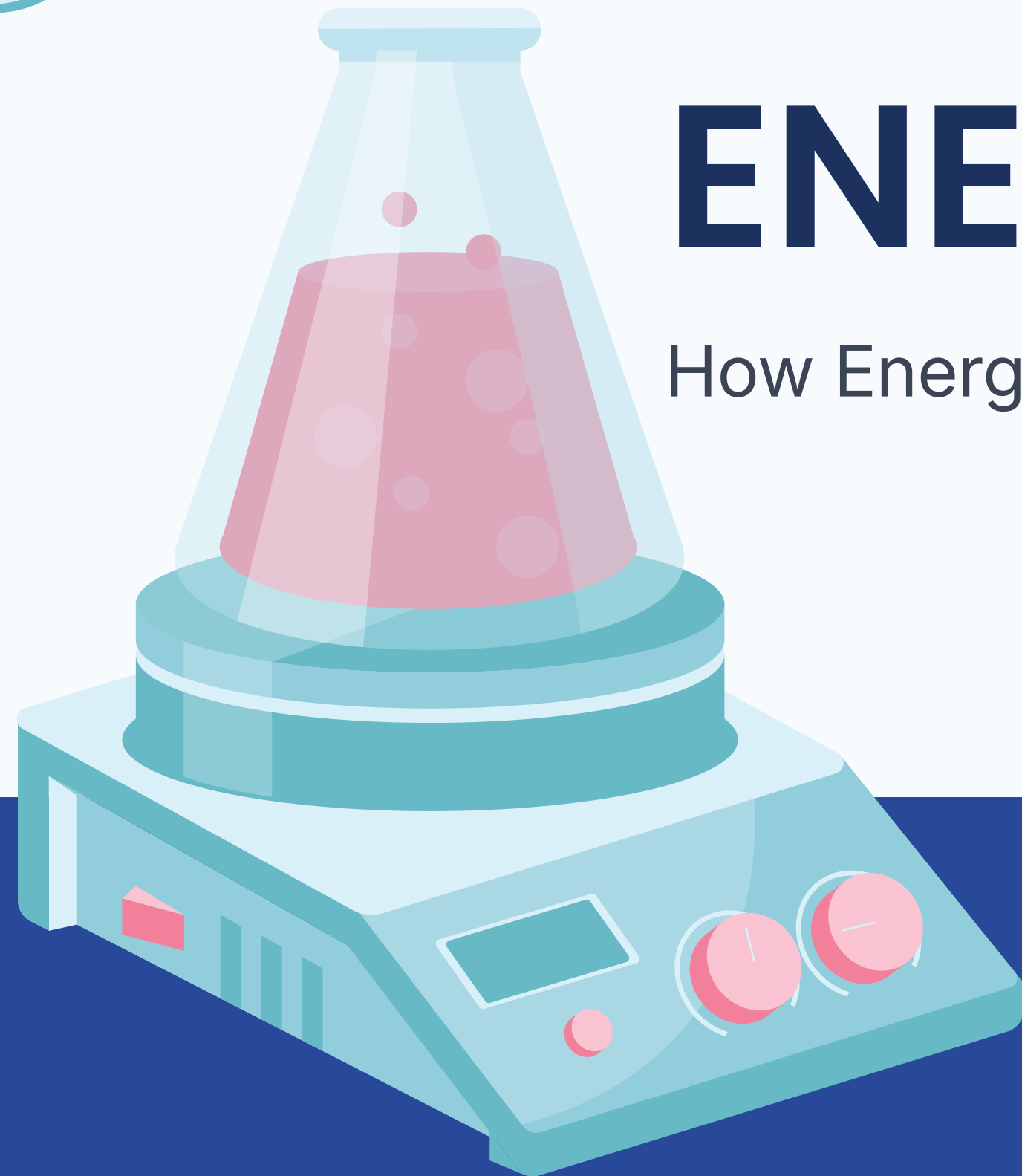
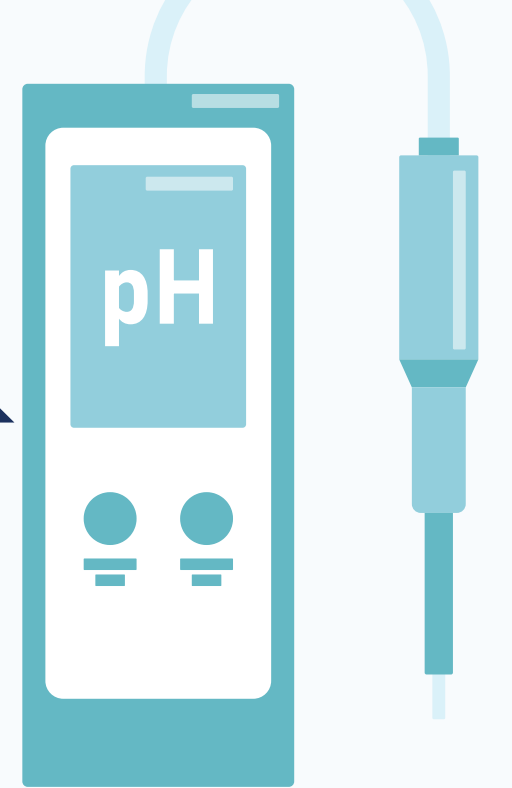
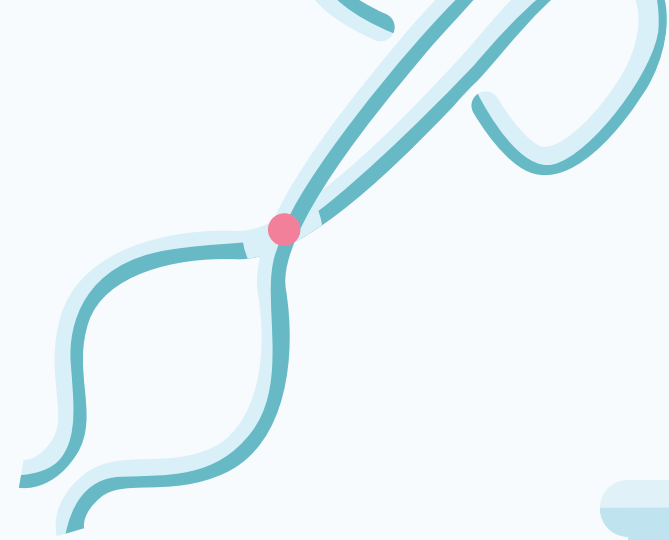


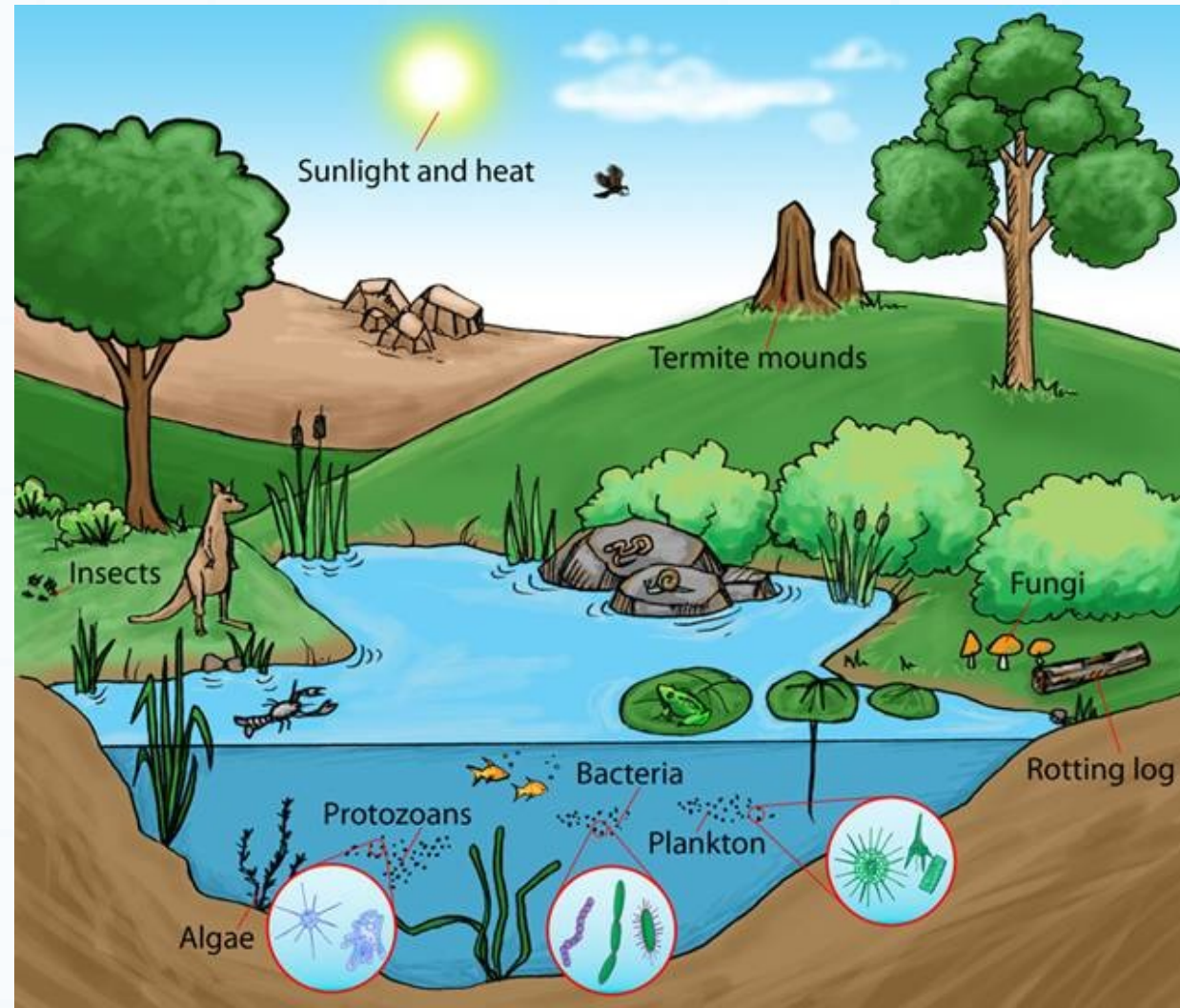
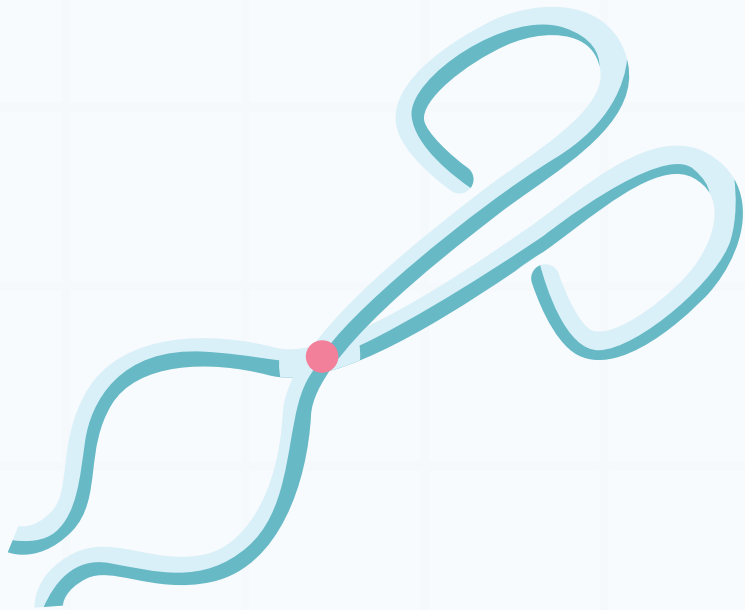
ECOSYSTEMS & ENERGY FLOW

How Energy and Nutrients Move Through Living Systems

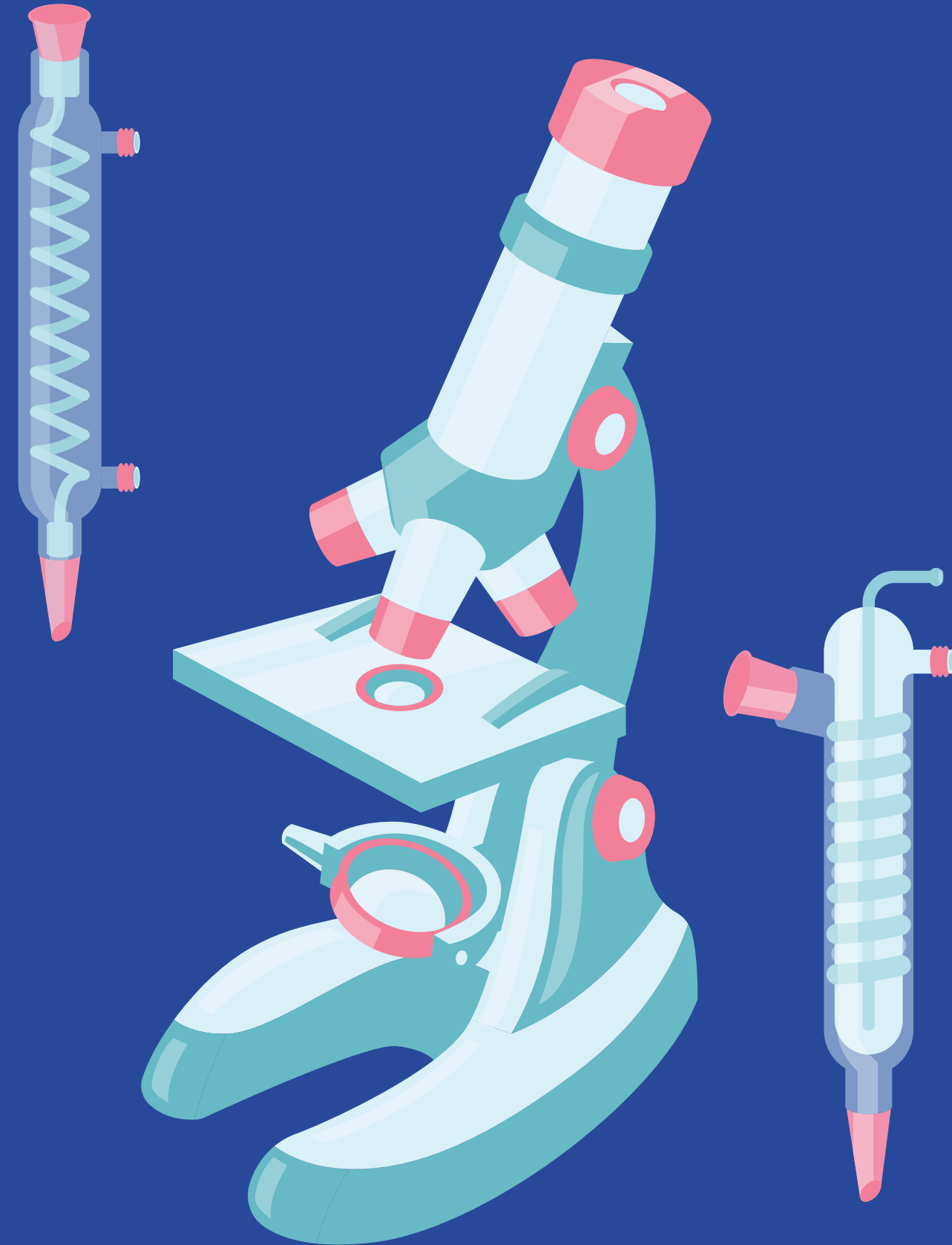


Presented by Pham Gia Han -Flower

WHAT IS AN ECOSYSTEM?



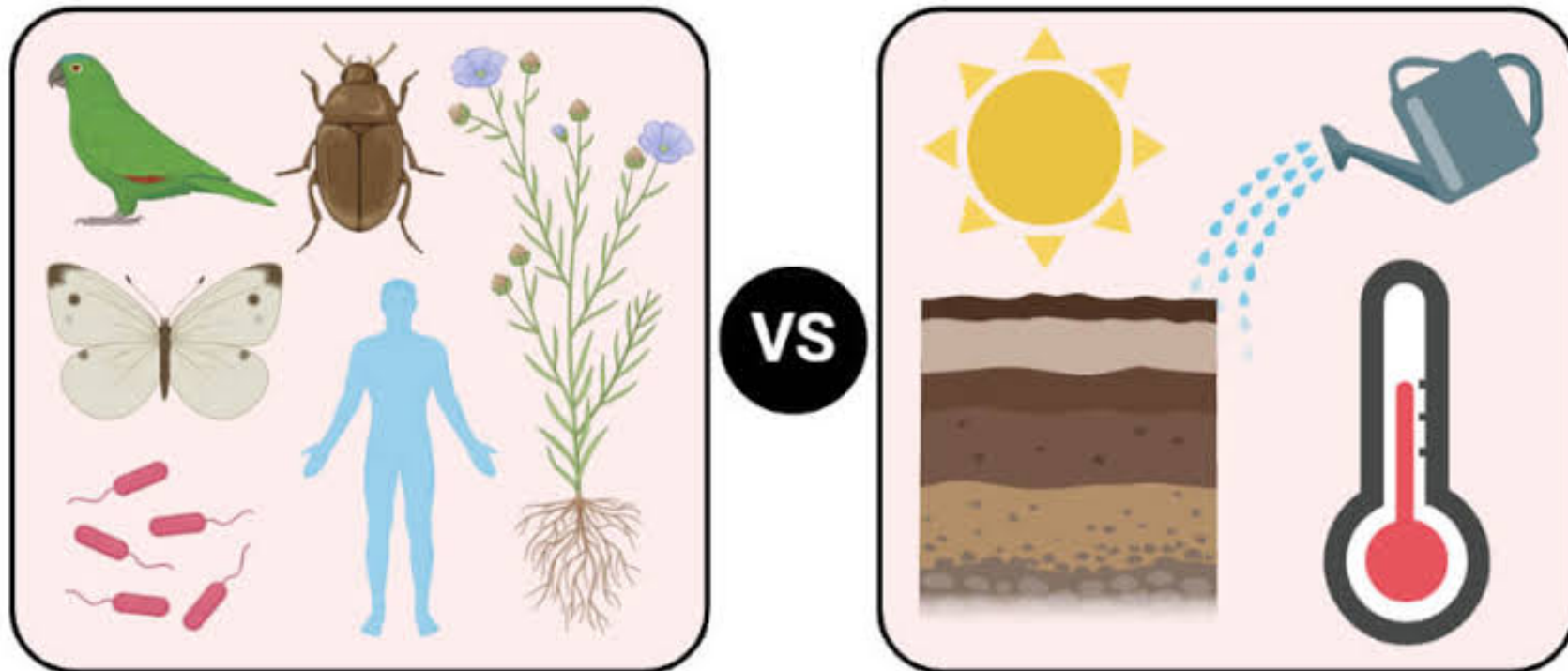
- An ecosystem is a community of living organisms interacting with each other and their non-living environment.
- Ecosystems can be very large (like a tropical rainforest or ocean) or very small (like a rotting log or a backyard pond).
- All parts of an ecosystem rely on one another to maintain balance.



BIOTIC VS. ABIOTIC FACTORS



Differences between Biotic and Abiotic Factors

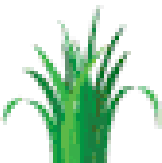
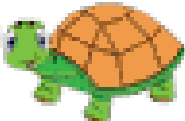


- Biotic Factors: All the living or once-living parts of an ecosystem.
 - Examples: Trees, insects, mammals, fungi, and bacteria.
- Abiotic Factors: The non-living chemical and physical parts of an ecosystem.
 - Examples: Sunlight, temperature, water, soil, rocks, and air.
- Key Takeaway: Biotic factors need abiotic factors (like sunlight and water) to survive.

ORGANISM ROLES IN AN ECOSYSTEM

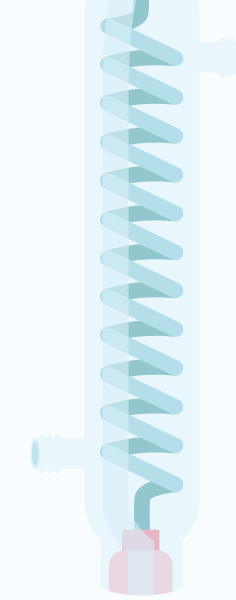
- Producers (Autotrophs): Make their own food using sunlight through photosynthesis (e.g., plants, algae).
- Consumers (Heterotrophs): Must eat other organisms for energy.
 - Herbivores: Eat only plants (e.g., rabbits, deer).
 - Carnivores: Eat only other animals (e.g., wolves, hawks).
 - Omnivores: Eat both plants and animals (e.g., bears, humans).
- Decomposers: Break down dead plants and animals and return nutrients to the soil (e.g., mushrooms, bacteria, earthworms).

Producers, Consumers, and Decomposers

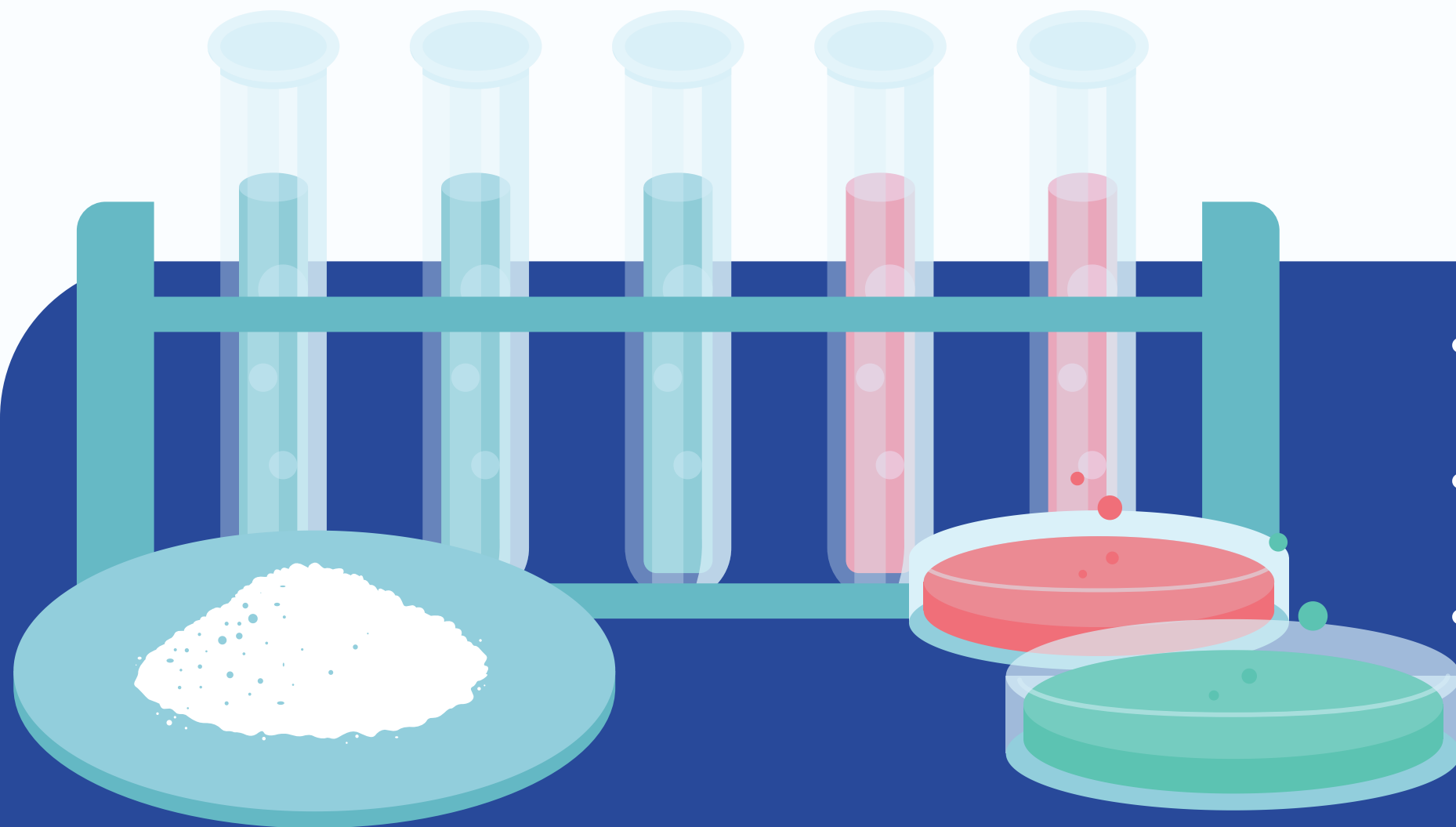
PRODUCERS	Producers are organisms that make their own food from sunlight, water, and carbon dioxide; they are also known as autotrophs.		
			
CONSUMERS	Consumers are organisms that need to eat food to obtain energy. They cannot make their own food. These organisms are also called heterotrophs.		
			
DECOMPOSERS	Decomposers are organisms that get energy by breaking down or eating dead plants and animals.		
			



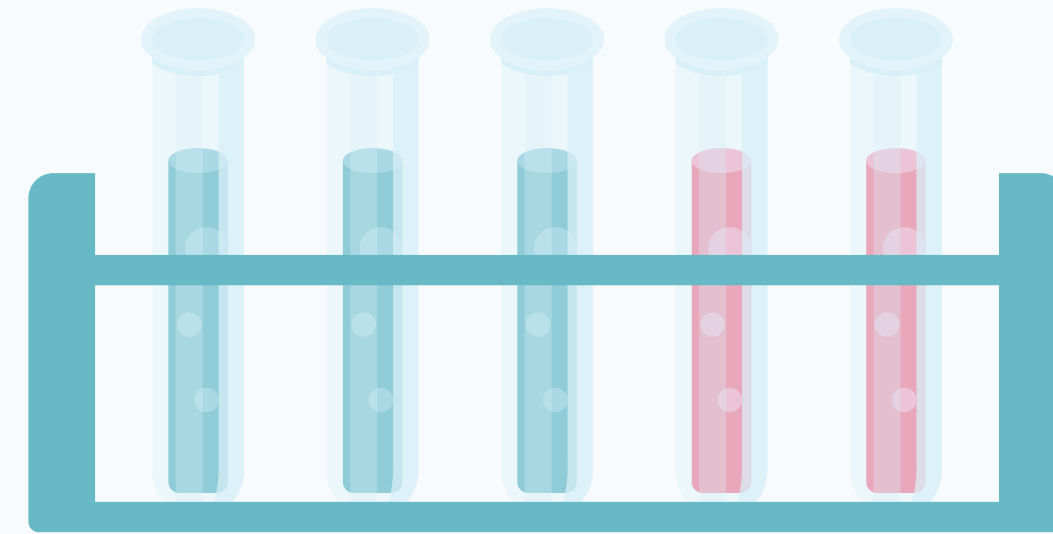
FOOD CHAINS (ENERGY FLOW)



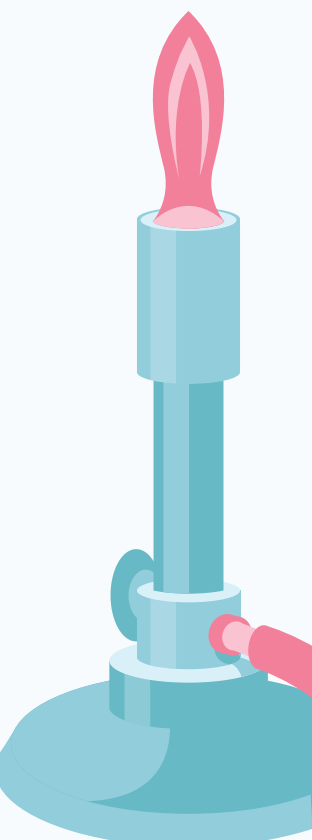
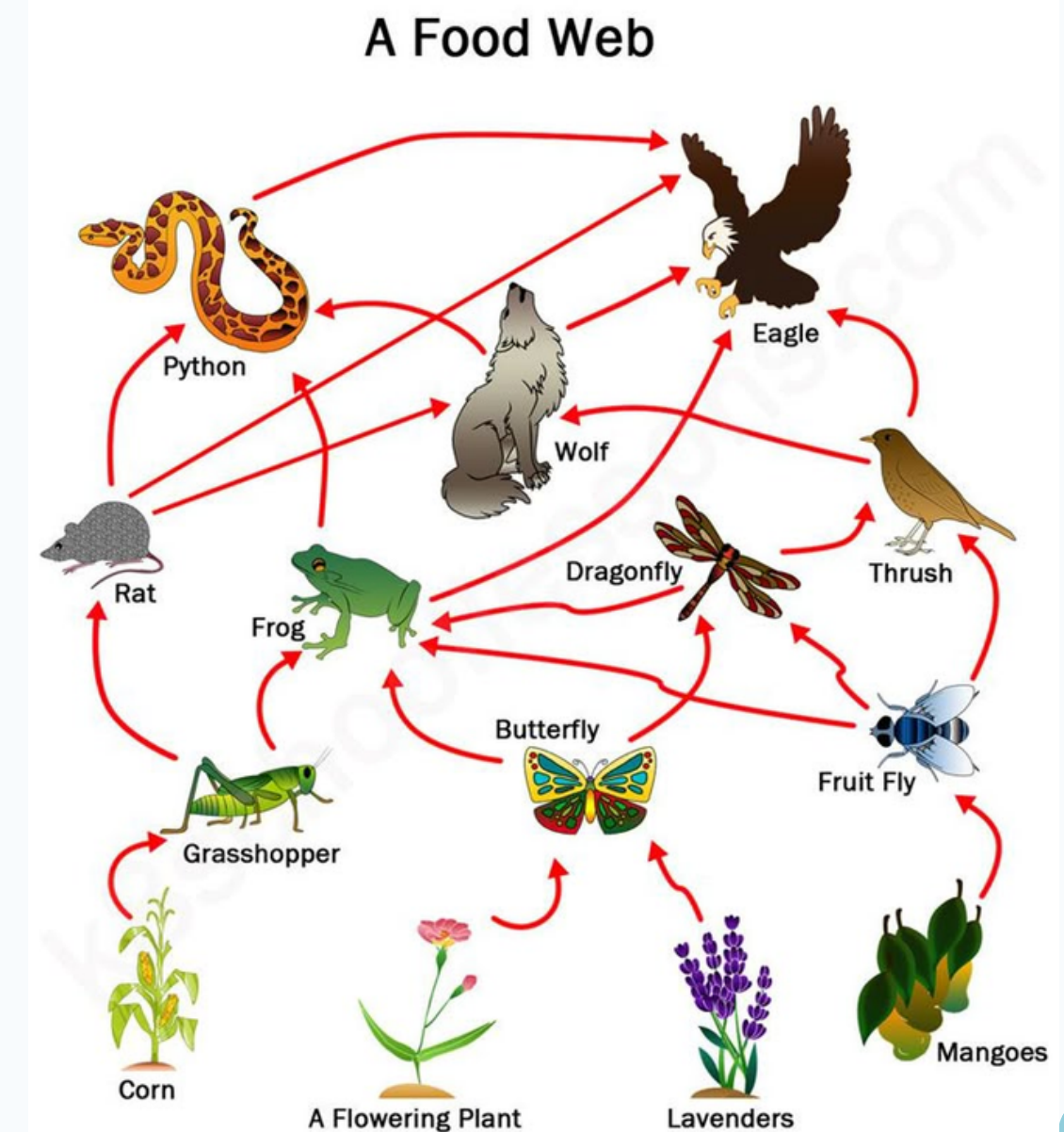
- A food chain shows a single linear path of how energy moves from one organism to another.
- The arrows in a food chain represent the direction of energy flow (from the organism being eaten to the organism eating it).
- Example:
 - Sunlight → Grass (Producer) → Grasshopper (Primary Consumer) → Frog (Secondary Consumer) → Snake (Tertiary Consumer).



FOOD WEBS (INTERCONNECTED SYSTEMS)



- Most animals eat more than just one type of food, so energy flows in many directions.
- A food web consists of many interconnected food chains within an ecosystem.
- Food webs give a more realistic picture of how energy and nutrients circulate in nature.
- If one species is removed from a food web, it can affect many other organisms.

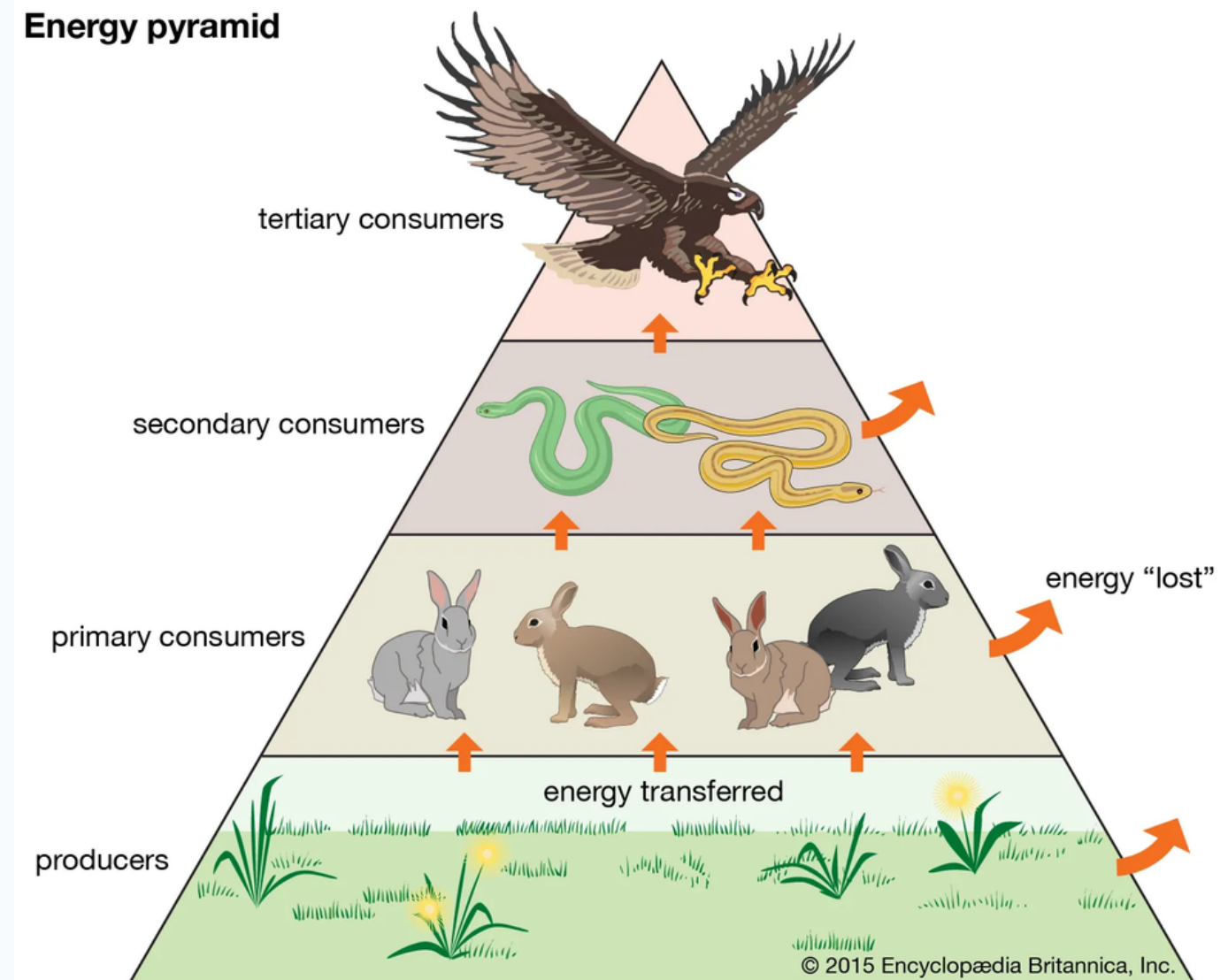


ENERGY PYRAMIDS & THE 10% RULE



- An energy pyramid shows how much energy is available at each level of a food chain.
- The 10% Rule: Only about 10% of the energy at one level is passed on to the next level.
- Where does the other 90% go?
 - Used by the organism for life processes (movement, breathing, growth).
 - Lost to the environment as heat.
- Because energy decreases as you move up, there are always fewer top carnivores than producers.

Energy pyramid



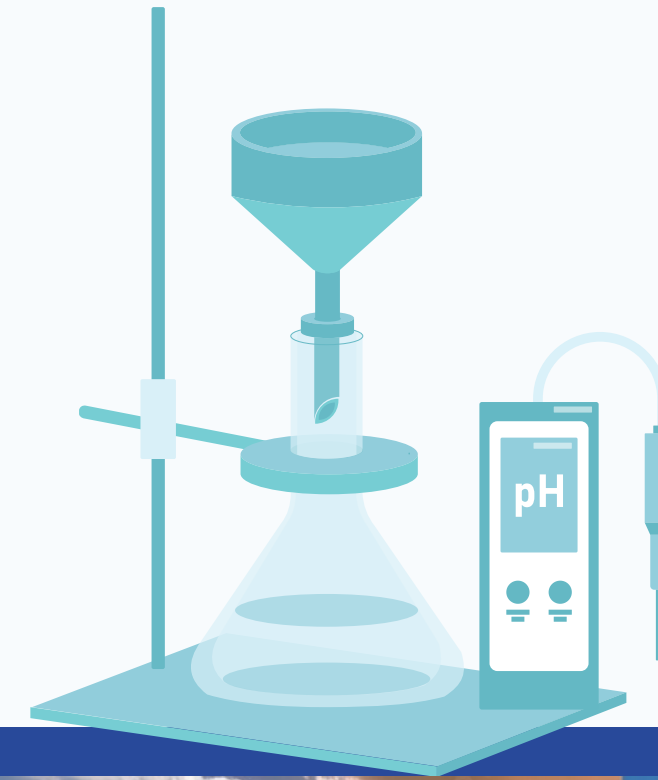
ECOSYSTEM BALANCE & DISTURBANCES

- Ecosystems stay healthy when populations of producers, consumers, and decomposers are balanced.
- Natural Disturbances: Volcanic eruptions, forest fires, floods, or droughts can destroy habitats and disrupt food webs.
- Invasive Species: Non-native organisms introduced to an area can outcompete local wildlife for food and resources (e.g., Kudzu vines, Asian carp).

A photo of a forest fire or an invasive species altering a natural habitat.



HUMAN IMPACT ON ECOSYSTEMS



- Deforestation: Clearing trees removes habitats and producers, reducing available oxygen and shelter.
- Pollution: Chemicals and plastics harm marine and land organisms.
- Conservation Efforts: Protecting natural parks, recycling, and planting trees help restore balance and protect biodiversity.



CONCLUSION



Ecosystems consist of interacting biotic (living) and abiotic (non-living) elements.

Energy starts with the sun and flows through producers, consumers, and decomposers.

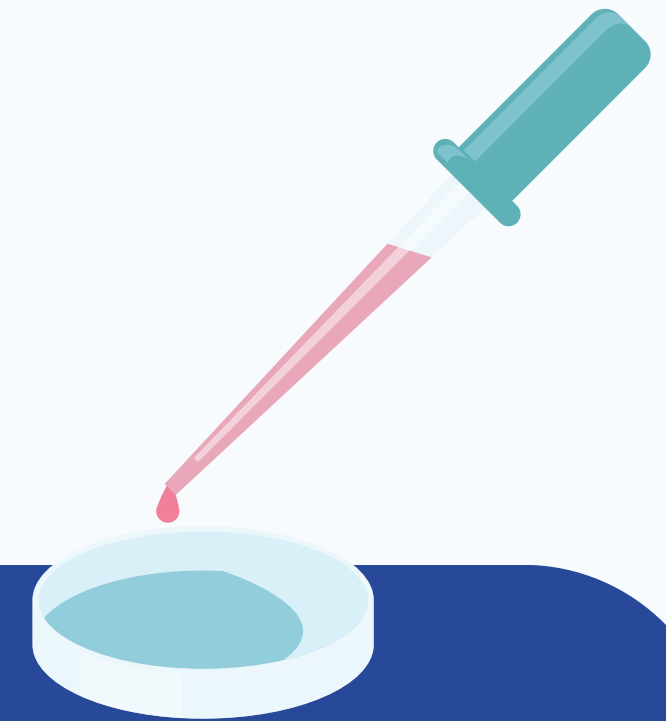
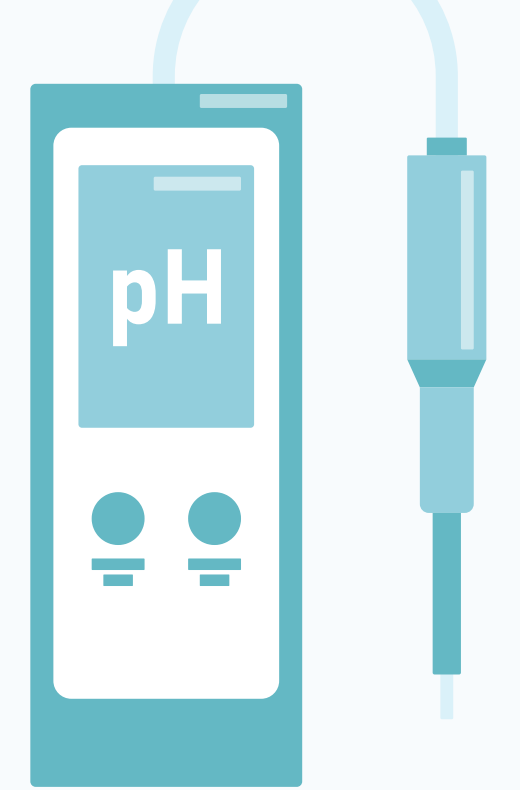
Food webs show how organisms depend on each other for survival.

Energy decreases by 90% at each level of the energy pyramid.

Protecting ecosystems is essential for maintaining biodiversity on Earth.



THANK YOU



Presented by Flower