

## Topic 1 - Biological Diversity and Survival

The entire collection of living organisms, each with their own unique characteristics, makes up the Earth's biodiversity. **Biological diversity** refers to the number and variety of species and ecosystems on the Earth and the ecological processes of they are a part of.

### A Wealth of Diversity

**Interdependence** of many different species stresses the need to protect what species we currently have on the Earth.

A **species** is a particular group of organisms that have the same structure and can reproduce with each other. Of the 30 – 100 million possible different species of living things, there are over 1.5 million species of animals and 350,000 species of plants that have been identified by biologists.

The most successful life form seems to be the insect. There are many different species that can potentially help other species, like the **Pacific Yew** tree, by producing medicines. Biological diversity is important for the health and survival of natural communities.

The **main components of biodiversity** include:

- **Ecosystem diversity** – the different types of living communities and the environments, such as marshes, lakes, streams and forests, in which they are found
- **Community** (*populations of different species living in the same area*) **diversity** – occurs within **populations** (*members of a species that live in a specific area and share the same resources*) of organisms living within a particular ecosystem
- **Species diversity** – occurs within individual organisms of the same species
- **Genetic diversity** – occurs within organisms at a cellular level, as it describes the variety of genetic material in all living things.
- **Species Distribution** – Plant and animal species are not distributed evenly throughout the various eco-regions of the world. Most of the different species of plants and animals can be found in tropical regions and, more specifically, in the rainforests. As you move closer to the poles of the Earth, there is less biological diversity.



**Taxol**, found to be effective in controlling different types of cancers, is extracted from the bark of the **Pacific Yew** tree.

### Variations for Survival

Every organism needs to adapt in order to survive in its environment. There are two types of adaptations. Physical features of an organism are **structural adaptations**, whereas, actions are **behavioral adaptations**.

### The Value of Variation

Having variation in an ecosystem enables some of the organisms in that ecosystem to survive because of their higher level of resistance and survival adaptations, when certain species die off. This is important in order to maintain the ecosystem. Sacrificing one part of the ecosystem to save the main parts is also necessary sometimes. This is why foresters might decide to burn one part of a forest to save the part of the forest that they know will be able to survive other factors that are threatening to destroy the entire forest.



Mountain Pine Beetle

Destroys pine trees by spreading a bluestain fungal disease as it bores through the tree.

The tree eventually dies.



### Measuring Biological Diversity

To determine the biological diversity of an area, biologists use a measurement called a **diversity index**. This compares the diversity of species in a certain area with the total number of organisms in that same area, or ecosystem. It is primarily used to check on the health of an ecosystem – a healthy ecosystem has a high diversity index.