BIOLOGY

POWERPOINT SLIDESHOW
Grade 9 Science

BIOLOGICAL DIVERSITY

Supporting Science Textbook Content while enriching the Learning Process in Junior High/Middle School

1.1 – Examining Diversity

1. Ecosystems, Species and Genetic Diversity

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.

- bacteria
- cowbird
- red fox
- tiger salamander
All living things are made up of cells, need energy, grow and develop, reproduce and have adaptations which suit them to the specific habitat in which they live.

The entire collection of living organisms, each with their own unique characteristics, make up the Earth's biodiversity. "Biological diversity refers to the variety of species and ecosystems on the Earth and the ecological processes of which they are a part of."
The main components of biodiversity are:

- **Ecosystem diversity** - the different types of living communities and the environments, such as marshes, lakes, streams, and forests, in which they are found.

  Living things interact with non-living (abiotic) and living (biotic) parts of the ecosystems they share. As these abiotic and biotic factors vary from one ecosystem to another, ecosystem diversity refers to these differences.

- **Population** - when members of the same species share specific resources as well as habitat.

- **Community** - where different species live in the same area of a habitat.
• **Species diversity** - occurs within individual organisms of the same species.

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.

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

• **Genetic diversity** - occurs within organisms at a cellular level, as it describes the variety of genetic material in all living things.

Genetic diversity is variation of individual genes, which provides an opportunity for populations of organisms to adapt to their ever-changing environment.

The more variation, the better the chance that at least some of the individuals will have a variation that is suited for the new environment, and will produce offspring with that variation, so that they can, in turn, reproduce and continue the population into subsequent generations.

With the interdependence between biological and genetic diversity: changes in biodiversity result in changes in the environment, requiring subsequent adaptation of the remaining species. Changes in genetic diversity, particularly loss of diversity through loss of species, results in a loss of biological diversity.
• **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.

2. **Biological Diversity Classification**

   The two-name Latin naming system for all living things was developed by Carolus Linnaeus in the 18th century, enabling scientists, around the world, to refer to the same species, by the same name. This classification system was much more reliable than previous systems, because he used structure, rather than habitat. **Two words identify each organism.** The 1st represents the organisms genus and the 2nd represents the organisms particular species.
• Linnaeus based his naming system on structures of the organisms

• the organization of organisms follows the following pattern:
  1) Kingdom (Kids)
  2) Phylum (Play)
  3) Class (Catch)
  4) Order (Over)
  5) Family (Farmer)
  6) Genus (Greens)
  7) Species (Shed)

Practice: P. 15 #’s 1, 2, 3, 6, 7, 9

Must be written in COMPLETE SENTENCES.
1.2 - Interdependence

1. Interdependence

Each and every species depends on many other species within an environment in order to survive and prosper. Food chains and Food webs represent different types of ongoing relationships between and among all the organisms, within a particular environment.

2. Symbiosis

Means to have life working together in some form.

- **Commensalism** - one organism benefits and the other does not, but it is NOT harmed.
  (barnacles on a whale)

- **Mutualism** - both organisms benefit from each other.
  (lichen growing in the Arctic Tundra - algae and fungi - benefit each other)

- **Parasitism** - one organism benefits and the other is harmed.
  (tapeworm in a human host)
Interspecies competition happens when two or more species need the same resource. This type of relationship helps to limit the size of populations, of the competing species.

Species Population Limiting Factors

3. Niches

A niche is the role of an organism within a particular ecosystem. An organism's niche includes:

- What it eats
- What eats it
- Its habitat
- Nesting site, range and habits
- What effect it has on the other populations
- What effect it has on the environment
Resource Partitioning: is the action which enables competing species to share resources by accessing these resources in different ways.

This natural selection process drives competing species into different patterns of resource use or different niches. The process allows two species to partition certain resources so that one species does not outcompete the other as dictated by the competitive exclusion principle; thus, coexistence is obtained through the differentiation of their realized ecological niches.

Practice: P. 19 #’s 1, 2, 4

Must be written in COMPLETE SENTENCES.
1.3 - Variation Within Species

1. Variability

Variation within a population, of a single species, is called variability. Variability is important if there is a sudden or drastic change in the environment, in which the species lives.

When a species has a great deal of variation, then some of the individuals within that species will likely survive when there is change.

Examples of variability include:

- Red fox (color of coat)
- Antibiotic resistance (bacteria)
- Banded snail (color of shell)

2. Natural Selection

Natural selection is when the environment “selects” which individuals will survive long enough to reproduce and those that will be killed off.

If they are able to live long enough to reproduce, then those individuals with their ‘survival adaptations (characteristics) will have offspring with similar survival characteristics.
Practice: P. 24 #s 1, 2, 3, 4

Must be written in COMPLETE SENTENCES.