

The Needs of Living Things

1.4

Organisms must have their basic needs (such as food, water, and suitable living conditions) met in order to survive. If an ecosystem does not supply an organism with its basic needs, the organism will not be found in this ecosystem. Think of what you need to survive. Plants and animals need these things too. Like you, if they have the right combination of all of these things, they will probably thrive.

Survival Needs

The survival needs of plants and animals include the following:

- *Sunlight*: Plants need sunlight in order to produce food. As well, sunlight provides heat for both plants and animals.
- *Food*: Plants can produce their own food using sunlight, but animals must eat plants or other animals to get their food.
- *Air*: Animals need oxygen from the air. Plants need carbon dioxide from the air to make food with the help of sunlight.
- *Water*: The bodies of both plants and animals are mostly water. In fact, you can think of living things as sacs of water. Water has many important functions in the bodies of living things.
- *Shelter*: Some animals find natural shelter in their environment. Others, like beavers and wasps, build shelters using materials from their environment.

The physical space where a certain species lives is called its **habitat**. A species of plant or animal can only live in a habitat where its survival needs are met. Although most species need the same basic things, the amount and type they need may be very different. Different ecosystems provide different amounts of sunlight and water and different types of shelter. For example, the Khutzeymateen Valley ecosystem gets about 304 cm of rainfall and has about 1400 h of sunlight per year. The antelope brush ecosystem, in the south Okanagan, gets about 34 cm of rainfall and has about 2000 h of sunlight per year (**Figure 1**).

LEARNING TIP

Make connections to your prior knowledge. What do you already know about survival needs from previous grades? Is there any new information here?



Figure 1

Many plants and animals that thrive in the rain forest ecosystem of the Khutzeymateen Valley could not survive in the antelope brush ecosystem of the south Okanagan because their survival needs would not be met.



▶ LEARNING TIP

Before reading the next four pages, “walk” through them and note the subheadings. Make a list of the limiting factors you expect to learn about.

Limiting Factors in the Non-Living Environment

All organisms have basic survival needs. If one of these needs is not met in an ecosystem, then the organism will not be able to live there. Any part of the non-living environment that determines whether or not an organism can survive is called a limiting factor. Limiting factors include physical barriers, sunlight, water, temperature, and soil.

Physical Barriers

Often an organism is not found in a particular ecosystem simply because it is unable to get to the ecosystem. Oceans, rivers, mountain ranges, and other landforms can block a plant or animal from moving to another suitable area. These landforms are called physical barriers.

Gwaii Haanas [G-why Hah-nas], the group of islands at the south end of Haida Gwaii [HY-duh G-why], has 39 plant and animal species that are not found anywhere else in the world. One of these species is the Haida Gwaii black bear, the largest black bear in North America (**Figure 2**). Many of the organisms in Gwaii Haanas would be able to live in similar habitats on the mainland, but it is too far for seeds to travel or animals to swim.

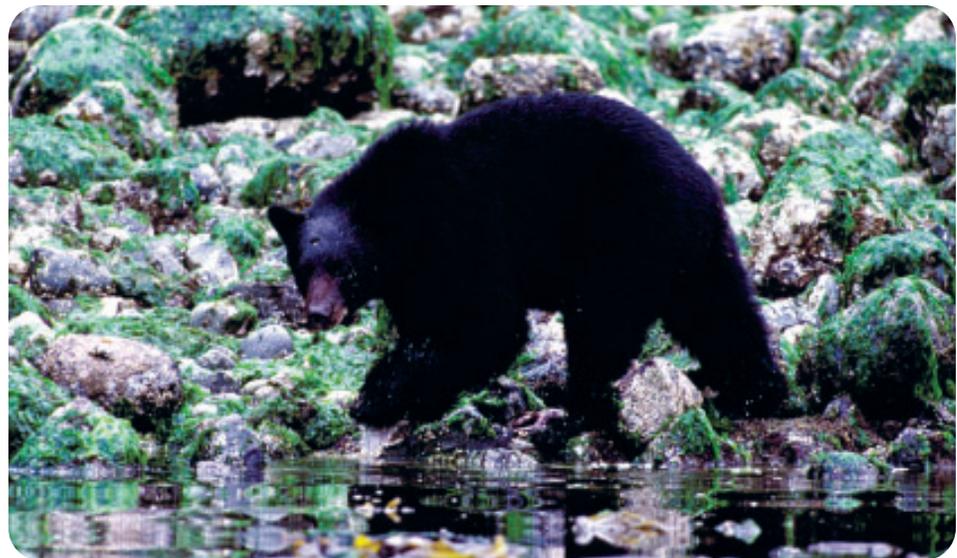


Figure 2

The Haida Gwaii black bear is only found in Gwaii Haanas because the stretch of water between the islands and the mainland is a physical barrier.

Sunlight

The amount of sunlight in an area can determine whether or not an organism can live there. Some plants grow better in bright sunlight. Other plants grow better in shade. For example, dandelions grow better in sunny places, but skunk cabbages grow better in shade.

In water ecosystems, sunlight can only shine down to a certain depth. Organisms that use sunlight to produce food can only exist in areas close to the surface, which have enough sunlight (**Figure 3**).

Many of the reptiles that live in British Columbia, such as snakes and turtles, bask in the sunlight to raise their body temperatures (**Figure 4**). Reptiles that live in hot climates seek the shade to escape the heat.



Figure 3

Kelp requires sunlight to produce food.



Figure 4

A western painted turtle basks in the sunlight to warm itself.

Water

All organisms need water. How much water they need, when they need it, and what type of water they need (fresh or salty) varies, however. The availability and type of water in an ecosystem determines what organisms can live there.

Some plants and animals need to absorb or drink water every day. Other plants and animals can exist for a long time without water. Some animals live on land but need water to reproduce (**Figure 5**).



Figure 5

This Pacific Treefrog lives on land but returns to a pond to breed.

Most plants and animals need either salt water or fresh water. A few organisms, such as salmon, live in fresh water for one part of their life cycle and salt water for the other part. Some organisms, such as the Nootka rose and shooting star (**Figure 6**), may be found in estuaries where salt water and fresh water mix.



Figure 6

This shooting star can grow in very salty soils.

Temperature

Temperature can limit the survival of an organism, if the temperature is too hot or too cold for an extended period of time. In British Columbia, the temperature is usually the coldest in the north or on mountaintops. As you travel north or up mountains, you find a tree line (**Figure 7**). Above the tree line, the temperature is too cold for trees to grow.



Figure 7

Temperature is a limiting factor for the growth of trees.

Even short-term changes in temperature can affect survival. For example, the upper limit of water temperature for successful hatching of salmon eggs is 20°C.

Soil

In nature, soil gets its nutrients from the decomposition of plants and animals. The soil of the Khutzeymateen Valley has large amounts of broken-down plant material in it. Therefore, it holds water like a sponge. The soil in the antelope brush ecosystem contains very little plant material, so water runs through it very quickly. Plants need different types of soil. For example, Indian hellebore grows well in rich, moist soil, but sagebrush requires thin, dry soil (**Figure 8**).



Figure 8

Indian hellebore (left) and sagebrush (right) require different types of soil to grow well.

TRY THIS: IDENTIFY THE BEST LIVING CONDITIONS

Skills Focus: inferring, classifying

The plant tags in **Figure 9** describe the best living conditions for the different plants. You can infer the limiting factors for the plants from their tags.

Design a “best living conditions” tag for an organism. The organism could be you, a pet, or a plant or animal from the ecosystem in which you live.

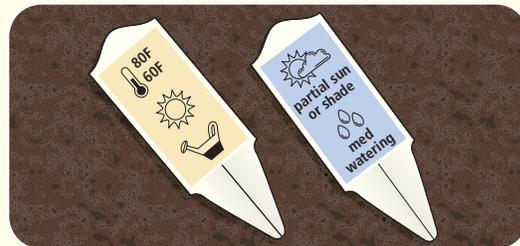


Figure 9

CHECK YOUR UNDERSTANDING

1. List the survival needs of all living things.
2. A gardener places a plant in a garden where there is a suitable amount of space and water, and suitable soil and temperature. The plant soon dies, however, because it is in the shade. What is the limiting factor for the success of this plant?
3. Logging companies are no longer allowed to remove trees that shade salmon streams. What limiting factor would exist for salmon if the trees were removed?