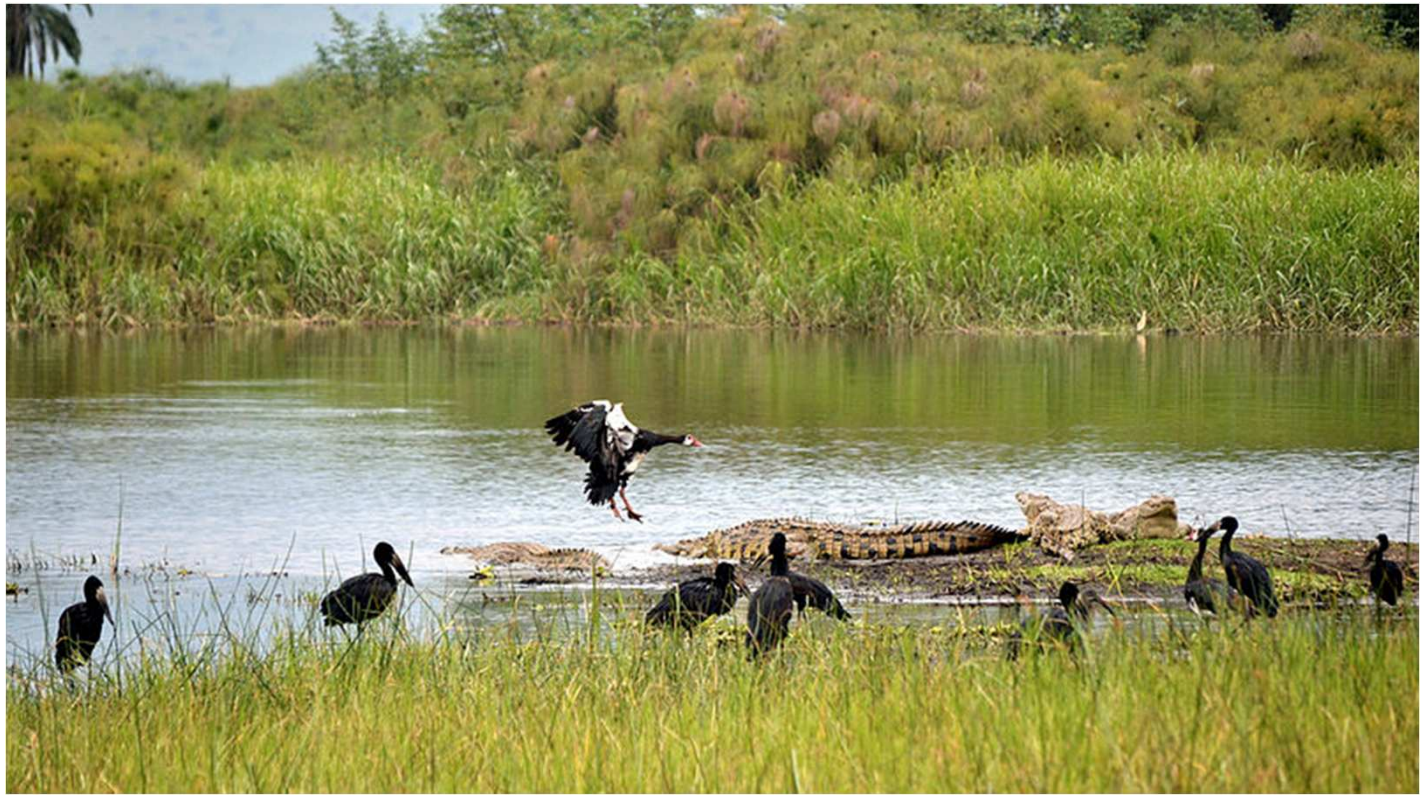
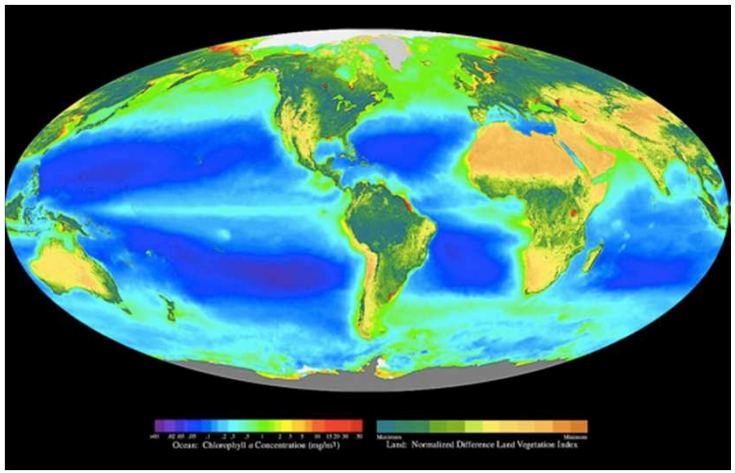
ECOLOGY

EQ: What is ECOLOGY and the levels of organization used when studying it?



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

The German biologist Ernst Haeckel came up with the term “ecology”, as he viewed nature as a house with its own economy.



The largest of nature’s “houses” is the **biosphere.** The biosphere refers to the biological component of Earth’s systems. In other words, all life found on the planet.

Interdependence

Organisms and their environment are interdependent.

Every organism relies on other organisms to survive.

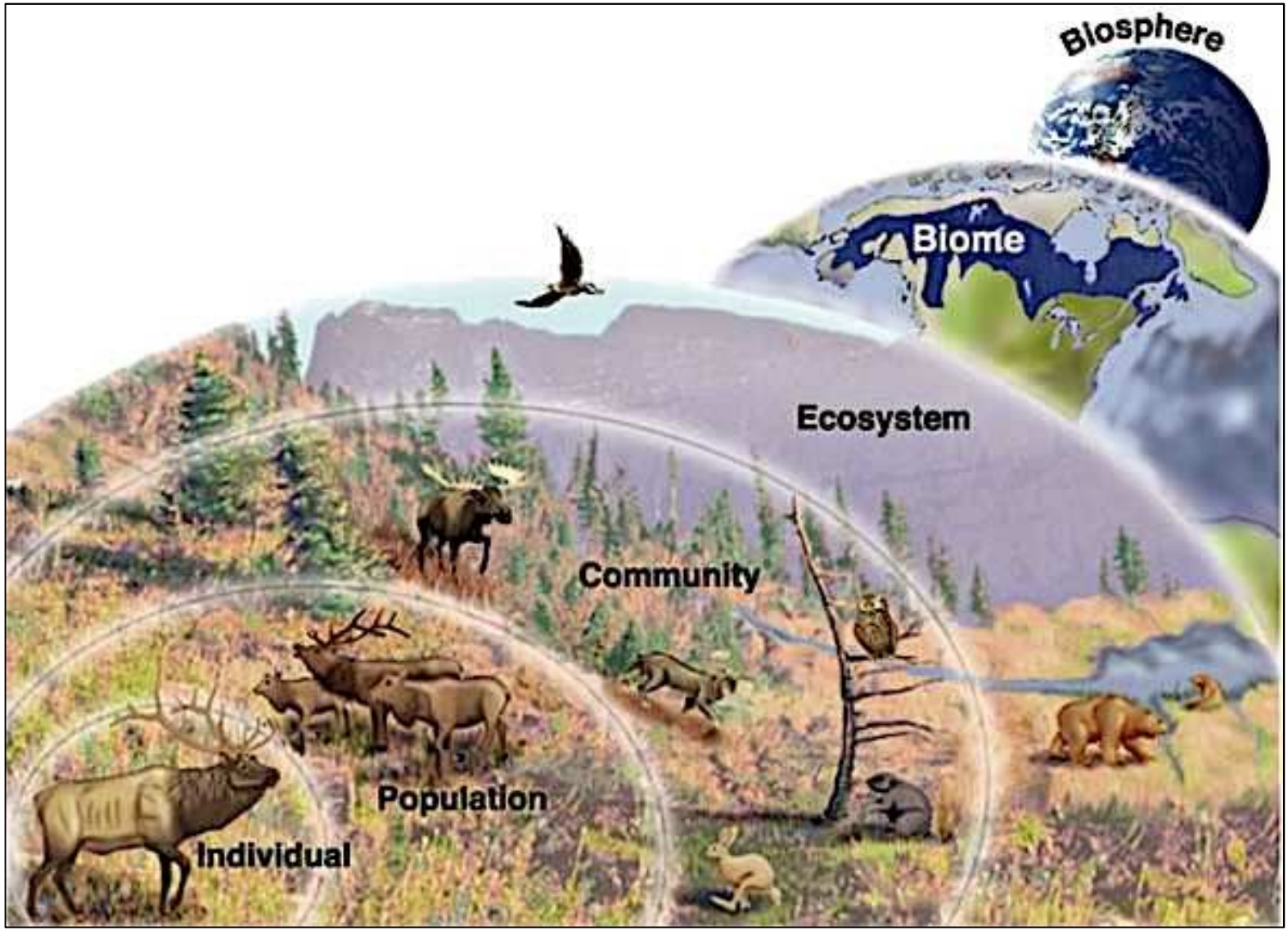
For example, the snail could not survive without plants and algae to eat, and the plants and algae would not grow without bacteria that help recycle nutrients.

The interdependence among organisms is a huge dynamic of the biosphere. Picture a complex web of interdependence. Everything is dependent on something else!

Levels of Organization

The study of ecology ranges from the study of an individual organism to a study of the entire planet as follows:

- Individual
- Population
- Community
- Ecosystem
- Biome
- Biosphere



Species- a group of individuals similar to one another that can breed and create fertile offspring.

Population- A group of organisms of one species that interbreed and live together within a defined area.

Examples of populations-

A herd of sheep

A flock of geese

A colony of ants

A culture of bacteria

A sleuth of bears

A brood of chickens

A pack of dogs

Communities are **groups of populations** comprised of many species that live together in a defined area.

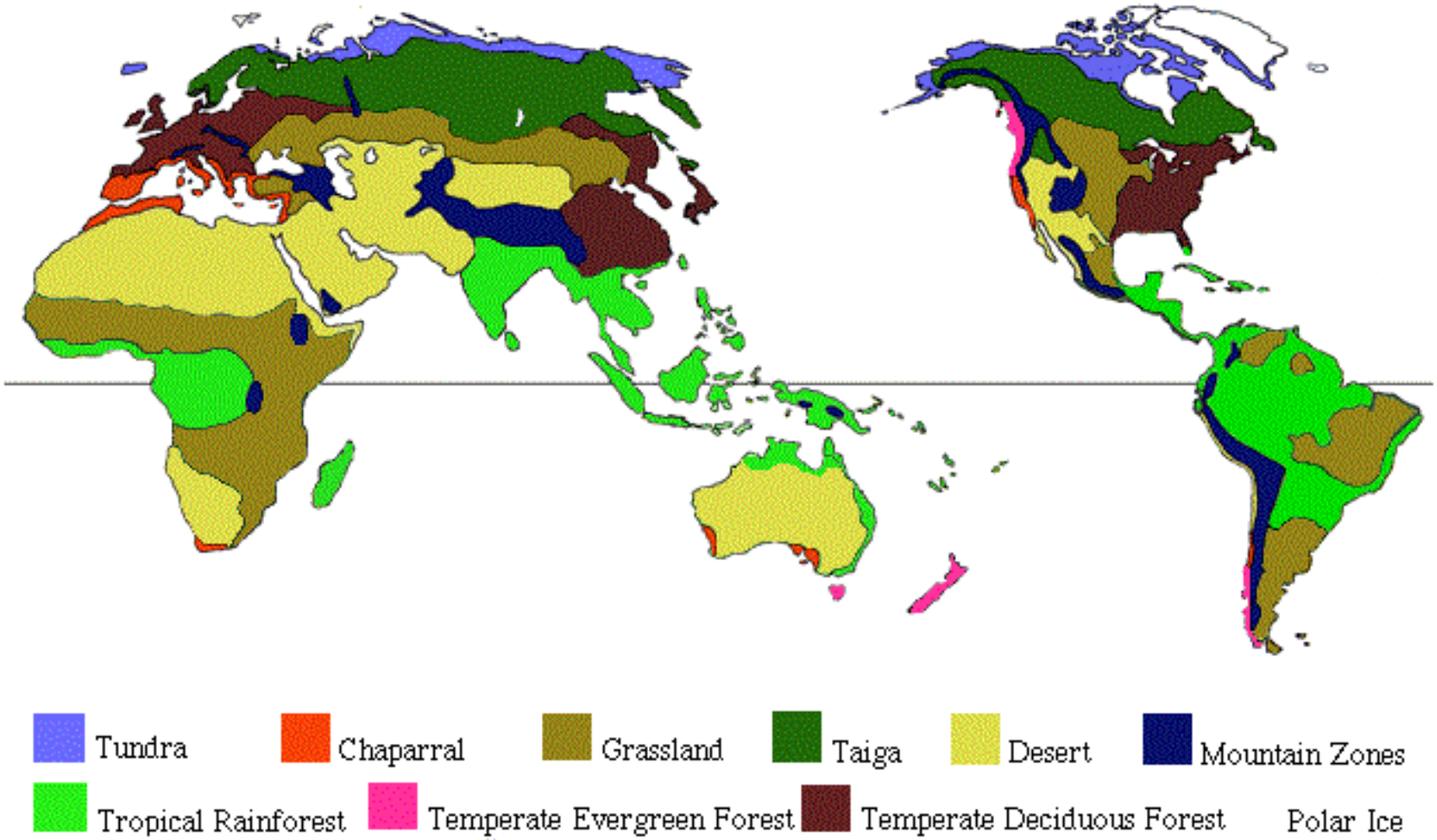
An ***ecosystem*** is a combination of the communities and the physical (nonliving) environment.

An ecosystem is all the living and nonliving factors in a particular place. An ecosystem can be small or large.

Examples:

Rotting Log
Koi Pond
Lake
Clump of Dirt
A field
An old maple tree
Bog
Marsh

Biome - large area that has a particular climate, and particular species of plants and animals that live there (tundra, rainforest, desert).



A biome is a large group of many ecosystems.

Biodiversity- the variety of organisms, the organisms genetic differences, and the ecosystems in which they occur.

- Ecological diversity- refers to the different **ecosystems** in a region
- Species diversity- refers to the different **species** within certain ecosystems

Tropical rainforests have the highest biodiversity of all the biomes.

Factors that Affect Ecosystems

Abiotic factors- nonliving factors that can affect an ecosystem (soil, pollution, natural disasters, climate).

Biotic factors- *Living* factors that can affect an ecosystem (plants and animals).

Factors that Affect Ecosystems

Biotic AND abiotic factors determine the survival and growth of individual organisms and ultimately the ecosystem.

Example) Bullfrog

Biotic factors that affect bullfrogs would be availability of food and other species that compete with the bullfrog for food or space.

Abiotic factors that affect bullfrogs would be water availability and temperature.

Can you think of any other examples of biotic or abiotic factors?

A **habitat** is a place where a particular population lives (anthills, squirrel nests, beaver dams, marshes, etc.)

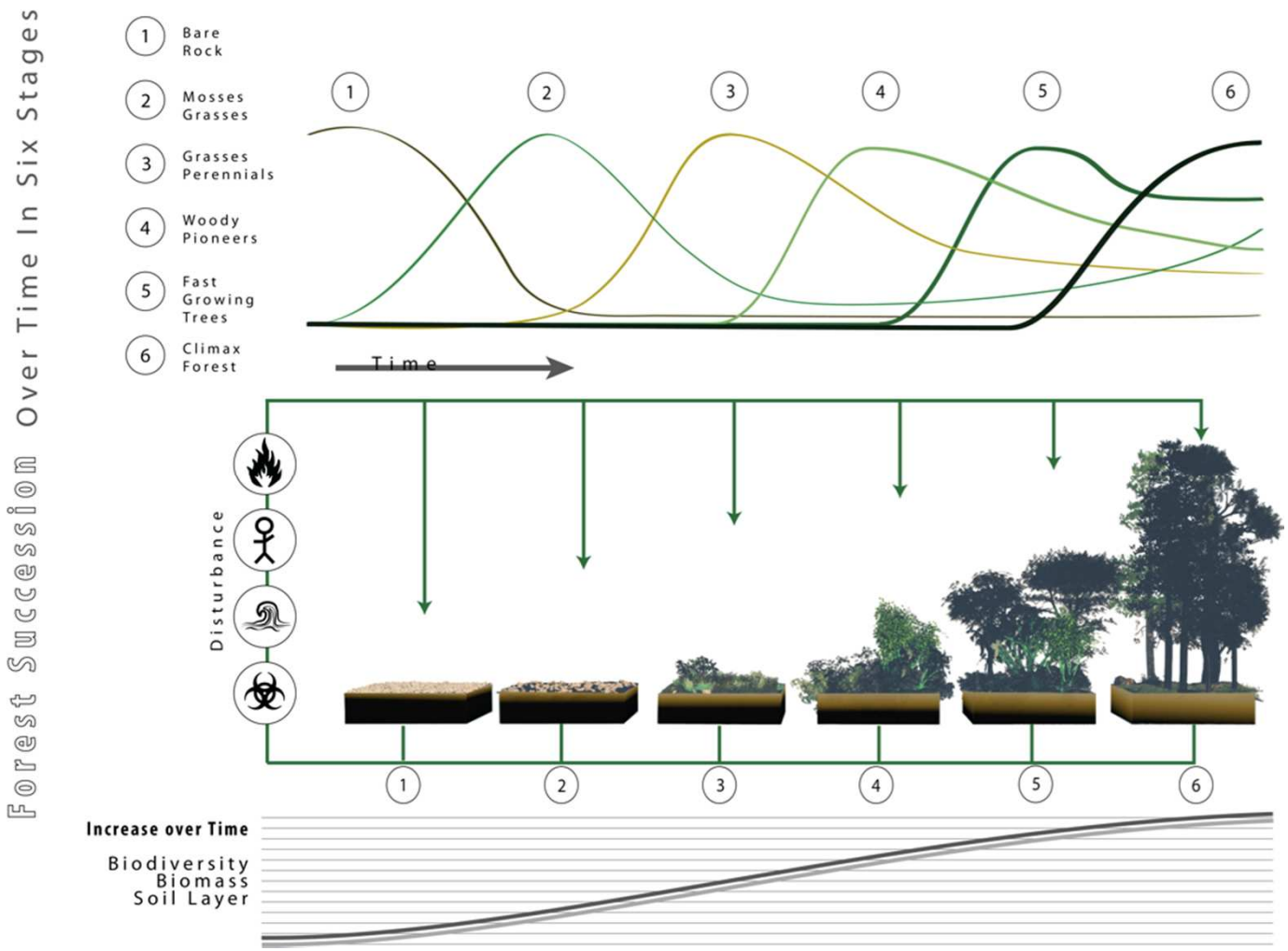
Habitats include both abiotic and biotic factors.

How do ecosystems form?

Though it may not appear this way, ecosystems are constantly changing.

Succession-
A regular progression of species of replacement over time
-- ecosystems evolving

Succession is typically slow, but natural disasters or human disturbances can make sudden changes.



Primary Succession

On land, succession that occurs where no soil exists is called **primary succession.**

The first species to populate the area are called **pioneer species.**

Examples) Receding glacier (as glaciers melt, bare rock underneath is exposed) and volcanic eruptions (new islands or built or land is covered with lava rock).

Pioneer species

Primary Succession

Lichen is a common pioneer species made up of alga and fungus. Lichen can grow on rock and release acids that help break down the rock into soil. When lichens die, they leave behind organic material that plants can use to grow.

Secondary succession- Succession that occurs in areas where soil exists, but has been damaged or disturbed.

-a change to an existing community that does not affect the soil.

Example- life after a forest fire

Re-growth after forest fire

Secondary Succession

LEFT SIDE ACTIVITY

- Levels of Organization Activity