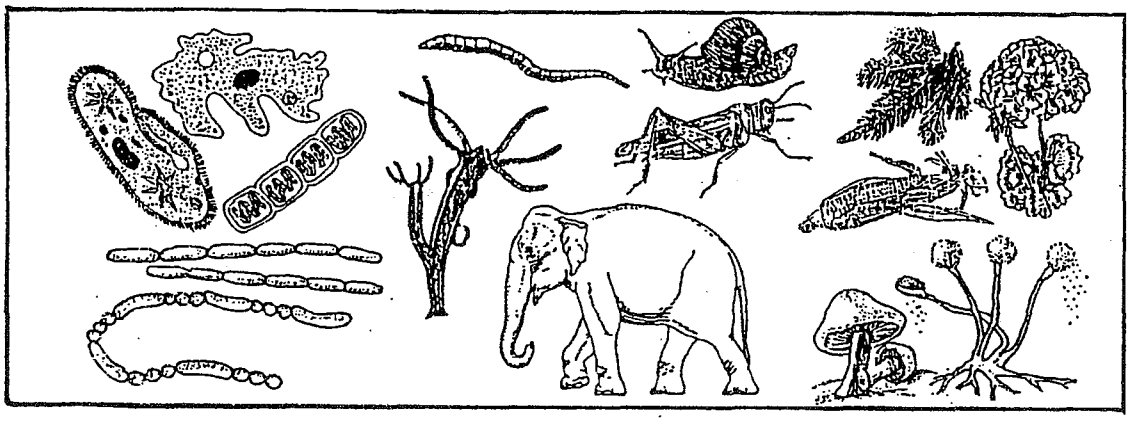
Unit Two — Key Idea

Living things are both similar to and different from each other and from nonliving things.



UNIT TWO

UNITY AND DIVERSITY AMONG LIVING THINGS

Chapter 3
Similarities in Life Processes

♦ **Defining Life.** Scientists do not agree on one definition of life. They do, however, agree that the cells of living things or **organisms** carry on certain processes that are necessary for life. These **life processes** or activities, common to all living things, are also called **life functions**. The sum total of all the life functions of an organism, including all its chemical and energy reactions, make up the organism's **metabolism.**

To stay alive, living things are similar or unified in that they rely on many of the same processes or life activities. However, the mechanisms by which these life processes are performed may vary from one group of organisms to another. Nonliving things lack certain features of living organisms, such as the ability to maintain a cellular organization, carry out metabolic processes while maintaining internal stability, and pass on hereditary information through reproduction.

In most biological respects, humans are like other living organisms. For instance, they are made up of cells like those of other animals, have much the same chemical composition, have organ systems and physical characteristics like many others, reproduce in a similar way, carry the same kind of genetic information system, and are part of a food web.

◆**Life Processes.** Life is generally defined in terms of the life functions, or life processes, that all living things perform in order to stay alive. These life processes include: nutrition, transport, respiration, excretion, synthesis, regulation, growth, and reproduction. Life processes are reviewed in Table 3-1.

Life Process	Description
Nutrition	All the activities by which an organism obtains materials from the environment and processes them for its own use. (Plants and other green organisms have the capacity to make their own food.) In animals, nutrition includes: •*ingestion*.... taking in of food •**digestion**.... breakdown of large, insoluble food molecules into smaller, soluble molecules that can be absorbed and used by the organism •*egestion*.... removal, or elimination, of undigested food materials from the organism.
Transport	Involves both: •*absorption*.... process by which end products of digestion and other dissolved substances are taken into the cells and fluids of the organism. •**circulation**....distribution of materials within an organism
Respiration	Process by which energy is obtained from the breakdown of food and stored in a form that can be used to carry on life activities.
Excretion	Removal from the organism of waste substances produced in the cells as a result of their life activities.
Synthesis	All the chemical reactions by which large molecules are produced from smaller molecules within the organism.
Regulation	Control and coordination of all the various activities of an organism in order to maintain **homeostasis**—a stable or balanced internal environment (steady state).
Growth	Increase in size and/or number of cells of an organism...uses the products of synthesis.
Reproduction	Production of new individuals...not necessary for the life of a single organism but is necessary for the continued existence of a particular kind of organism.

Table 3-1. Review of Life Processes.

Chapter 3 Review Questions
Multiple Choice

1. Which of the following is a property of all living things?
   (1) use of atmospheric oxygen
   (2) are capable of locomotion
   (3) use of carbon dioxide
   (4) carry on metabolic activities
2. The control and coordination of an organism's life processes involves
   (1) growth
   (2) transport
   (3) regulation
   (4) respiration
3. Which of the following systems is not necessary for the life of an individual organism?
   (1) digestive
   (2) reproductive
   (3) excretory
   (4) transport
4. The maintenance of a stable internal environment is known as
   (1) metabolism
   (2) homeostasis
   (3) locomotion
   (4) synthesis
5. Which activity is a function of all living cells?
   (1) synthesis
   (2) anaerobic respiration
   (3) locomotion
   (4) extracellular digestion
6. Respiration is best described as a process by which
   (1) necessary nutrients are circulated
   (2) hydrogen is used to synthesize glucose
   (3) metabolic wastes are absorbed
   (4) chemical energy is converted into a usable form
7. Which process includes the other three?
   (1) synthesis
   (2) metabolism
   (3) excretion
   (4) nutrition
8. The breathing rate, heart rate, and blood hormone levels of a human would most likely provide information about human
   (1) cellular organization
   (2) nutrition
   (3) inheritance
   (4) metabolism

Constructed Response

9. Define two life functions and explain how they interact to keep an organism alive.

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10. Normally, when the concentration of glucose in the blood falls below a certain level, stored glucose reenters the blood until the original concentration is reached again.

Name and describe the life process that is responsible for maintaining a stable concentration of glucose in the blood.

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