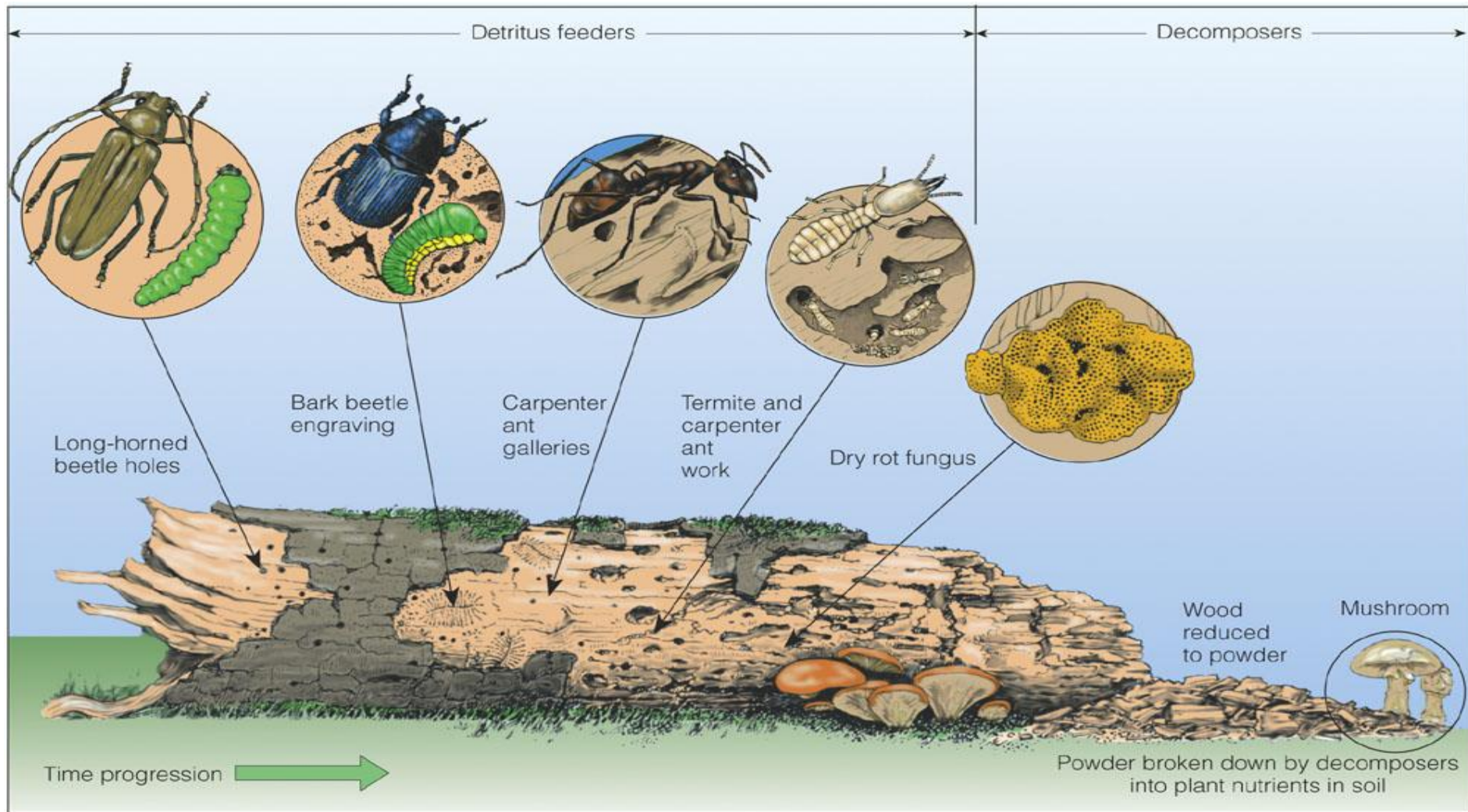


Types of Consumers

- Decomposer: breaks down dead decaying organisms
- Critical to ecosystem health
- Returns nutrients
- Fungus, bacteria



Detritivores and decomposers: recycle nutrients within the ecosystem by breaking down nonliving organic matter



How do Organisms Use Energy



Most organisms spend large amounts of time/energy in search of food and a mate.



How do Organisms Use Energy

- Cellular Respiration:
process of breaking
down food to yield
energy
- Gives energy to walk, read, grow, think, run, fight diseases
- Excess stored as fat

Cellular Respiration

cell food + oxygen → energy + carbon dioxide

Cellular Respiration

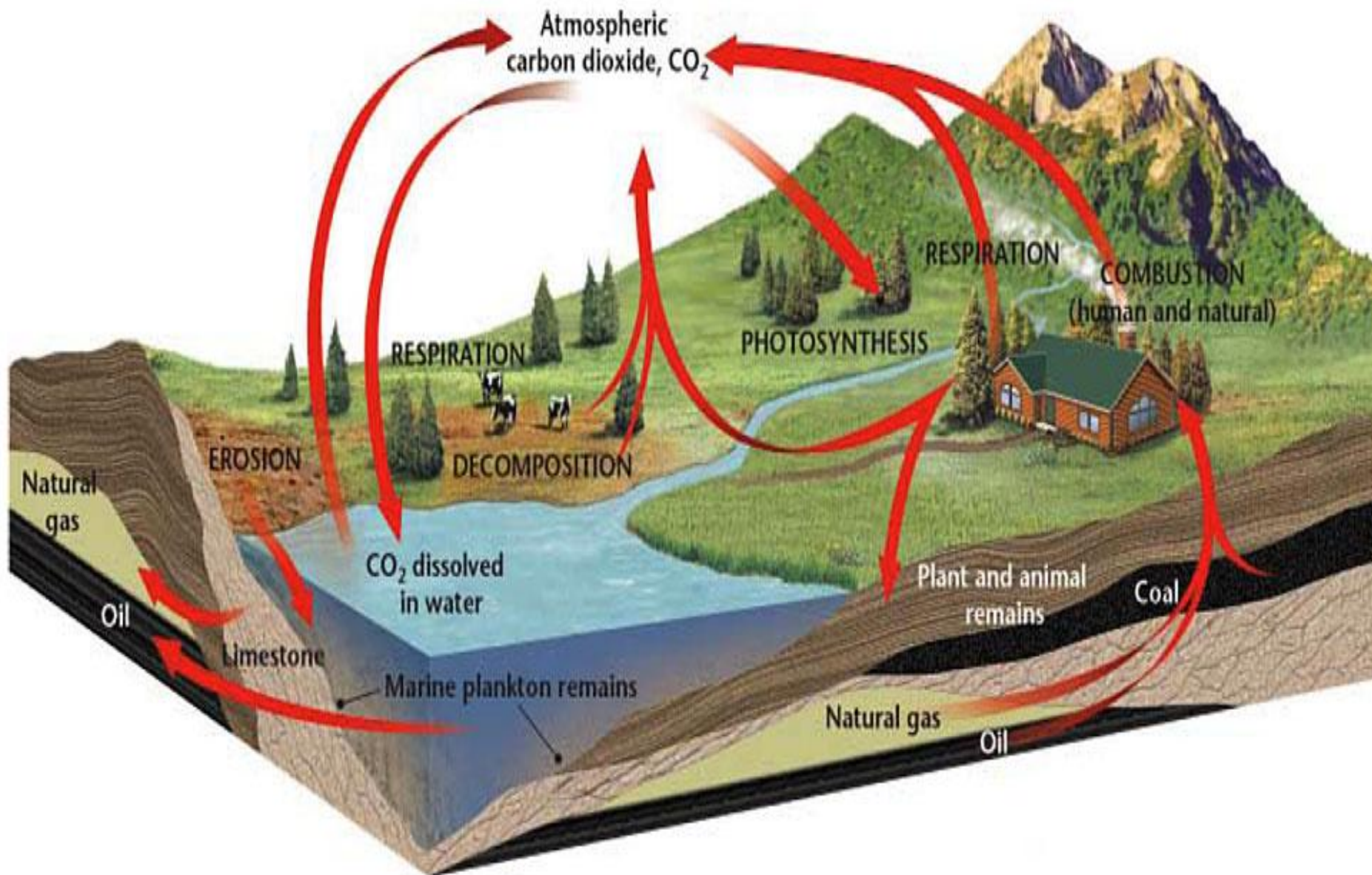


Glucose (sugar) + Oxygen yields carbon dioxide, water and energy

REACTANTS



PRODUCTS



All energy ingested does not become part of the organism

■ Energy is converted for an organism's own respiration, metabolism, digestion, and predation.



Figure 55.10

