Chapter 1

About Science

Living Earth

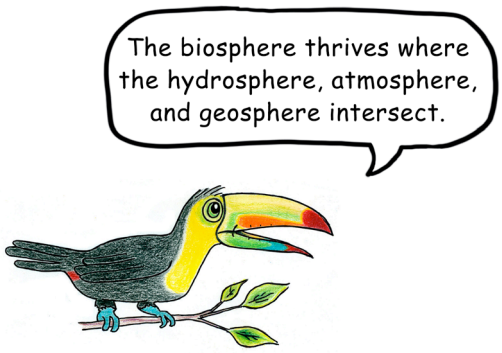
1.1 What Is Life?
1.2 The Scientific Method
1.3 Science and Technology
1.4 Facts, Laws, and Theories
1.5 Working with Numbers
1.6 LE: What Is Biogeology?

Planet Earth can be classified into three domains: The geosphere, the hydrosphere, and the atmosphere. The **geosphere** is the rocky planet itself and is, by far, the most massive of these three domains. The **hydrosphere** is all the water of planet Earth, which is found mostly in the oceans, but also in the polar ice caps, lakes, and rivers. The **atmosphere** consists of all the gaseous materials, such as nitrogen and oxygen, that are held down by gravity close to the Earth's surface.

A fourth domain is the **biosphere**, which consists of all the living things here on planet Earth. These living things rely on the resources of the geosphere, hydrosphere, and atmosphere in order to survive. That's why it's often said that the biosphere arises where the geosphere, hydrosphere, and atmosphere intersect.

Changes to the geosphere, hydrosphere, or atmosphere can greatly impact living things. In response to these changes, the living things adapt, or evolve, as we'll be discussing in Chapters 8 - 9. But might it be possible for the biosphere to have an impact on the geosphere, hydrosphere, or atmosphere? The answer is a resounding yes.

A good example is with the development of photosynthetic organisms (Chapter 4), which in absorbing the energy of sunlight generate molecular oxygen. Most alll the oxygen of the atmosphere is, in fact, a by-product of these living things. Thus, much of the atmosphere itself was formed by the biosphere. Further, molecular oxygen is a rather reactive material, which means it can react with minerals within the geosphere, such as iron, thus changing the chemical composition of parts of that geosphere.



While biology is the study of life, **biogeology** is the study of the many interactions between life and geology. The impacts of these interactions are most significant and will be featured within these special Living Earth "LE" sections of *Conceptual Biology*. We'll be exploring topics such as the history of life on this planet, how genetic engineering can be used to solve planetary problems, the availability of natural resources, climate change, the importance of biodiversity for sustainability, and more.

Planet Earth is our home. It supports us, but, in return, we need to support planet Earth. We've no other choice but to go extinct.

To Life!