Ecology

Lesson 1

Definitions

Biology: Bios "life" study of living organisms

Ecology: origin of ecology "oikos"–>home(i.e Earth), "logos"–>study
It is the study of plants and animals in relation to their environment, i.e. It is the study of interactions of living things with each other and with their surroundings

Ecosystem: relationship among the many species living in an environment and the relationships among those organisms and the non-living components of the environment

Food Chain: is a step-by-step sequence linking organisms that feed on each other, e.g.
algae —> small organism —> small fish —> large fish —> bear

Producers (or Autotrophs): these make food from the abiotic environment, e.g., plants, algae:

$$CO_2 + H_2O \xrightarrow{\text{light energy}} \text{Food} + \text{oxygen}$$

Consumers: animals feed on plants, e.g., adult frogs are consumers, they eat insects but are eaten by birds such as owls. (Consumers can not manufacture their own food from the abiotic environment.)

Herbivores: animals that eat only plants, e.g., tadpoles,(eat algae),cricket, insects.
Carnivores: animals that feed on other animals, e.g., frog, heron, some fish
Omnivores: animals that eat both plants and animals

Detritus: describes any organic waste from plants and animals, including their dead remains, e.g., dead leaves from trees, dead animals

Decomposers: organisms that break down detritus to get nutrients for their own use, and also release nutrients to the soil and water i.e. organisms that recycle dead material.

Habitat: environmental space where a species can live, the conditions required for the survival of a species

Scavenger: is a consumer of dead organism, e.g., vultures and jackals, gulls. The cockroach is a scavenger that lives off garbage – it is one of the species that has benefitted from human activity.

Parasites: consumers that feed on living organisms i.e. insects, micro-organisms, tapeworms.

Detritivore: is a scavenger or decomposer. It can break down and recycle nutrients from waste organic materials, such as dead producers and consumers.

Niche: all of the ways in which an organism interacts with its environment, a specific function within the ecosystem, everything an organism does to survive and reproduce.

Population: all members of the same species living in the same area.

Community: a collection of all the populations of all the species in an ecosystem.

Homework:
Complete questions # 1 to 4 "Understanding Concepts" . (page 13)

Introduction to Ecology

Book Reference Section 1.5 pp. 22-31

Definition: Ecology: as the study of all the interactions in the biosphere

Earth's environment is divided into two categories:

Biotic
consists of all living things
in the environment.
e.g. plants, grass, dandelions,
animals, fungi, bacteria

Abiotic
consists of all the non-living
Components in the environment
e.g. air, water, minerals, climate,
Sun's radiation, soil, rocks

All living things interact with the abiotic environment

Organisms of the biotic environment are
divided into two main categories:

Producers (autotrophs)
-these manufacture food
from the abiotic environment
e.g. green plants

Consumers (heterotrophs)
-these cannot manufacture food
from the abiotic environment
-they must obtain their food from
the biotic environment by consuming
other organisms, e.g. frogs, birds, humans.
-they are dependent on producers directly or indirectly

Herbivores | Carnivores | Omnivores | Detritivores

Detritivores → Scavengers | Decomposers

Cycle of Life:

Light energy → Producers → Consumers → Decomposers

nutrients in the soil → plants → animals

plants → scavengers

animals → decomposers

scavengers + decomposers → nutrients in the soil

Biosphere: the layer of the planet where living things can exist and interact is divided into three categories:

1. Lithosphere: two is solid portion of the earth's surface, e.g., rocks, soil, ice
2. Hydrosphere: the layer of water, covering 3/4 of the earth's surface, and is a habitat for organisms
3. Atmosphere: is the mass of air surrounding the earth

Biome: refers to plant and animal communities that inhabit an area.

Ecosystem is a unit of the biosphere in which organisms forming a distinct group interact with each other and with their environment.

Community: a collection of all the populations of all the species in an ecosystem.

Population: all members of the same species living in the same area. (e.g., the frogs in a pond).

Biosphere ⟶ Biome ⟶ Ecosystem ⟶ Community ⟶ Population ⟶ Community

Ecological studies determine how abiotic factors (i.e. % sunlight, temp, wind, minerals) and biotic factors (i.e. the presence of other living things such as fish, frogs) affect an individual in an ecosystem.

Ecotones: are boundaries between two ecosystems, more species are found in ecotones that border the two ecosystems because the organisms from both ecosystems are found in an ecotone.

Assignments:

1. Read pages 22-23
2. Answer: Understanding Concepts # 3-6
3. Page 45, Key terms Learn the 37 key terms for an upcoming Quiz

The Silence of the Frogs

Lesson 2

Text Book Reference 1.1 page 12-13

Why are frogs disappearing?
1989, conference in England: scientists from around the world realized that there was a decline in the population of amphibians.

Aim: **To examine the factors (natural + external) that affect the survival and equilibrium in an ecosystem.**

Why: Population declines and extinctions are important, because they result in a reduction of biodiversity.

Amphibians are good indicators of environmental health.

Frogs are more sensitive than most species, including humans to environmental changes since they breathe partially through their skin and are directly exposed to the external environment.

A study of amphibians is a good **"bioindicator"** of the health of the planet because they occupy both freshwater and forest ecosystems, any decline in frog population can be used to foretell ecological problems in both of these systems.

If frogs were wiped out → insect population would increase → results in an increase in the population of insects, and algae

↓

increase in crop destruction and disease and an increase in decomposing bacteria therefore lower oxygen level in lakes resulting in the death of fish.

Possible reasons for the decline in the amphibian population:
(1) habitat destruction
(2) chemical pollution
(3) increased UV radiation
(4) increased fungi, parasites and predation
(5) climate changes: global warming

Homework

1. Make a concept map linking the factors relating to the disappearance of the frog population.
2. Page 13, Understanding Concepts, # 1 – 4
3. Worksheet: An Ecosystem
4. Worksheet: The silence of the frogs