

1-1 The Diversity of Life

Outcomes:

1. Evaluate relationships that affect the biodiversity and sustainability of life within the biosphere. (NLS-1)
2. Analyze from a variety of perspectives the risks and benefits to society and environment of applying scientific knowledge or introducing a particular technology (e.g., analyze the risks and benefits of using insecticides such as DDT). (118-2)
3. Illustrate the cycling of matter through biotic and abiotic components of an ecosystem by tracking carbon, nitrogen and oxygen. (318-1)
4. Evaluate the importance of biodiversity to life on Earth. (318-6)
5. Explain how biodiversity of an ecosystem contributes to its sustainability. (318-6)

Introduction

When studying ecosystems, *biologists* use the term *biodiversity* to describe the types of plants and animals found in an area. Biodiversity is the total of all living organisms in an area like a park, a lake or a whole province. In Newfoundland and Labrador, this might include bears, wolves, spruce trees, trout, frogs, and eagles. It would not include elephants, tigers, crocodiles, or palm trees since these organisms are not normally found here. All living things on our planet are connected. No one thing can live in isolation from other living things. Plants need the sun to make their food then animals eat plants and other animals. Living things die and *decomposers* break them down so that new plants can make food. This has been the cycle of life for billions of years.

An *ecosystem* is the interaction of living organisms (plants and animals) and their physical environment

Biologists: A person who studies living things and where live

Biodiversity: The different types of living things in an area

Decomposers: Things like mushrooms, worms and insects that breaks down dead organisms

Ecosystem: A place where organisms live together sharing their physical environment

like water, soil and sunlight. Without biodiversity, these systems of life would not work properly or survive. Having a wide diversity of life on Earth is important for three reasons:

1. Ecological Values

All living things are supported by the way plants and animals use their environment. Loss of biodiversity makes ecosystems *unstable*, more vulnerable to extreme events, and weakens its natural cycles. For example the *carbon/oxygen cycle* balances the amount of carbon dioxide and oxygen on Earth through living things like plants and animals. Carbon and oxygen move through living things by animal breathing and plant decay. Even the burning of fossil fuels generates carbon dioxide (CO₂) in the atmosphere. An example of this would be, when gasoline is burned in cars or when garbage is burned in incinerators. Trees and plants use CO₂ to make food (in the form of sugar) that is necessary to grow. Then they release oxygen (O₂) back into the atmosphere, which gives air to breath.

Unstable: Not able to continue without help

Carbon cycle: Natural cycle of carbon from living things to the atmosphere and back

Oxygen cycle: Natural cycle of oxygen from the atmosphere to livings things (breathing) and back

2. *Economic Values*

Many different living organisms in the environment provide humans with the things needed to live. This forms the basis for our economy. Everything we buy and sell originates from the natural world. For example, the lumber that we build our homes with comes from trees in our forests. The food we eat comes from both the natural world and on man made farms where fruits, vegetables, and animals are raised. About 40% of the drugs used for medicine are developed in some way from the variety of wild plants and animals in our world. This often includes the weeds we consider pests and things that are poisonous to us. Before the making of *synthetic* drugs, humans used natural medicines and in many places of the world this is still true. For example, dandelion root can be use to make a laxitive while morphine is obtained from poppy flowers.

Synthetic: Not occurring naturally; made by man

The ocean provided fish for food and for money, the land provided wood for shelter and heat, and wild animals provided extra meat during the long winters. Today, the people in our province still show a connection to the environment. In fact, the people from Newfoundland and Labrador are well known across North America for their special connection with nature. We use it for recreation, sport, hunting and fishing, hiking, camping, and many more activities. Thus our cultural diversity is strongly linked to our province's biodiversity.

3. *Cultural Values*

Most people feel connected to nature, often for reasons that can be hard to explain. Some people love the woods and others love the ocean. Both are heavily connected to the culture of Newfoundland and Labrador. In our province, the lifestyles of past generations depended on the natural environment.

