

Characteristics of Living Things

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What are all living things made of?
- What do all living things have in common?

National Science Education Standards

LS 1b, 1c, 1d, 2a, 2b, 2c, 3a, 3b, 3c

What Are All Living Things Made Of?

If you saw a bright yellow, slimy blob in the grass, would you think it was alive? How could you tell? All living things, or *organisms*, share several characteristics. What does a dog have in common with a bacterium? What do *you* have in common with a bright yellow slime mold?

All living things are made of one or more cells. A **cell** is the smallest unit that can carry out all the activities of life. Every cell is surrounded by a cell membrane. The *cell membrane* separates the cell from the outside environment.

Some organisms are made of trillions of cells. In these organisms, different kinds of cells do different jobs. For example, muscle cells are used for movement. Other organisms are made of only one cell. In these organisms, different parts of the cell have different jobs.



Some organisms, such as the monkeys on the left, are made up of trillions of cells. The protists on the right are made up of one or a few cells. They are so small they can only be seen with a microscope.

How Do Living Things Respond to Change?

All organisms can sense changes in their environments. Each organism reacts differently to these changes. A change that affects how an organism acts is called a **stimulus** (plural, *stimuli*). Stimuli can be chemicals, light, sounds, hunger, or anything that causes an organism to react. ✓



Organize As you read this section, make a list of the six characteristics of living things.

STANDARDS CHECK

LS 1b All organisms are composed of cells—the fundamental unit of life. Most organisms are single cells; other organisms, including humans, are multicellular.

1. Identify What are all living things made of?



READING CHECK

2. List Give three examples of stimuli.

SECTION 1 Characteristics of Living Things *continued***TAKE A LOOK**

3. Complete For a Venus' flytrap, the touch of an insect is a _____.



The touch of an insect is a stimulus for a Venus' flytrap. The stimulus causes the plant to close its leaves quickly.

Even when things outside the body change, an organism must keep the conditions inside its body the same. The act of keeping a constant environment inside an organism is called **homeostasis**. When an organism maintains homeostasis, all the chemical reactions inside its body can work correctly.

Critical Thinking

4. Predict What would happen if your body couldn't maintain homeostasis?

RESPONDING TO EXTERNAL CHANGES

If it is hot outside, your body starts to sweat to cool down. If it is cold outside, your body starts to shiver to warm up. In each situation, your body reacts to the changes in the environment. It tries to return itself to normal.

Different kinds of organisms react to changes in the environment in different ways. For example, crocodiles lie in the sun to get warm. When they get too warm, they open their mouths wide to release heat.

How Do Organisms Have Offspring?

Every type of organism has *offspring*. The two ways organisms can produce offspring are by sexual or asexual reproduction. Generally, in **sexual reproduction**, two parents make offspring. The offspring get traits from both parents. In **asexual reproduction**, one parent makes offspring. The offspring are identical to the parent. ✓

Most plants and animals make offspring by sexual reproduction. However, most single-celled organisms and some multicellular organisms make offspring by asexual reproduction. For example, hydra make offspring by forming buds that break off and grow into new hydra.

 **READING CHECK**

5. Identify How many parents are generally needed to produce offspring by sexual reproduction?

SECTION 1 Characteristics of Living Things *continued*

Like most animals, bears produce offspring by sexual reproduction. However, some animals, such as hydra, can reproduce asexually.

**TAKE A LOOK**

6. Identify How do most animals reproduce?

Why Do Offspring Look Like Their Parents?

All organisms are made of cells. Inside each cell, there is information about all of the organism's traits. This information is found in DNA (**d**eoxyribo**n**ucleic acid). DNA carries instructions for the organism's traits. Offspring look like their parents because they get copies of parts of their parent's DNA. Passing traits from parent to offspring is called **heredity**. ✓

 **READING CHECK**

7. Define What is the function of DNA?

Why Do Organisms Need Energy?

All organisms need energy to live. Most organisms get their energy from the food they eat. Organisms use this energy to carry out all the activities that happen inside their bodies. For example, organisms need energy to break down food, to move materials in and out of cells, and to build cells.

An organism uses energy to keep up its metabolism. An organism's **metabolism** is all of the chemical reactions that take place in its body. Breaking down food for energy is one of these chemical reactions.

 **READING CHECK**

8. Compare How does growth differ in single-celled organisms and those made of many cells?

How Do Organisms Grow?

All organisms grow during some part of their lives. In a single-celled organism, the cell gets bigger and divides. This makes new organisms. An organism made of many cells gets bigger by making more cells. As these organisms grow, they get new traits. These traits often change how the organism looks. For example, as a tadpole grows into a frog, it develops legs and loses its tail. ✓

Section 1 Review

NSES LS 1b 1c, 1d, 2a, 2b, 2c, 3a, 3b, 3c

SECTION VOCABULARY

asexual reproduction reproduction that does not involve the union of sex cells and in which one parent produces offspring that are genetically identical to the parent.

cell in biology, the smallest unit that can perform all life processes; cells are covered by a membrane and contain DNA and cytoplasm

heredity the passing of genetic traits from parent to offspring

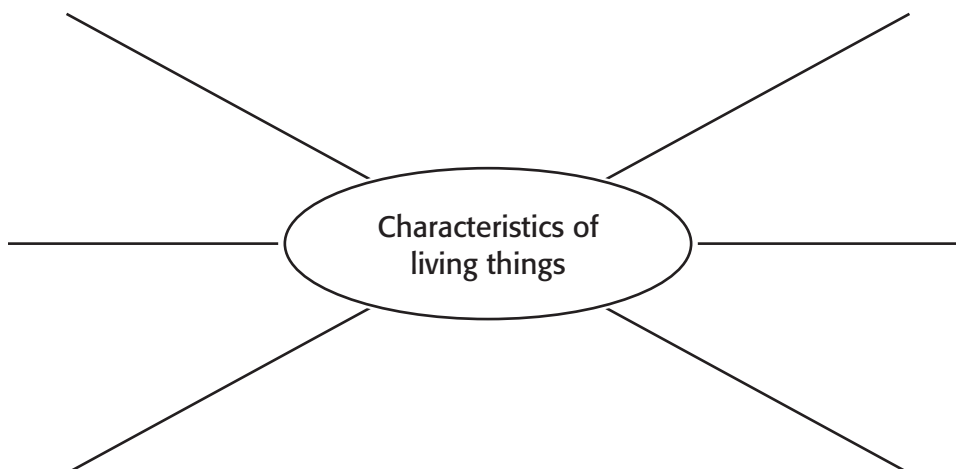
homeostasis the maintenance of a constant internal state in a changing environment

metabolism the sum of all chemical processes that occur in an organism

sexual reproduction reproduction in which the sex cells from two parents unite to produce offspring that share traits from both parents

stimulus anything that causes a reaction or change in an organism or any part of an organism

- 1. Summarize** Complete the Spider Map to show the six characteristics of living things. Add lines to give details on each characteristic.



- 2. Compare** How does sexual reproduction differ from asexual reproduction?

- 3. Explain** How do the buds of an organism such as hydra compare to the parent?

- 4. Identify Relationships** How is a bear's fur related to homeostasis?
