Biodiversity

Biodiversity refers to the variety of life in an area. The simplest measure of biodiversity is the number of different species that live in a certain area. For example, an acre of farmland may contain only a single plant species, while an acre of rain forest may contain 400 different plant species.

Where is biodiversity found?

On Earth, biodiversity increases as you move towards the equator. The most biodiverse places on earth are all warm climates: tropical rain forests, coral reefs, and large tropical lakes.

Why is biodiversity important?

If one species is lost from an ecosystem, other species may be affected:

- a species might starve when an organism they feed on is removed permanently from the food chain

- a species might quickly exceed an area's carrying capacity if all of its predators are removed

Biodiversity brings stability to an ecosystem. The more species that are present in an area, the less harmful it will be if a single species is removed.

Think of species in an ecosystem as similar to rivets holding an airplane together. If a few rivets break, the plane will probably be fine. If a lot of rivets break, the plane falls apart.

Loss of Biodiversity

Extinction is the disappearance of a species when the last of its members dies. Since the 1980s, more than 40 species of plants and animals have disappeared, or gone extinct, in North America.

When the population of a species begins to decline rapidly, the species is said to be a **threatened species**.

A species is considered to be **endangered** when its numbers become so low that extinction is possible.

A species is considered to be **extirpated** when it has disappeared from Canada, but still exists elsewhere.

What causes extinction?

Extinction has many causes:

- habitat loss
    - the complete destruction of a habitat
    - e.g. cutting down a forest for lumber

- habitat fragmentation
    - separating wilderness areas from other wilderness areas
    - e.g. building a road through a forest

- climate change
    - e.g. increasing or decreasing water temperatures can kill off various organisms on a coral reef

- habitat degradation
    - damage to a habitat by pollution (making it less livable)
    - e.g. acid rain, algal blooms, pesticides (DDT)

- species introduction
    - introducing a species that is not native to an ecosystem
    - the new species grows rapidly since it has no predators, and can eventually edge out native species
    - e.g. zebra mussels

- humans
    - humans are often the reason for many of the above

- large-scale disasters
    - e.g. asteroid hits Earth

Conservation of Biodiversity

Conservation biology is a new field that studies how to protect biodiversity. They develop and implement strategies such as:

1. Legal Protection of Species
    - there are laws that make it illegal to harm any species on the endangered or threatened species lists
    - "harm" includes changing an ecosystem where a threatened or endangered species lives

2. Habitat Preservation
    - many countries establish "nature preserves" or "national parks"
    - such areas are protected by law from habitat destruction and from harming native species
    - these areas often employ rangers to help protect the land and animals
    - the philosophy of **sustainable use** aims to let people use the resources of an ecosystem in ways that will not damage it

3. Reintroduction Programs
    - these programs release organisms into an area where their species used to live
    - before reintroduction, the factors that led to the decline of the organism are eliminated
    - the best way to do this is to reintroduce wild animals from another area (using captive-bred animals is more difficult)

Worksheet

1. Define biodiversity.

2. Would you expect to find more biodiversity in northern Canada, or in the southern United States?

3. What are two reasons that a sepcies might become threatened or endangered?

4. What does extirpated mean?

5. How does the introduction of a non-native species affect an ecosystem?