

4.2

The Needs of Living Things

LINKING TO LITERACY

Scanning

Scanning is a way of previewing the section to get an idea of what it is about. Look at the title of this section. Now look at the subheads. What do you think are the needs of living things?

habitat: the environment where an organism lives

Figure 1 Death Valley National Park in California is one of the hottest and driest places in North America. How do living things survive in such a harsh environment?

Can organisms live in every environment found on Earth (Figure 1)? Think of what you need to survive. You need a warm place to live, food, water, and air. All organisms have basic survival needs. If these needs are not met within their environment, the organism cannot live there. The physical space where an organism lives is called its **habitat**. An organism can only live in a habitat where its basic needs are met.



Figure 2 Almost all the energy that makes life possible on Earth comes directly or indirectly from the Sun.

Sunlight

Sunlight is a basic need for life. Most of the energy that makes life possible comes from the Sun (Figure 2). Plants and animals need energy to grow and reproduce. Plants use sunlight to make their own food (sugars), which are then used to perform life functions. The amount of sunlight that an area receives can determine what is able to live there. For example, dandelions grow best in bright sunlight (Figure 3(a)), while ferns prefer shade (Figure 3(b)). Sunlight can shine through water only to a certain depth. Therefore, plants can only exist close to the surface in underwater ecosystems because they need sunlight to produce food.



Figure 3 Different organisms have different needs. Dandelions require lots of sunlight to grow (a), whereas ferns grow best in shade (b).

Animals obtain energy indirectly from sunlight. Some animals consume plants, which have already produced energy-rich sugars using sunlight. Eating plants provides the animals with energy. These animals may then be consumed by larger animals, and energy is transferred. In this way, the energy produced in a plant may be transferred to a plant-eating animal, such as a deer, and then to another animal that consumes the deer.

Sunlight heats Earth's surface and provides warmth. Many animals such as snakes depend on this warmth to raise their body temperature so they can move more quickly. In Canada, there are more hours of sunlight in the summer than there are in the winter. Changes in the number of hours of sunlight trigger seasonal events such as bird migration and the flowering of plants.

Air

Air is another basic need for life. Air is made up of many gases, including oxygen, carbon dioxide, and nitrogen. Humans and many other organisms breathe in air to obtain oxygen, which they need to perform life processes (Figure 4). Plants absorb carbon dioxide from the air. They need carbon dioxide to produce sugars. In addition to sugars, plants produce oxygen. Oxygen production by plants is one of the most important processes on Earth. Without the oxygen input from plants, there would not be enough oxygen in the air for most organisms to perform their life functions. In one way or another, all organisms depend on the oxygen produced by plants. You will learn more about this in Chapter 5.

The gases found in air are critical for living things to survive. Canadian environmentalist Dr. David Suzuki stresses the importance of air: "You can't see it or grab it or hear it, but it's just about the most precious thing in the world." 🌍

To learn more about the
David Suzuki Foundation,

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Figure 4 This moose cow is breathing air to obtain the oxygen its body needs.

Water

All organisms need water to survive (Figure 5). Animals need water to digest food and to form body fluids, such as blood, that distribute water, minerals, gases, and food particles throughout their bodies. Plants need water to grow and produce their food. Organisms vary in their need for water. Some need salt water, while others need fresh water. Some need very little water and others need a lot.

Many organisms live in water. Water contains dissolved oxygen and carbon dioxide. Water plants, such as seaweed and pond lilies, absorb carbon dioxide from the water, and animals, such as lake trout and clams, absorb oxygen from the water.



Figure 5 Water covers 74 % of Earth's surface. Adult humans are composed of about 60 % water.

nutrient: a substance that an organism needs to grow and maintain its body

Food

Food provides organisms with nutrients (Figure 6). A **nutrient** is a substance that an organism needs for energy and to grow and maintain itself. Nutrients include sugars and starches, fats, proteins, vitamins, and minerals, such as phosphates and nitrogen. Plants that live on land absorb nutrients from the soil and surrounding environment. Animals obtain nutrients from the food they eat as well as from the environment.



Figure 6 Plants obtain nutrients from the soil and surrounding environment. Humans can obtain nutrients from the plants they grow as crops.

Ideal Temperature Range

In everyday terms, temperature is a measure of the warmth or coolness of a place or object. Temperature is affected by the interactions of sunlight, soil, air, and water.

Temperatures on Earth can range from -88°C to 50°C . Most organisms have an ideal temperature range in which they can live. If temperatures are too hot or too cold for any length of time, then the organism may not be able to survive. For example, brook trout prefer water temperatures between 4°C and 20°C and will only lay eggs when the water temperature is below 13°C (Figure 7).



Figure 7 Brook trout will lay eggs only when the water temperature is ideal.

TRY THIS: Identify the Best Living Conditions

SKILLS MENU: performing, communicating

When you purchase a plant from a store, the plant comes with instructions on how to care for it (Figure 8). You can use this information to determine the best growing conditions for the plant. Visit a plant nursery or pet store or conduct research on the Internet to help you with the following activity.

Equipment and Materials: markers; scissors; bristol board

1. Choose an organism to study. This organism could be a plant or animal from an ecosystem in your area, or a pet.
2. Research the needs of the organism you have chosen.

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- A. Design a “best living conditions” list of instructions for your organism.
- B. What are the most important considerations you have to take into account?
- C. Are conditions for plants and animals similar? Explain.

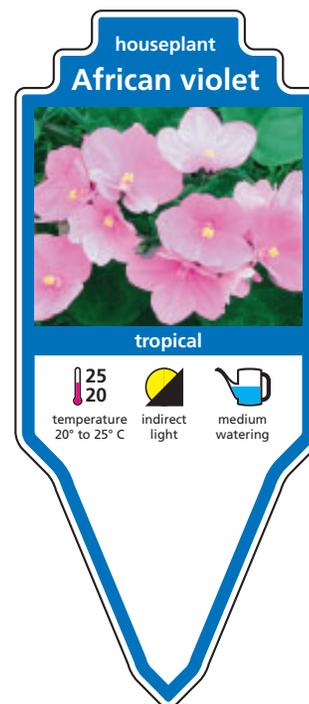


Figure 8 Plant tags provide information on how to care for the plant.

Many abiotic elements determine which organisms can live in a particular location. For example, few plants can survive in Canada’s Arctic because of the cold temperatures, long periods without sunlight, and lack of nutrients in the soil.

Unit Task Living things need sunlight, air, water, food, and ideal temperatures to survive. How might this information help you in the Unit Task?

CHECK YOUR LEARNING

1. (a) List the basic needs of all living things.
(b) Explain why organisms need these factors to survive.
2. Explain why sunlight is a basic need for both plants and animals.
3. Describe the different ways that different organisms need water to survive.
4. Name two ways that plants affect human survival.