

A detailed illustration of a savanna landscape. In the foreground, a large black bird with a yellow beak and red throat is in flight. To its left, a leopard is visible among green plants. In the lower left, a black gorilla is walking. In the center, a lion is walking. To the right, a tiger is walking. In the background, a herd of buffalo is grazing, and a group of white and brown cows is in the lower right. A road with a yellow and green bus, a blue car, a red truck, and a white trailer is visible. The sky is blue with white clouds and a few birds flying.

Biology

Section A2

Living organisms and their environment

What is an environment?



It is the surroundings or conditions in which organisms live or operate.

What is a Habitat?

It is the place where organisms live.

Examples include: Pine forest (Mountain Pine Ridge), Savanna (Pasadita area), Tropical Rain Forest (Chiquibul Forest), Mangrove Forest (along coastline area), Wetland (swamps), Coral Reef (Belize), etc.







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What is a Ecology?

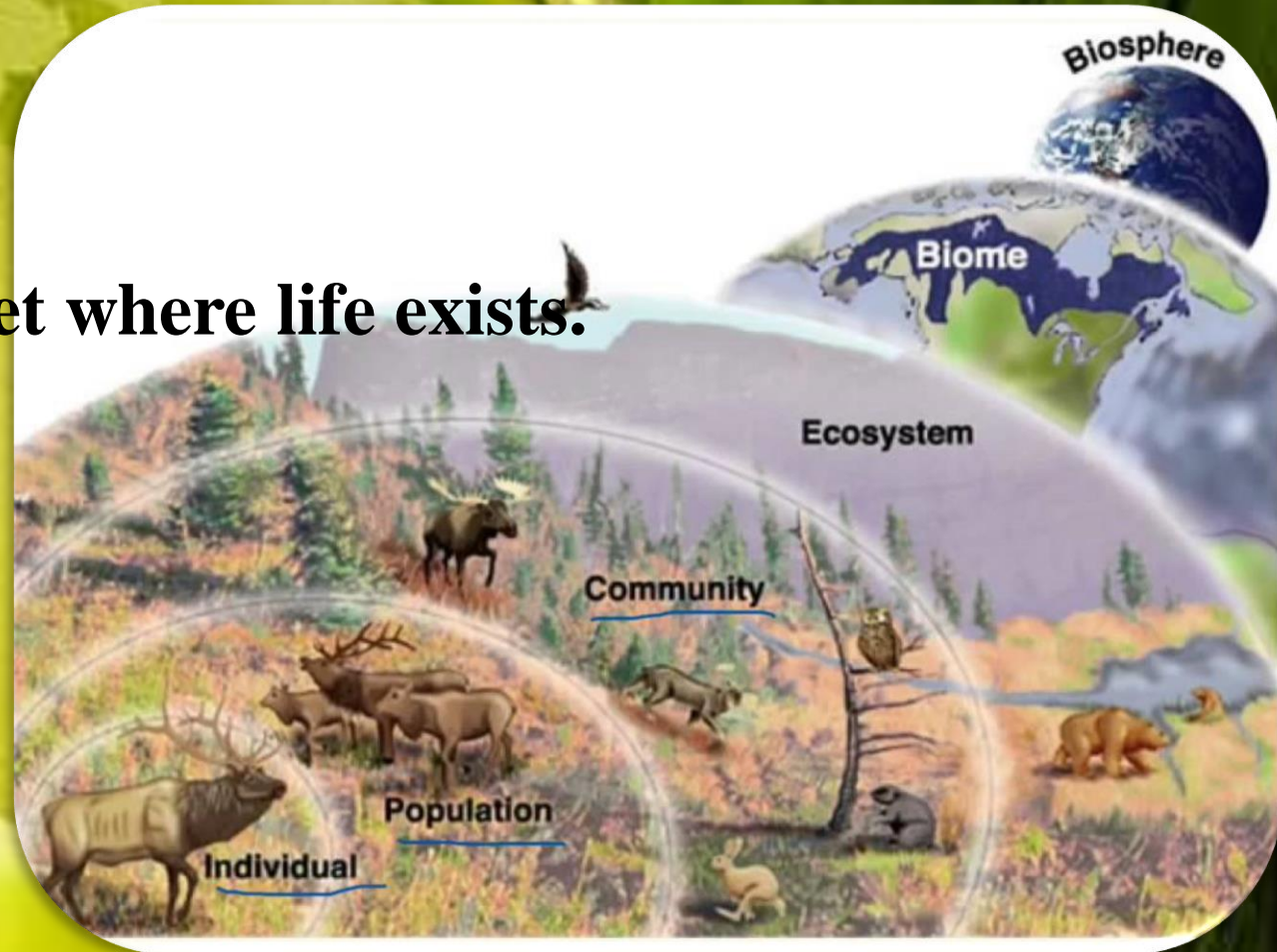
It is the study of interactions among organisms with each other and with environment.



LEVELS OF ORGANIZATION

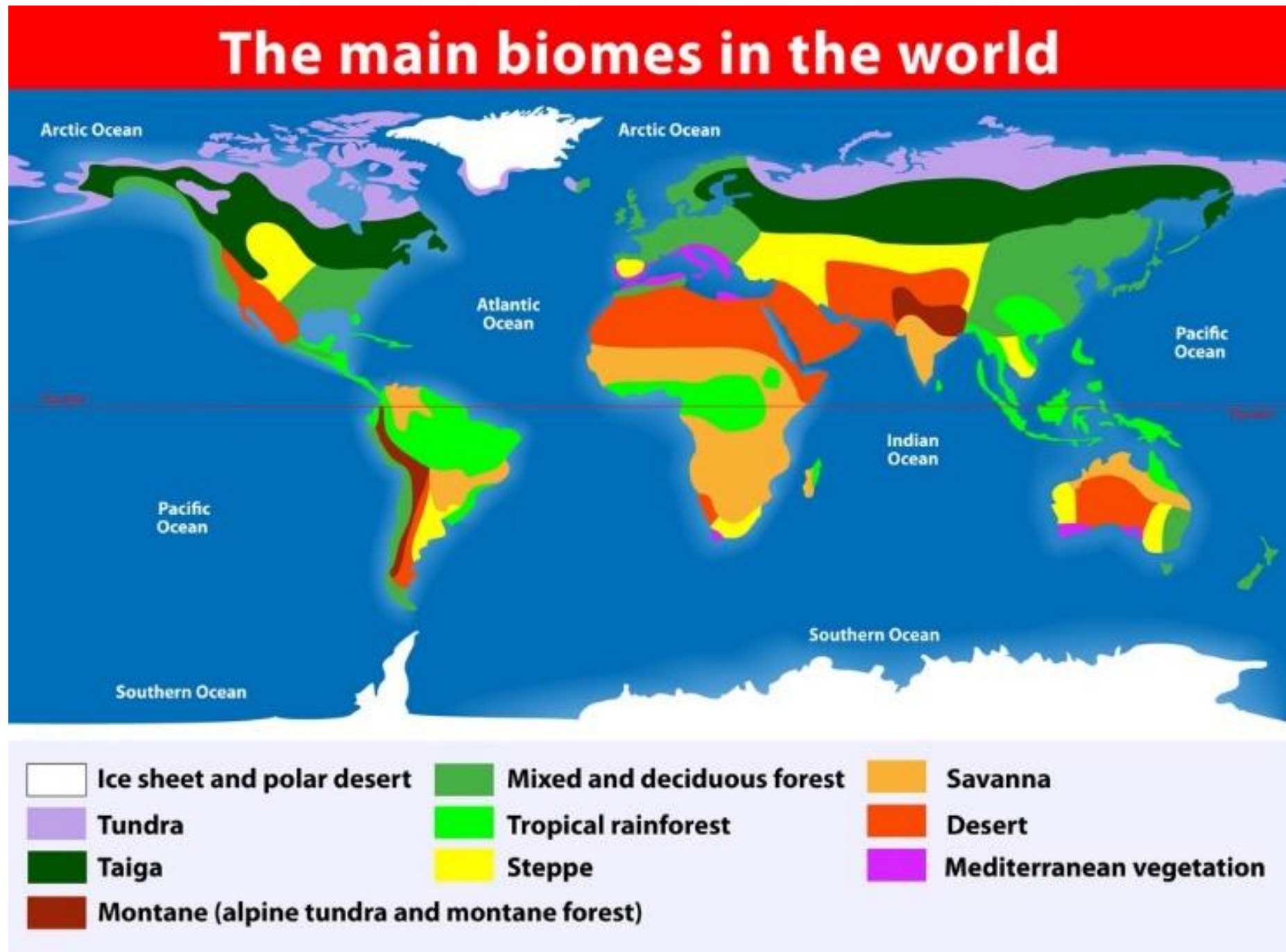
Biosphere

A portion of the planet where life exists.



Biome

It is a large area that has a particular climate, and particular species of plants and animals that live there.
(Tropical rain forest)



Ecosystem

The biological community of interacting organisms plus the physical factors in an area



(Eg. frog + trees + dragonflies + temperature + soil + rainfall)

Community

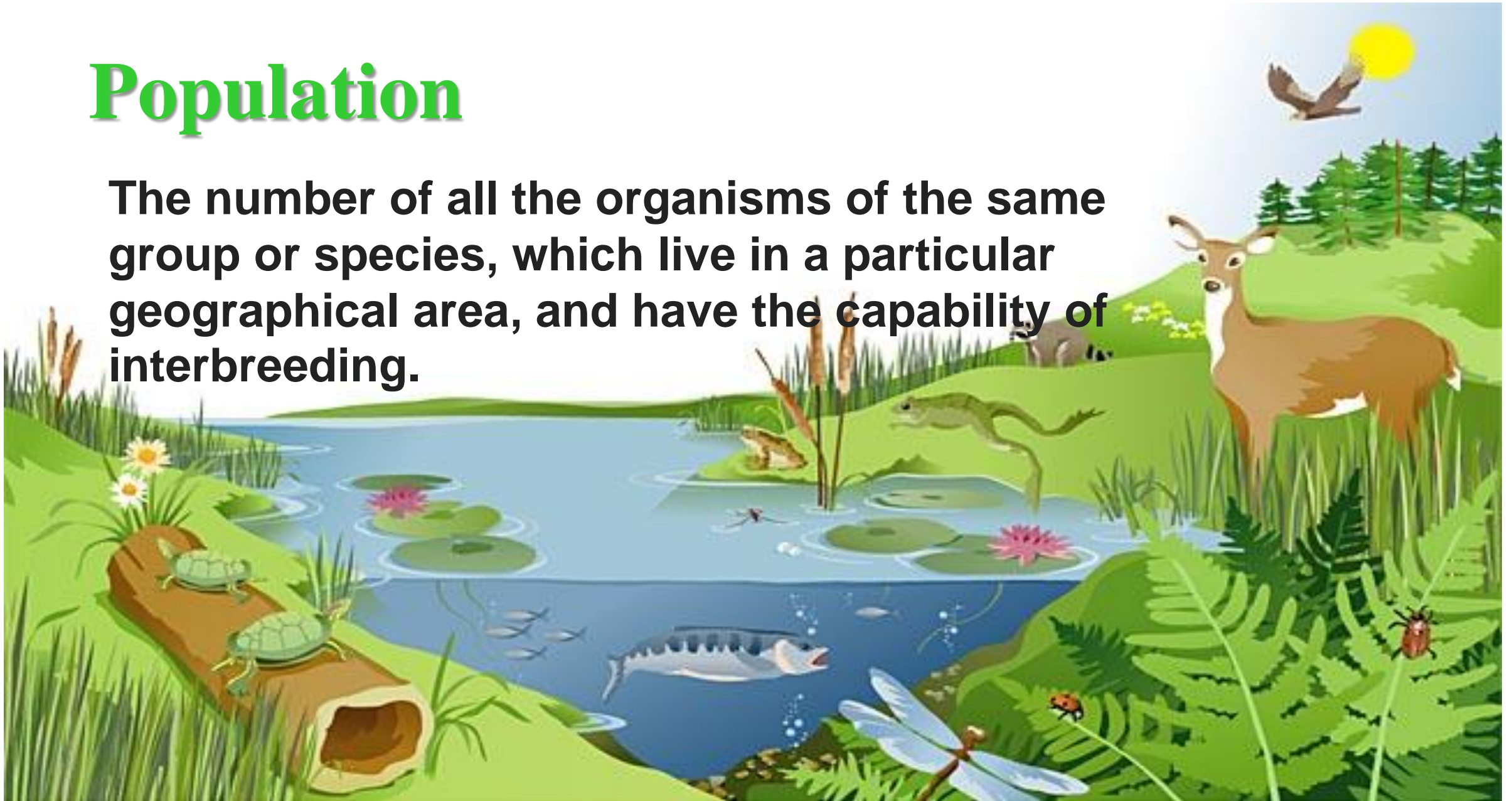
An interacting group of All the different species in a common location.



(Eg. frog + turtles+ raccoon+ beetles+ dragonflies + trees + shrubs)

Population

The number of all the organisms of the same group or species, which live in a particular geographical area, and have the capability of interbreeding.



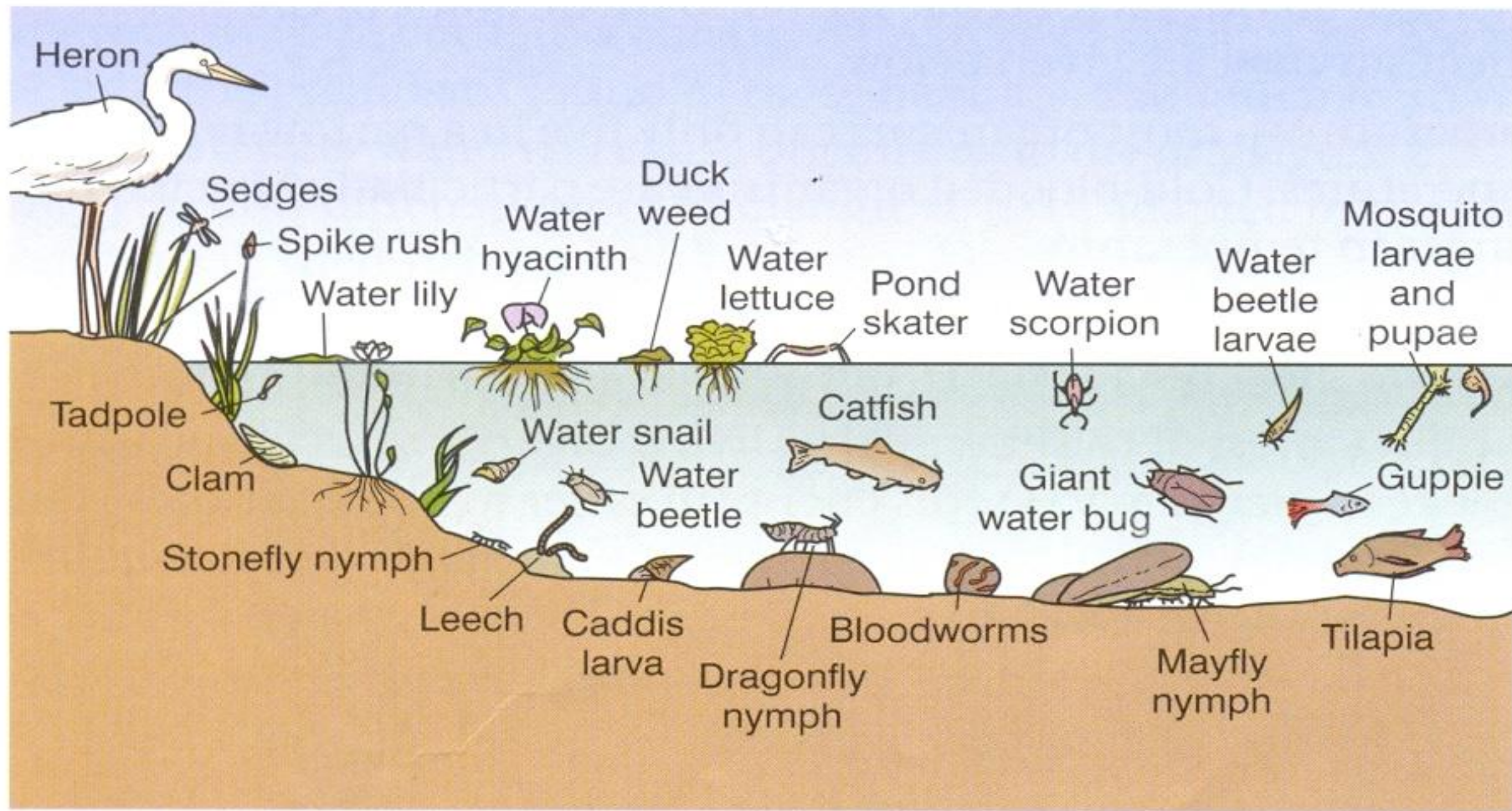
All the deers in the area.

Species

A group of closely related organisms that are very similar to each other and are usually capable of interbreeding and producing fertile offspring.



Individuals that can breed with one another eg. Turtle.



▲ **Figure 2.1.3** A pond community showing different habitats and populations

Each organism in a community has a particular position or role that it is suited to. This role or position is known as the organism's **niche**. For example, the heron's niche is the water's edge where it eats large fish. There are no other organisms in this niche.

Factors that affect the environment

An ecosystem is a community of **organisms** that interact with each other and with the abiotic and biotic factors in their environment.

- I **Biotic** factor is any living component that affects the population of another organism, or the environment. This includes animals that consume the organism, and the living food that the organism consumes. **Biotic** factors also include human influence, pathogens, and disease outbreaks.

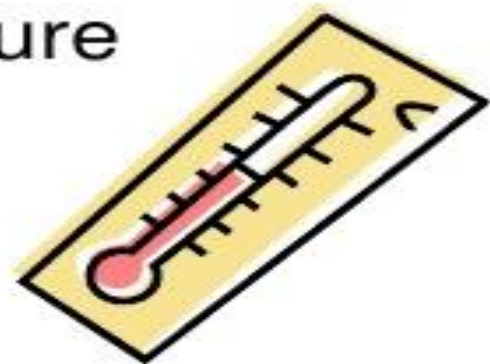
- II **Abiotic** factors are chemical and physical factors such as **temperature**, **soil composition**, and **climate**, along with the amount of **sunlight**, **salinity**, and **pH**.

Biotic vs. Abiotic Factors

- Living
- Examples
 - ▣ Plants
 - ▣ Animals
 - ▣ Fungi
 - ▣ Bacteria



- Non-Living
- Examples
 - ▣ Water
 - ▣ Sunlight
 - ▣ Soil
 - ▣ Air
 - ▣ Temperature



Abiotic and Biotic factors that influence ecosystems

Ecosystem

Biotic

- Other organisms, so:
- Competition
- Predation
- Symbiosis
 - Mutualism
 - Parasitism
- Disease agents

Abiotic

- Air (O_2 , CO_2 , N_2 , etc)
- Water
- Light
- Wind
- Soil
- pH
- Temperature
- Salinity
- Humidity
- Inorganic nutrients (N, P)
- Etc.

Sunlight
Temperature
Precipitation
Water or moisture
Soil

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factors

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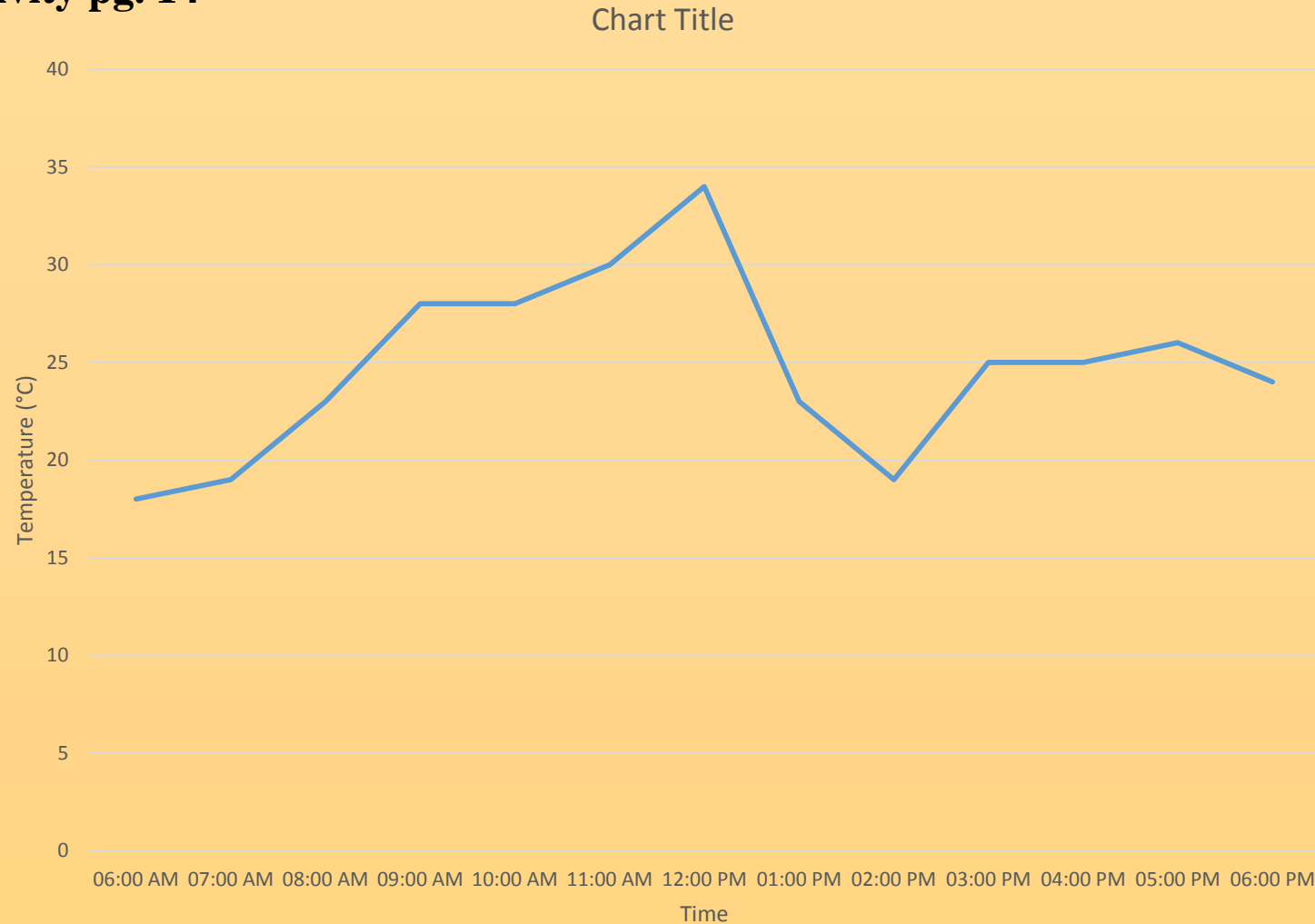
Primary producers
Herbivores
Carnivores
Omnivores
Detritivores

Two habitats common in Belize

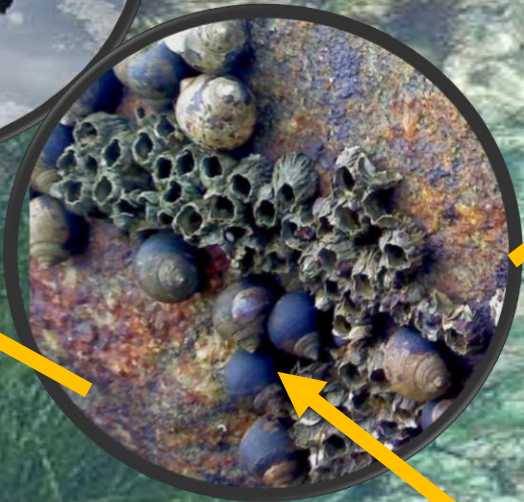
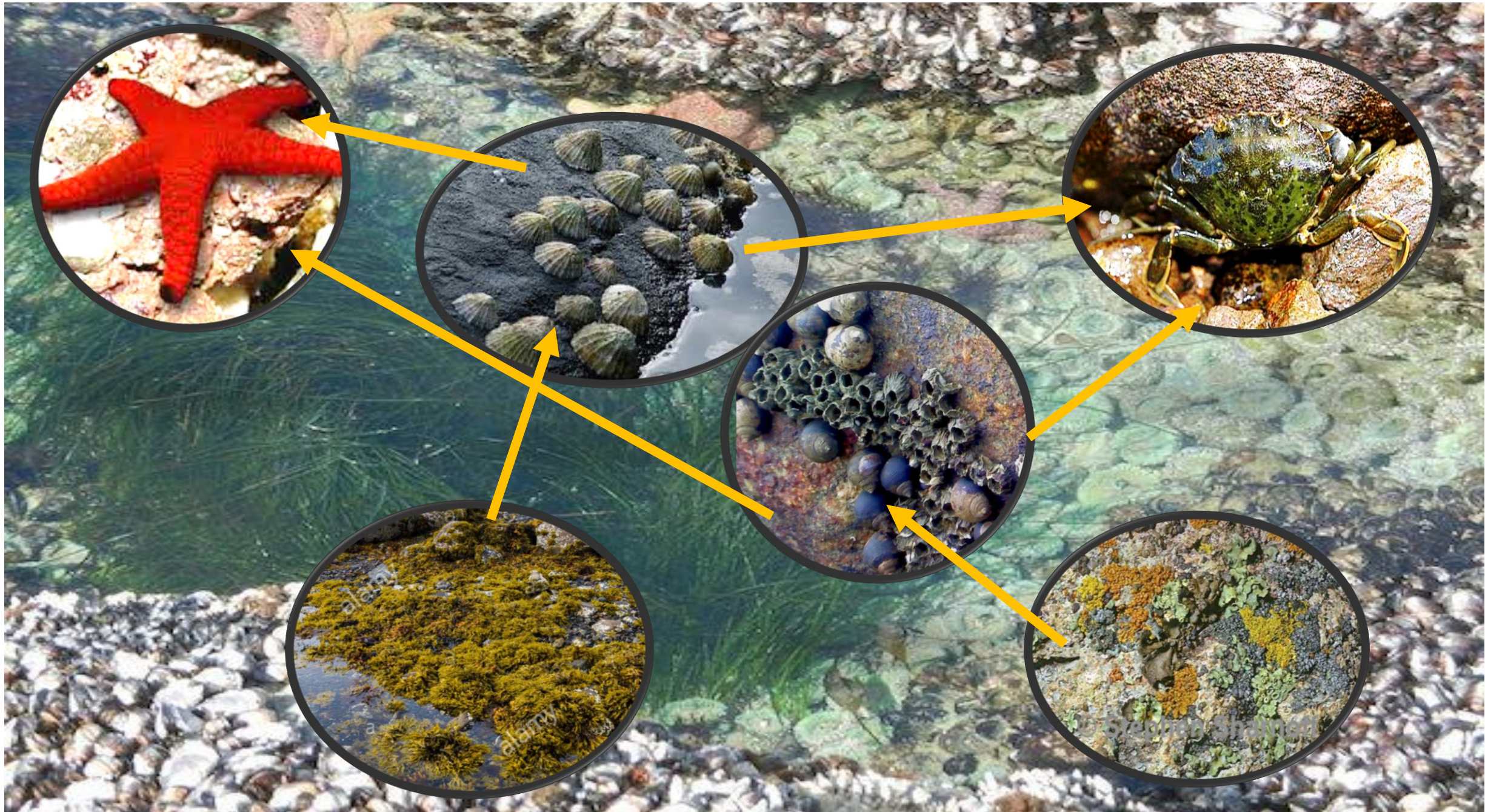
I Aquatic Habitat It is a habitat with water. It includes areas that are permanently covered by water and surrounding areas that are occasionally covered by water. Estuaries, rivers, marshes, rock pool, coral reef and mangrove swamp are examples of aquatic habitats.

In an aquatic habitat can be found many animals and plants. There are two types of water bodies on Earth: Freshwater and Marine (salt water)

Practical Activity pg. 14



**GRAPH SHOWING THE WATER TEMPERATURES IN A
ROCK POOL RECORDED IN ONE DAY**

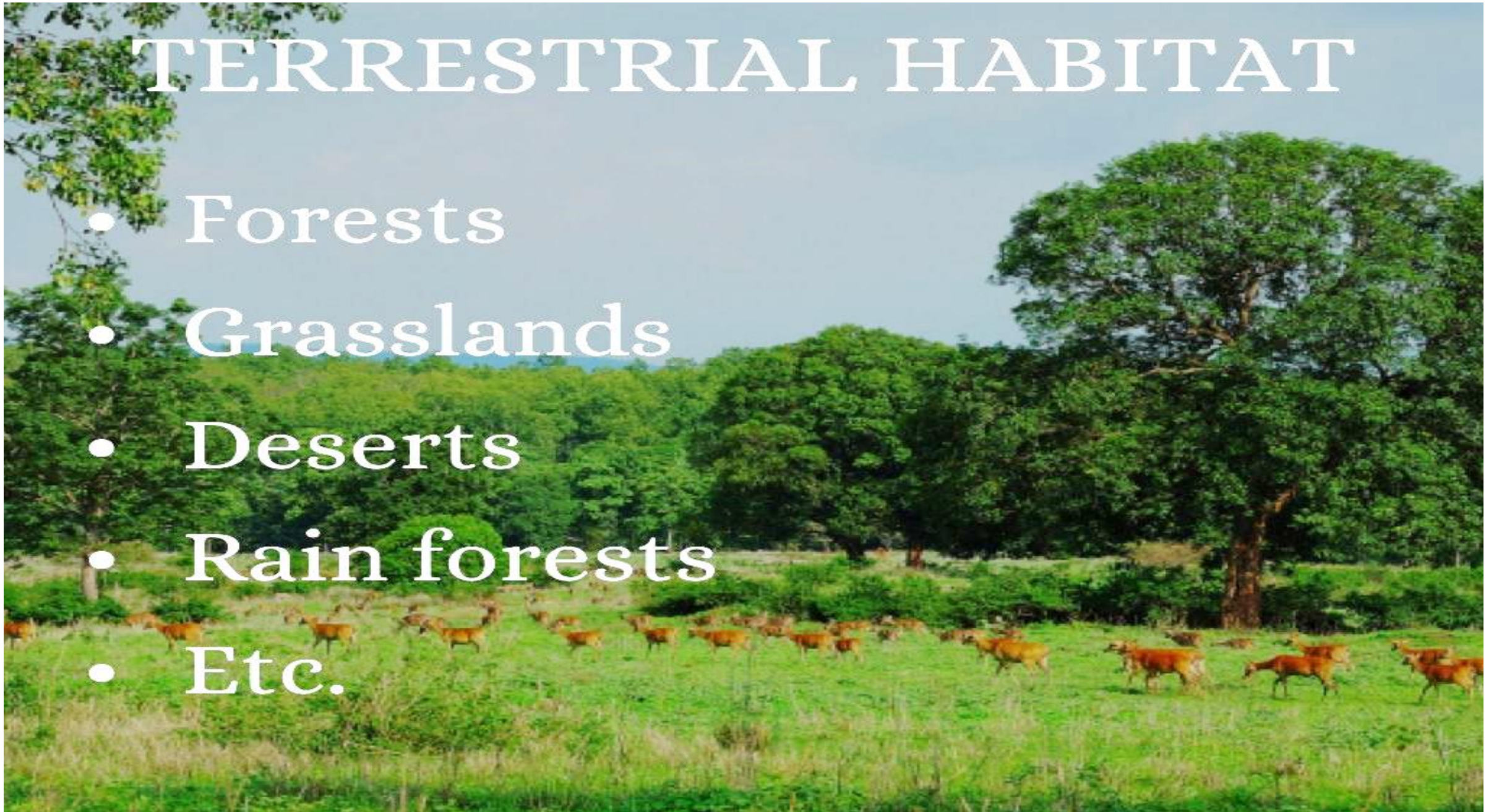


II Terrestrial Habitats

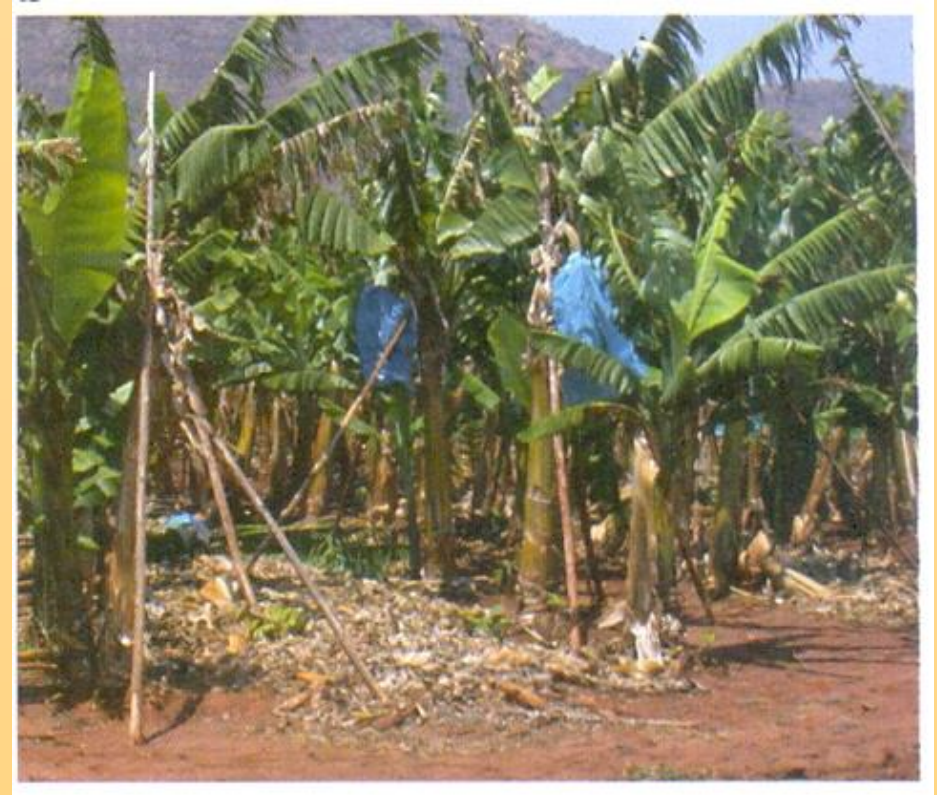
These are ones that are found on land, like forests, grasslands, deserts, shorelines, and wetlands. Terrestrial habitats also include man made habitats, like farms, towns, and cities, and habitats that are under the earth, like caves and mines.

TERRESTRIAL HABITAT

- Forests
- Grasslands
- Deserts
- Rain forests
- Etc.



All terrestrial habitats are dependent on Soil.



What is soil?

Soil is the thin, top layer of the Earth's crust.

What is soil made of?

Soil can be black, brown, red, yellow, or gray. It can be dry and crumbly or wet and sticky.

Soil is made up of:

- Rocks
- Minerals
- Water
- Air
- Humus** (remains of dead plants and animals)



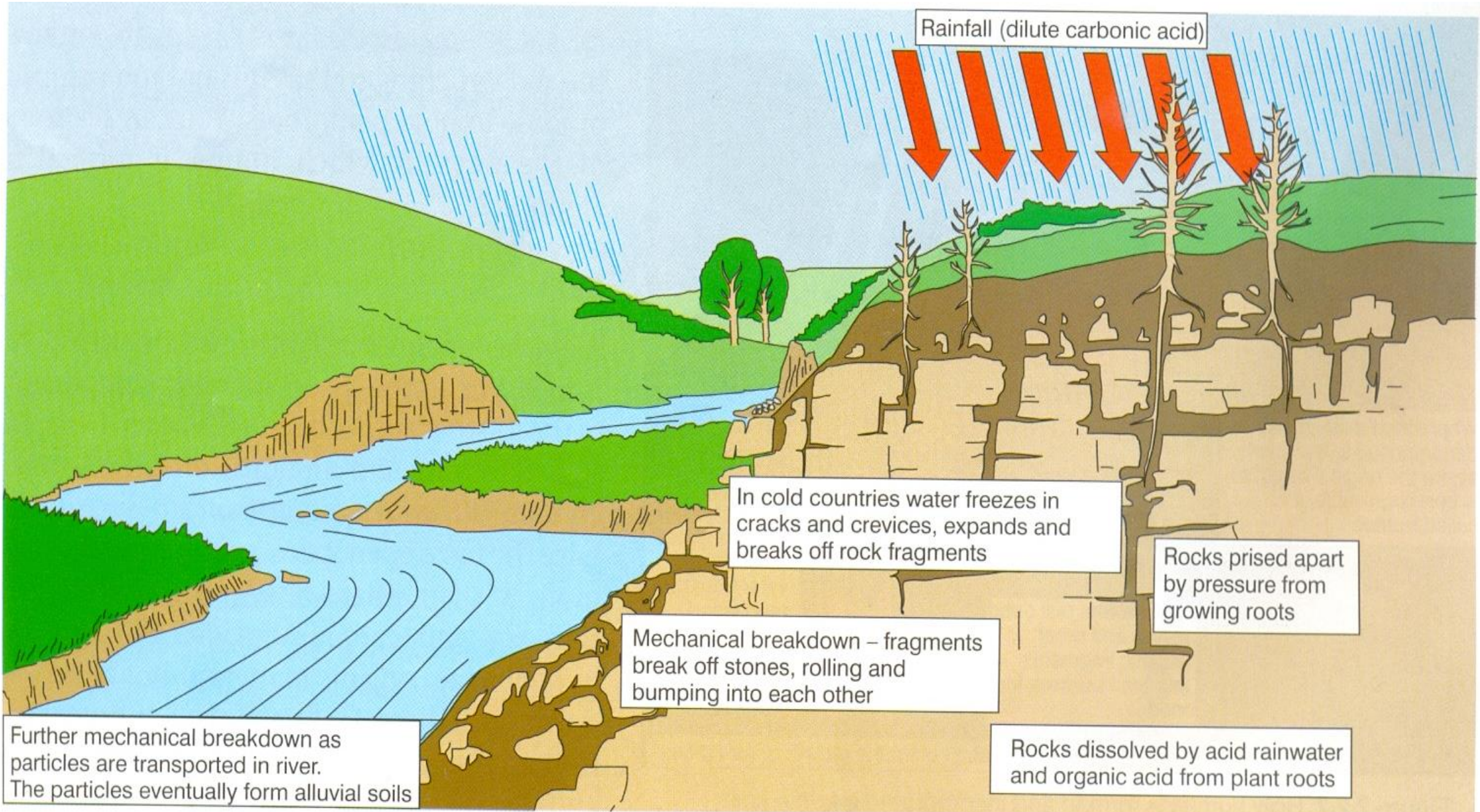
The background of the slide is a photograph showing a cross-section of soil and green grass. The soil is dark brown and appears moist, with some roots visible. The grass is green and growing in the upper part of the frame.

What does soil contain?

Animals and humans depend on plants for food. Plants also depend on soil since they contain the nutrients, water and air that plants need to grow.

Soil is largely made up of small particles of rock, however living organisms also contribute to the formation of soil by providing organic products that give different soils their particular characteristics.

Soil is a physical factor (abiotic).



Rainfall (dilute carbonic acid)

In cold countries water freezes in cracks and crevices, expands and breaks off rock fragments

Rocks prised apart by pressure from growing roots

Mechanical breakdown - fragments break off stones, rolling and bumping into each other

Rocks dissolved by acid rainwater and organic acid from plant roots

Further mechanical breakdown as particles are transported in river. The particles eventually form alluvial soils

Three main types of soil

Sandy Soil: it has very little organic matter and fairly large rock particles. There are large spaces for air and water so it drains quickly.



Sandy soil

Clay Soil: this soil is made up of very small rock particles. The small particles do not leave much space for air and water takes a long time to seep through the soil.



Clay soil

Loam Soil: this soil is made up of very small rock particles. The small particles do not leave much space for air and water takes a long time to seep through the soil.



Loam soil

Components of Soil

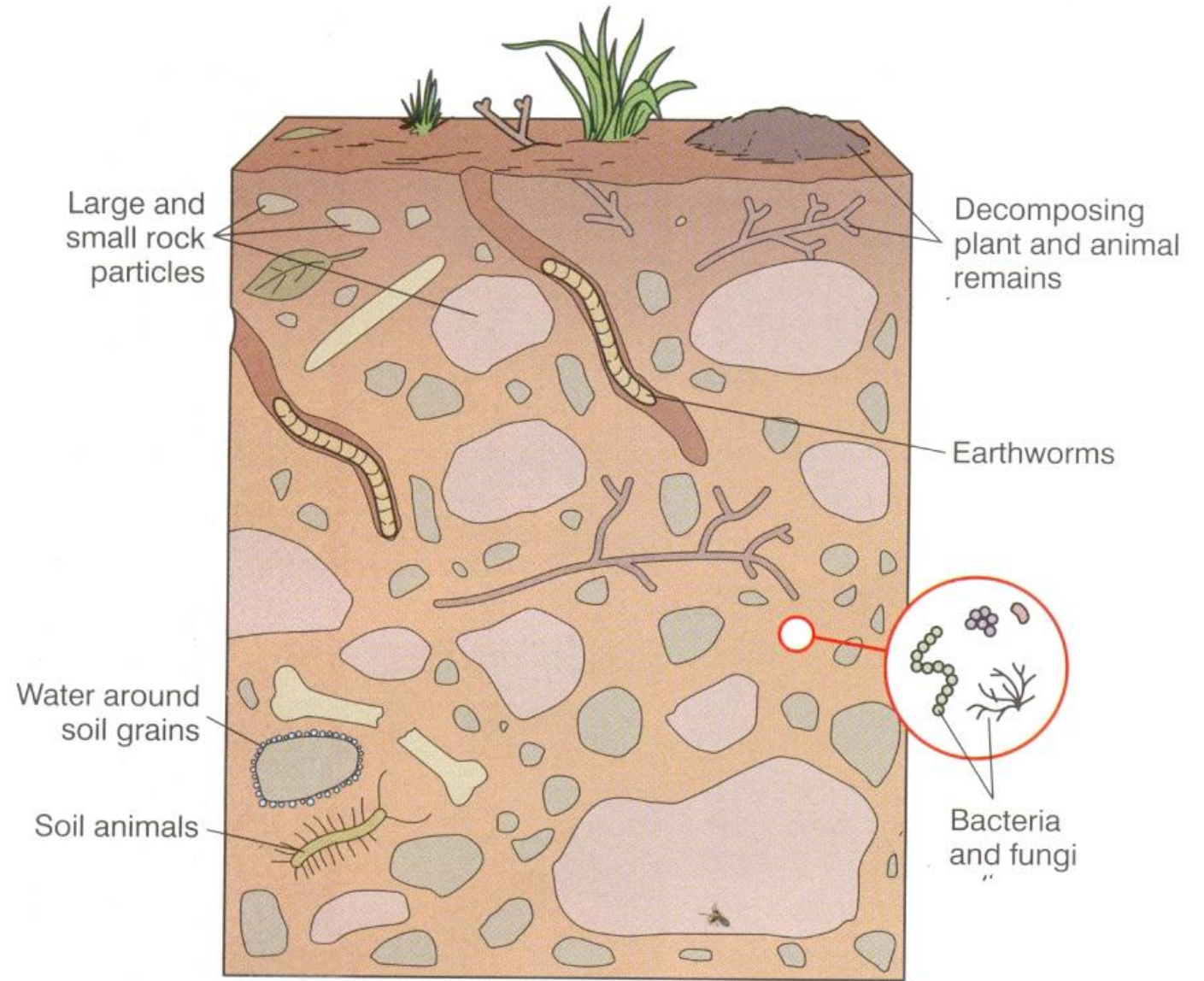
Rock particles

Organic matter

Air

Water

Living organisms



▲ Figure 2.2.6 The components of soil seen through a magnifying glass

Percentage of Soil Components



45%
Rock
particles

25%
Air

25%
Water

5%
Organic matter

Living organisms 0.01%

What is Humus?

Importance of humus to the soil.

How Humus is formed and incorporated into the soil?

