Alive and Thriving

Wyoming Science

Objectives:

- Students learn all things need food, water, air shelter, and space (a habitat) in order to survive.
- Students investigate why plants specifically all need sun, air, water, soil, space, and shelter.
- Students learn that the quality of habitat is important for a plant or animal's health

Background:

When a gardener or farmer grows food, he or she become to provider of that plants habitat needs. On a basic level (to survive), a plants needs sun, soil, air, water, space, and shelter. Like people, when they are provided with top-quality habitat components like nutrient rich soil, full sunlight, TLC, clean air, and the right amount of clean water, they thrive. In most habitat lessons, the concentration is on the basics-only what an organism needs to survive, but in this lesson, we are interested in what is needed to grow healthy, thriving plants!

"Plants manufacture their own "food" through the wonderful and mysterious process of photosynthesis-a plant uses air(carbon dioxide) and water to store the sun's energy into" food energy" (carbohydrates and starch). But a plan still needs soil for the nutrients necessary for growth, repair and overall health, water to carry these dissolved nutrients into the plant from the soil, space for growth-spreading leaves out to the sun and sending roots out for water and nutrients,and shelter for protection from high winds, flooding, drought, insects or animals.

A farmer may use many things to help enhance a plant's habitat-tractors and tools to ease the work; compost cow manure, worms and other beneficial insects to prey on insect pests; honeybees, hummingbirds, and wild pollinators to increase production; fences; trees as windbreaks' irrigation; and a greenhouse or row covers to protect and shelter. In this activity encourage students to look at the option available for proving the optimum habitat for their crops.

Getting Ready:

Gather materials and set them out on a table. Review the concept of habitat with your students if it's unfamiliar to them.Note: This activity can be done without all the props. Just provide each group with a list of the items suggested above. Although we believe space and shelter are essential for healthy plant growth, these concepts are difficult to repre-

Standards

Science

3rd & 4th Grade

Life Systems: 1.1, 1.2, 1.3

5th & 6th Grade:

Life Systems:1.4, 1.5, 1.6

Materials

- Jars of soil
- Air (can substitute with inflated balloon representing carbon dioxide)
- Water
- Sunlight (Flashlight, light bulb or a cut-out of the sun.)
- Pictures of toys representing toy tractors; garden tools; plastic worms and/or soil microorganisms; honey bees and/or native pollinating insects' bats; hummingbirds; cow manure; compost; fences; irrigation; mini greenhouse; etc.

Estimated Time

60 Minutes

Grades 3-6

notes:

sent on a concrete level in the activity. Please discuss these with your "farmers" and suggest they keep these important points in mind as they build their farms. Representative ingredients for "Healthy Farm habitat" (4-6 of each, depending on the numbers of groups you have):

The list of materials on page one is enough for one group:

Activity Procedure:

1. Ask students to identify things they use from plants (food, furniture, medicine, oxygen, clothing). Make a list on the board. (older students could identify which plants these products come from.) Do we absolutely need the things we listed in order to survive? Since plants are important to out survival, shouldn't we know what plants need to survive? Are their needs similar to ours? Challenge your students to start thinking about what plants need. Remind them of the habitat concept.
2. Break the students into small groups and explain this scenario. Each group owns a "Healthy farm Habitat"-in its first year of operation. They plan to grow vegetables to sell at a farm stand. As farmers, they must provide they vegetables' habitat needs. Because they are first-year farmers, they have a limited budget and workforce so can provide just a little bit more than the basics. Point out the table with the "Healthy Farm Habitat" pieces where each group can choose five pieces, each (no doubling up on one ingredient) to help them grow the healthiest and best tasting vegetables they can.
3. Send each group up one at a time to gather five different pieces. (you may need to limit their time) Once they agree on their five, they need to develop good reasons why they made each choice. When all groups have had a chance up at the table, allow a second trip to make any trades. Ask them to record their reasons for the five things they choices.
4. Have each group report to the class what five items it felt it needed for its first year of farming (for its plant habitat). Write these on the board. See which items are common from group to group. Try to determine what the habitat basics were. Find out how each farm hoped to enhance its plants' habitat. Discuss how the various pieces on the table could affect a plant's life. Ask each group what additional items it would like to add and why, Allow it to add one or two.
5. Allow students to "micro-farm" with their "Healthy Farm Habitat' ingredients-set up a farm on their desks. Start posing "what if" questions to the farmers to see how the

vegetables on their farms would fare in different scenarios: Your soil lost nutrients. You didn't get enough rain. A huge flock of birds landed in the fields and started eating your plants. There was a drought. The stream got polluted. A herd of deer appeared near your farm. The wind threatens to blow away your soil and damage your crops. The farmer was sick and unable to farm. Is it possible to create the perfect farm? Why or why not?

Extension and Variations:

1. Test plants' needs for sun, soil, water, air, space, and shelter by setting up a few experiments. Predict results ahead of time and track in a journal what happens.
   - **Sun:** Put one plant in the sun and one in darkness. Compare the plant growth over time.
   - ***Soil:*** Plant seeds in potting soil, sawdust, wet paper towels, and note what happens to the plant over time.
   - ***Water:*** Water one plant regularly over-water one, and water another very little, Not what happened to the plants over time.
   - ***Air:*** Cover some plant leaves with oil or petroleum jelly so these leaves cannot breathe." Note what happens to the air-deprived leaves compared with the others.
   - ***Space:*** In two equal size pots with potting soil plant a handful of seeds in one and two seeds in the other. Observe their growth and vigor over time.
   - ***Shelter:*** Place a plant very near to a hot air vent, air conditioner, or fan and another under similar light conditions but protected from the harsher conditions. Watch the plants for changes over time.
2. Have students create slogans reminding us all of basic needs and that these needs should be clean, unpolluted, etc.
   - Example: "Everyone needs to eat well-even soil"; "Feed the soil, Feed yourself"; "What if there were not clean water?"; What if_____?"
3. Ask students what it would be like if we humans could manufacture our own food directly form the soil, sun, water, and air as plants do. Write about the experience. Compare the basic habitat needs of plants and children.
4. Explore ways a garden or farm can become a healthy habitat for other living things.

Adapted From Healthy Foods From Healthy Soil

vocabulary:

- *habitat*
- *carbon dioxide*
- *photosynthesis*
- *nutrients*