

## BSCS Biology An Ecological Approach

### Chapter 22 Biomes around the World

*I am the Lorax.. I speak for the trees. I speak for the trees, for the trees have no tongues. And I'm asking you sir, at the top of my lungs - that thing! That horrible thing that I see! What's that thing you've made out of my truffula tree?*

-Dr. Seuss

#### Introduction

In order to study the natural **ecosystems** of the earth, scientists have grouped various ecosystems together into similar regions of plant life known as **biomes**. Each biome is home to distinct groups of plants and animals. Many factors contribute to the development of a biome; however, they are primarily a result of **climatic conditions**. **Human activity** is having an increasing effect on the various biomes resulting in the expansion of deserts and other factors such as **acid rain**.

#### The Earth's Climate and Biomes

The earth's ecosystems are influenced by weather patterns over time (**climate**). Predictable patterns of **precipitation**, **temperature ranges**, and local land forms (**topography**) are the primary **abiotic** factors determining biome plant composition. The amount of solar **radiation** absorbed is determined by the **latitude**, or position on the earth between the poles. The earth is warmest near the **equator** and much cooler near the **poles**. Differential heating of the earth's surfaces results in wind and weather patterns. **Ocean currents** also influence weather and thus, biomes.

#### Tundra, Taiga, and Forest Biomes

These biomes have either a seasonal or a constant source of high solar energy. The **arctic tundra** is a region in the far north and consists of stunted vegetation, permanently frozen ground (**permafrost**), and long cold winters. The **alpine tundra** is similar, but is found above the tree line on high mountains and mountain ranges. Vast reaches of coniferous forests of the northern hemisphere is the **taiga** or **boreal forest**. Like the tundra, winters are long and cold, and solar radiation is limited. Moving towards the equator, we find the midlatitude **temperate forest** biome. This plant community is characterized by deciduous trees which are well adapted to the **four** distinct **seasons** of the year. The **tropical rain forests** grow near or at the equator and the trees keep their leaves throughout the year. This biome is home to a majority of living species on earth.

#### The Dry Climate Biomes

Areas of reduced precipitation are represented by the **grasslands**, **savannas**, and **deserts** of the world. There are three distinct types of grasslands: the **short grass prairie**, the **tall grass prairie**, and the **mixed grass prairie**. These grasslands previously covered vast areas of the earth. Today, most have been converted to crop raising farms. Some grasslands are characterized by widely scattered trees and are referred to as **savannas**. Deserts are often found next to the grasslands. **Deserts** receive the least amount of precipitation. The **chaparral** biome is somewhat like the desert except that the plants are very thick and bushy. **Fire** was an important part of the grassland and chaparral **circle of life** pattern.

### **Earth's Ecosystems are Constantly Undergoing Change**

Many factors can contribute to changes in ecosystems. These include **fires, earthquakes, volcanic eruptions, erosion, tsunamis, floods**, and other natural events. Plant communities change over time and one may eventually be replaced by another until the area results in a relatively stable state known as a **climax community**. This process of change is known as **succession**.

### **The Human Influence**

**Human activity** is having an increasing, often detrimental, impact on the earth's ecosystems. The need for **land** for various uses by humans has resulted in the decline of grasslands and forests. In addition, poor farming practices and other disruptive practices are resulting in **desertification**, or the increase in desert environments. The burning of coal and oil (fossil fuels) has contributed to a process resulting in **acid rain**. Acid rain is having a most harmful effect on many of the living ecosystems of the northern hemisphere.