Differences Between Plants and Animals

ORGANISMS, especially plants and animals, are the basis of the agricultural industry. Therefore, it is important that employees in the agricultural industry fully understand the characteristics of living organisms and how those characteristics impact an organism's life processes.

Objectives:

1. Define *organism.*
2. Describe the life processes of living organisms.
3. Compare and contrast the characteristics of plants and animals.

Key Terms:

animal
cell
cell wall
circulation
food
growth
life process
life span
locomotion
organism
plant
protoplasm
repair
reproduction
respiration
secretion
sensation

Organisms

An **organism** is any living thing. Organisms may vary in size and shape, but all organisms are similar in that they can function independently and carry out life processes. A **life process** is a function that is essential for an organism to remain alive and produce new members of the species. When the life processes stop, the organism dies.

All organisms are unique, though they share many similarities. All organisms are alike in that they share the following characteristics:

- All organisms are made of cells. A **cell** is a unit or building block with a definite structure and function. The number of cells in an organism varies from one to millions, depending on the size of the organism. Cells have membranes and substances that carry out chemical activities needed for life processes. **Protoplasm** is a liquid-like substance inside a cell that contains various suspended solid materials that carry out chemical processes needed for living.
- All organisms need energy to carry out life processes. Energy for plants and animals comes from food.
- All organisms grow, reproduce, and have life spans. **Growth** is increasing in size by adding cells. **Reproduction** is the process by which organisms produce new individuals of the same kind. **Life span** is the length of time an organism lives.
- Organisms respond and adapt to their environment. The environment may promote growth and life processes, or it may prevent growth or cause death.

Life Processes of Living Organisms

As previously mentioned, a life process is a function that is essential for an organism to remain alive and produce new members of the species. All living organisms carry out life processes in different ways. Living organisms carry out the following eight life processes:

- **Acquisition and use of food—Food** is the material that provides nourishment for a living organism. The nutrients found in food provide organisms with energy. Some organisms require food in a ready-to-use form. Other organisms, such as plants, can convert solar energy into chemical energy. The original source of energy for most living organisms is the sun.
- **Movement—**Movement refers to internal processes as well as locomotion. **Locomotion** is the ability of an organism to move itself from one place to another. Locomotion is obviously very important to animals, as it helps them find food.
- **Circulation—Circulation** is the movement of necessary materials throughout an organism. Circulatory systems move blood, nutrients,

FIGURE 1. Food provides nourishment for a living organism.

oxygen, and wastes throughout animals, whereas vascular systems move water and nutrients throughout plants.

- **Respiration—Respiration** is the process by which the cells of an organism receive oxygen so that the energy in nutrients can be released. Respiratory structures vary among organisms and species.
- **Growth and repair—**Growth processes occur from the beginning to the end of life. During growth, an organism increases in size. Growth occurs when cells become larger, multiply, or specialize into tissues and organs. **Repair** is the replacement of worn-out or damaged cells by new cells.
- **Secretion—Secretion** is an organism's production of substances that it needs for the living condition to occur. Secretions are often important in how an organism carries out other life processes. For example, saliva is important to the digestive process in animals.
- **Sensation—Sensation** is an organism's awareness of its environment and the responses it makes to it. Organisms respond to stimuli received through their senses. Animals have highly developed systems for sensation in five areas: vision, hearing, touch, smell, and taste. Plants are responsive to light and to deficiencies or conditions in their environment.
- **Reproduction—**Reproductive processes vary, but all sexual reproduction involves the union of a male sex cell and a female sex cell, regardless of the species involved. Some organisms reproduce asexually, such as plants that send out runners or bulbs that divide.

Seven of the processes are essential for an organism to remain alive. Reproduction is not essential for an organism to live, but it is required for new members of a species to be produced. Disruption of any of the eight processes results in organisms failing to live and reproduce.

FIGURE 2. Reproduction is necessary for new members of a species to be produced.

Characteristics of Plants and Animals

The similarities and differences of organisms have been studied by scientists, and every known organism is classified into one of five groups known as kingdoms. The five kingdoms are monera, protista, fungi, plant, and animal. In agriculture classes, the plant and animal kingdoms are studied in more detail than the other three.

UNDER INVESTIGATION...

LAB CONNECTION:

Similarities and Differences Between Plant and Animal Cells

To understand fully the similarities and differences between plants and animals, you will first need to understand the similarities and differences between plant and animal cells. Obtain a microscope, a prepared slide of a plant cell, and a prepared slide of an animal cell from your instructor. Observe each slide's contents. Draw the cellular components for a plant cell and an animal cell, and describe their functions. Compare and contrast the similarities and differences between plant and animal cells.

A **plant** is a multicellular organism, incapable of movement, that produces its own food through photosynthesis. Approximately 350,000 species of plants have been identified on Earth.

An **animal** is a multicellular organism, capable of movement, that cannot produce its own food. Animals acquire and ingest food from other sources. Scientists have identified more than a million different animal species.

SIMILARITIES BETWEEN PLANTS AND ANIMALS

The plant and animal kingdoms are very diverse, yet all living organisms share similar needs and functions. These can be used as the basis for listing similarities between plants and animals. The similarities between plants and animals include the following:

- Both have life cycles.
- Both are composed of cells. The cells also contain many of the same organelles.
- Both plants and animals use mitosis and meiosis.
- Cellular respiration occurs in the mitochondria in both plants and animals. Additionally, both plants and animals take in oxygen and release carbon dioxide during respiration.
- Both have hormones.
- Both require water and nutrients.

Animals depend on plants to manufacture food, which then enters the food chain. Animals eat the plants. Upon death, the animals decompose to provide nutrients for plants. Plants use the nutrients from the decaying remains of animals and other plants. In addition, plants use nutrients found in animal manure for growth.

DIFFERENCES BETWEEN PLANTS AND ANIMALS

All living organisms have some basic similarities, but they are also different in many ways. The major differences between plants and animals are as follows:

- Animals are capable of locomotion; plants are not.
- Plants take up nutrients in water and make their own food through photosynthesis. Animals cannot make their own food and must eat other organisms to get the necessary nutrients.
- Plant cells have cell walls, whereas animal cells do not. A **cell wall** maintains the cell's shape and rigidity, which in turn helps the plant to stand and retain its shape. Animals have soft cell membranes and rely on skeletons to provide and maintain body shape.
- Usually, male and female reproductive parts are present on each individual plant. Animals are typically male or female.

Summary:

An organism is any living thing. All organisms are unique, but they are also similar in that they all carry out life processes. The eight life processes are the acquisition and use of food, movement, circulation, respiration, growth and repair, secretion, sensation, and reproduction. The primary organisms in agriculture are plants and animals, and they have similarities and differences.

Checking Your Knowledge:

1. Name and describe the eight life processes of living organisms.
2. List at least four major similarities between plants and animals.
3. List the four major differences between plants and animals.

Expanding Your Knowledge:

Scientists have identified approximately 350,000 species of plants and more than 1 million species of animals. Develop a list of all plant and animal species that you can identify in your home.

Web Links:

The Maize Page
http://corn2.agron.iastate.edu/

Soil Organisms
http://www.swac.umn.edu/classes/soil2125/doc/s9chap1.htm

Agricultural Career Profiles
http://www.mycaert.com/career-profiles