BSCS Biology An Ecological Approach

Chapter 10: Ordering Life in the Biosphere

Four million different solutions for the problem of staying alive

Camera Obscura from Leiden, The Dutch Mountains

Introduction

There are almost two million different identified and described species of living things on earth. Some biologists believe that the number is much greater. It is evolution that has produced this great diversity. Humans have developed systems to classify and describe this life. As new information becomes available, classifications may change.

Classification and Living Things

Taxonomy is a way of classifying organisms. It is based on such categories as similar structures, chemical composition, or behaviors. These similarities are known as **homologies**. Scientists study these groupings and group organisms accordingly. **Fossil** evidence is used to classify living organisms from the past that are extinct. Scientists use such descriptive aids as biochemical trees to group organisms.

The Levels of Taxonomy

All living organisms are grouped according to the rules of taxonomy into different levels based on similarities. The levels are (from the most closely related) **species, genus, family, order, phylum,** and **kingdom**. As new information about an individual species emerges, it may be reclassified. Biologists use the **binomial system** of nomenclature making use of Latin as a universal language of identification. In this way, local or common name confusion is kept to a minimum.

The Five Kingdoms

The highest level (most general) of classification is the kingdom. The living world is divided into five kingdoms. The two most primitive kingdoms are the **prokaryotes** (primitive bacteria, etc.) and the **protista** (simple single-celled and multi-celled organisms). The other three kingdoms are the **plantae** (plants that make their own food), the **fungi** (reproduce from spores), and the **animalia** (animals as we know them.).

The Origin of Life

Scientists have calculated that the first primitive life appeared on earth approximately 3.5 billion years ago. Primitive life was found in fossils known as **stromatolites**. Scientists have studied the birth and formation of stars as a way to understand the conditions on primitive earth. They duplicated the conditions on early earth with experiments which produced simple amino acids, the building blocks of life. Through continued experiments scientists determined that the first forms of life were probably types of **heterotrophs** in that they needed to obtain their “food” from their immediate environment. As time passed, these simple molecules developed the ability to replicate themselves. Later still, cells developed and began to use light to create and store energy. From these primitive “plants” life continued to evolve into the complexity we find today on earth.