The Life Box

Grades: K-3

Subject, Science,

Time required:30 minutes

Key Concepts:
All life must have enough clean water.

Objectives:
Students will identify four essential factors necessary for life and explain how living things use these four factors.

SQUAMISH RIVERS

Key Words:
Soils, water, photosynthesis

Skills:
Analysis, discussion, interpreting

Background:

Why all the fuss about water? Why worry? The answer is really quite simple: the availability of water is a matter of life and death. Throughout history people have engineered ways to meet their needs and to protect themselves from water related natural events like floods and drought. You can not simply snap your fingers and get water. You can not wish water out of the sky or locate it below the ground where it does not exist. Plants, wildlife, and human communities have formed around water.

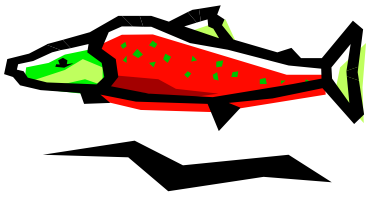
Four factors are necessary for life to exist:
Soil:
Soil is the result of rock that has been broken down by physical and/or chemical processes called weathering. Soil contains organic matter from decomposed plants and animals. Soil provides plants with minerals and nutrients, and it helps transport water to plants' roots.

Sunlight:
Radiant energy from the sun illuminates and warms

Materials

- Potted plant
- Rock
- Cups of soil
- Bottles of water
- "Life Boxes", labeled

(optional, 250ml milk cartons, soil, water, seeds)



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Background continued:
the Earth's surface. Plants use the sun's energy to make sugar from carbon dioxide and water – a process called photosynthesis.

Sunlight and soil are used directly by plants and indirectly by animals. Plants get minerals from the soil. Animals get their nutrients and energy from plants (or from animals that eat plants). Aquatic life in our rivers depends on sunlight reaching the depths through clean, clear water.

Air:
Air is a mixture of numerous gases that make up Earth's atmosphere, including nitrogen, oxygen, hydrogen, carbon dioxide, argon, neon, helium, and others. During plant photosynthesis, carbon dioxide is used to build sugar. Oxygen helps many plants and animals metabolize sugar in their cells. The burning of sugar, or respiration, supplies energy to living things.

Water:
Water is the combination of two colorless and odorless gases – hydrogen and oxygen. It is needed to dissolve and carry nutrients in solution for transport of food and waste within organisms. The process of photosynthesis also requires water.

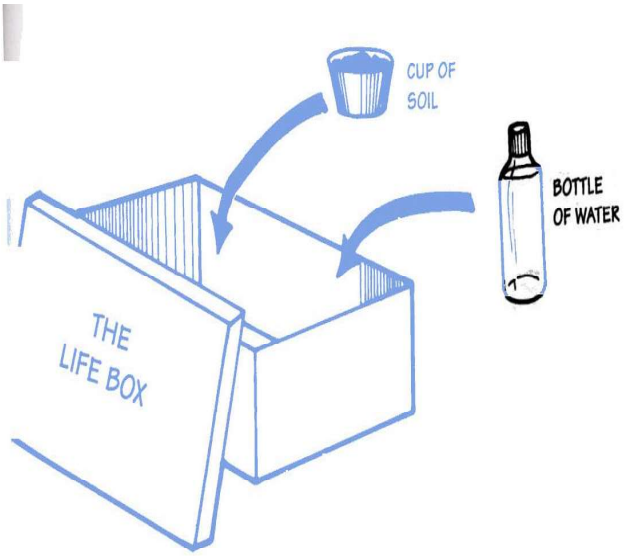
Soil erosion and air or water pollution compromise the life-supporting properties of these resources. Through awareness of our dependence on clean water, soil, and air, and perhaps through more direct use of sunlight for energy resources, we can learn to sustain the quality of our resources for future generations.

Procedure:

1. Assemble several "Life Boxes" prior to class; each with 1 cup of soil and a bottle of water inside. Label each box "The Life Box." Place lids securely on boxes.
2. Show students a live potted plant, a rock, and a child selected from the class. Ask them to identify the two things that are living.
3. Circulate the Life Boxes among your students. Ask each student to open a box and note what is inside. After each student has examined the contents, he or she should place the cover back on the box and give it to the next student.
4. Ask the students what they found in each box. They will likely answer soil and a bottle of water. Their interest should grow when you tell them that each box contains two more items.
5. Circulate the boxes again and repeat the question: "What is in the box?" If, after a short brainstorming session, your students still have not identified air and light, provide the answer.
6. Tell students that each box contains the four things necessary for most life. Actually three things are in the box – water, soil, and air. The fourth, light, entered when the box was opened!
7. Explain how each of these factors is used by living things (see background).
8. In addition to the four essential life factors, discuss with student the important concept that living things require a healthy environment: food, shelter, water, and space. What would happen if food was limited or polluted or water was contaminated? Would life such as salmon survive?

The Life Box

9. Bring the selected student back to the front of the room; also display the potted plant. Ask the class how each of these organisms uses the four life factors.



Extensions:

1. Have student plant two or three seeds or beans in each 250 ml milk carton and water them lightly each day, thus verifying that the four factors will cause dormant seeds to germinate and grow. Remind students that they must keep open the top of the carton to allow sunlight to enter.

Evaluation:

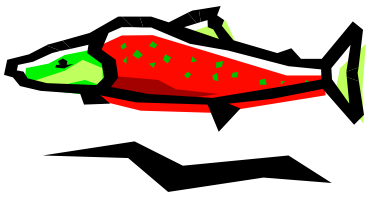
1. Identify the four essential factors of life.
2. Describe how living things use the four factors of life.

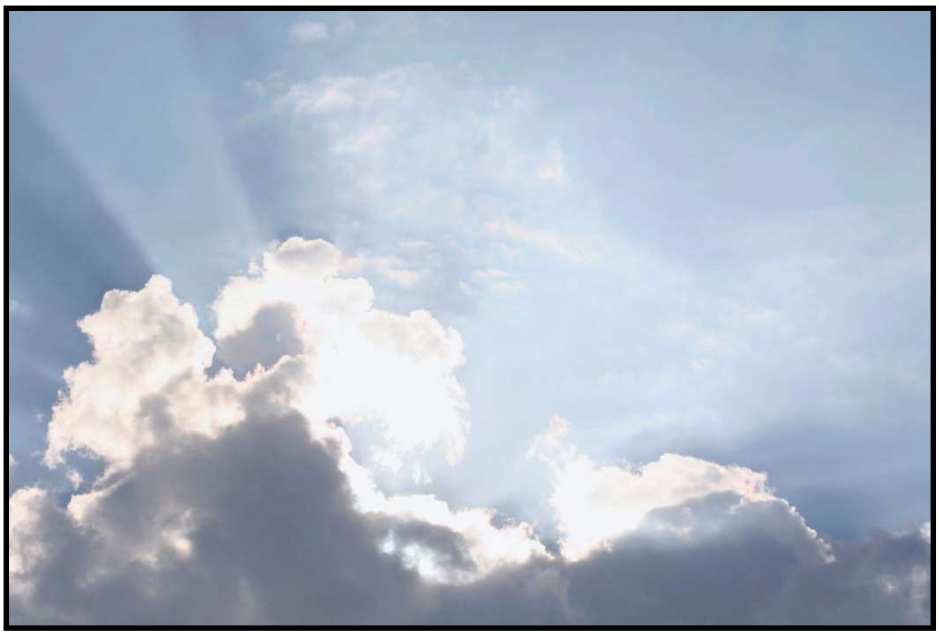
Community Connections:

1. Visit a local green house or local fish hatchery to see the four factors in real life action. Or, invite a green house owner or fish hatchery volunteer into your classroom for a presentation.

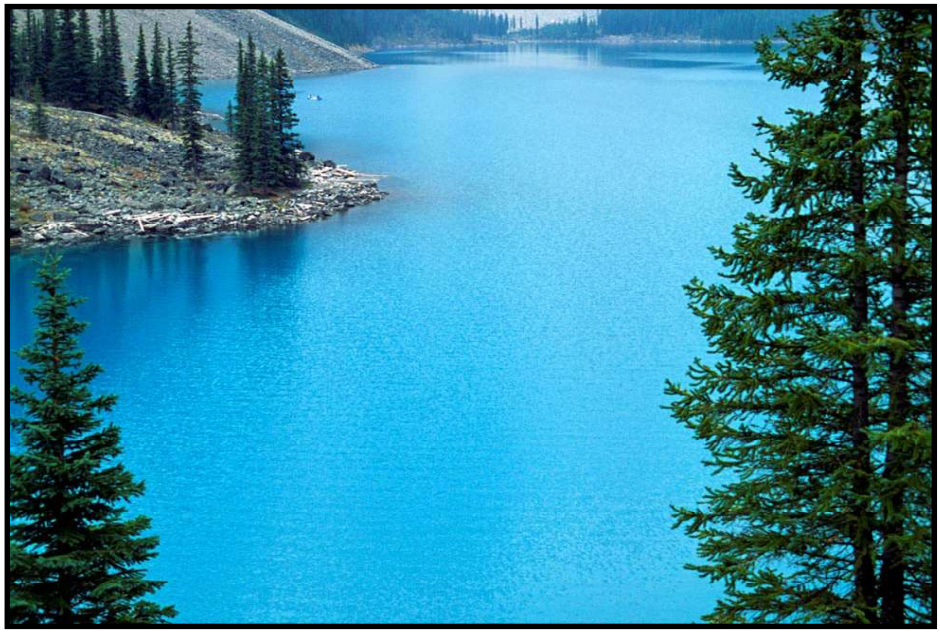
Resource:

This activity has been adapted from "The Life Box" from Project WET (1996).





AIR



WATER

SOIL

SUNLIGHT