Student Scientists:

What do Plants Need for Growth?
Introduction

Do you ever wonder why grass grows, flowers bloom, and fruits blossom and ripen? It is because they are getting the right things they need to help them grow!

Sunlight, healthy soil, clean air, and water all work together to help a seed become a strong, healthy plant.

What would happen if a plant didn’t get enough water, air, sun, or nutrients from the soil? Would the plant still grow? Or would the plant die?

The word “science” comes from the Latin word “sciens” meaning “to know”. Don’t be fooled, science is not just memorizing facts, it’s a process of discovery. And, it can be fun!

Scientists have not found all there is to know about life on Earth and how the universe works. People are finding out new things each day by using science!

In this lesson you will have the chance to perform experiments on plant seeds. You get to be a scientist!

What do plants need in order to grow?

What is an experiment?

What is the Scientific Method?

Can seeds survive if they are missing water, air, sun, or soil?

What does fertilizer do?
What do plants need for growth?  

Sun and Soil

Sun

The sun provides warmth and energy for plants to survive. Plants use the sun’s energy to make their own food energy in their leaves. Not enough sun will slow down a plant’s growth and even kill it. Too much sun can be a problem too, if the plant and soil are drying out too quickly.

Soil

Soil provides a base which the roots hold on to as a plant grows bigger. It also provides plants with water and the nutrients they need to be healthy. In turn, some plants become healthy food for us.

Nutrients in the soil also help plants grow strong. Some nutrients that plants need are nitrogen, phosphorus, potassium, calcium, magnesium, and sulfur.

It is important for soil to be loose and not packed down. If the soil in a field is packed down (also known as being compacted), farmers plow it up before they plant their seeds.

Think of compacted soil as a snowball. When snow falls, it is fluffy. To make it into a snowball, you have to pack it tightly with your hands. It becomes heavier and is not as light-weight. That is what compacted soil is like.

Compacted soil makes it harder for plant roots to spread out. This limits their access to soil nutrients and weakens the plant’s hold in the ground. The more room roots have, the more soil the plant can hold in place so it doesn’t wash away during a rain storm.
What do plants need for growth?

Air

Plants take in carbon dioxide from the air to use in the process of PHOTOSYNTHESIS (making their own food energy) and give off oxygen which we use.

Pollution in the air, from machines, fires, and other sources, can block sunlight from plants. Harmful chemicals in pollution can be bad for plant growth too.

The wind also carries pollen and seeds of plants to help spread them around. This is the plant’s way of making more of its own kind.

Water

It comes from the sky as rain or snow and it flows on top of or through soil into lakes, rivers, and streams. Water is very important to plant growth.

Water helps the plant move nutrients from the soil up through its stems and leaves. Water keeps the plant moist, flexible, and helps the plant make its own food.

When growing your own plants, pay attention to how often it rains and how long the ground takes to soak up the water. If it hasn’t rained in a while and the soil feels dry, you may need to water your plants. You can do this with a hose, a sprinkler, or a watering can.

However, there is such a thing as over-watering your plants. A plant’s roots not only need room to spread out in the soil, they also need air! If the ground is OVERSATURATED, it has too much water and not enough air. Some plants can die if the water is not drained away soon enough.
Well...color me in! It looks like rain!
Review

* The sun provides warmth and energy for plants.

* Too much sun can dry out the soil and plants.

* A plant’s roots use the soil to hold the plant in place. The plant can grow tall if it has a strong base.

* A plant’s roots hold soil in place so it doesn’t wash away in the rain.

* Compacted soil is usually not good for plants because roots have a harder time spreading out to get the nutrients and water they need.

* Plants can drown in soil that has been flooded (oversaturated) with water.

* Plants need water and sun to make their own food energy (photosynthesis).

* The movement of air refreshes the plant’s supply of carbon dioxide.

* Air can transport pollen and seeds from plants so that new plants can grow somewhere else.
Vocabulary

*Conditions* - something important to the look or happening of something else

*Control* - a subject in an experiment that isn't treated with the variable; it is used as the 'normal' subject others are compared to

*Oversaturated* - having much more than the proper amount

*Photosynthesis* - the chemical process green plants use to make their own food energy with sunlight, water, air and nutrients

*Variable* - something that is being tested in an experiment, making it different from the control subject
Test Your Knowledge

1. What would happen to a plant without water? ______________________
   ____________________________________________________________

2. What can you do to help a plant if the soil is dry? _________________
   ____________________________________________________________

3. Is there such a thing as “too much water”? Explain. _________________
   ____________________________________________________________

4. Why is compacted soil bad for growing plants? _____________________
   ____________________________________________________________

5. Why is polluted air not good for growing plants? ___________________
   ____________________________________________________________
Background for teaching this lesson:

Simply observing an animal moving around or a plant growing does not always grab the attention of students. Performing experiments generally increases interest in a project.

With experiments, as opposed to an activity, students are coming up with questions, guessing the answers, and then setting out to prove whether their answer is true or not. The more input a student has, the more the project means to him or her. Experiments inspire students to learn more about a topic.

The scientific method (experimentation being its 4th step) encourages students to question what they see, becoming more innovative. Forming a hypothesis and performing an experiment to test it promotes higher levels of thinking skills.

--- adapted from Sally Kneidel’s “Creepy Crawlies and the Scientific Method.”

Science can be thought of as a “yucky”, “boring”, or “brainy” subject by many students and even teachers. But it’s really about discovery. As with any other subject, students will have to read about it and memorize certain facts and aspects of it. But a science experiment has as much hands-on potential as an art project and as much creative thought as in writing or philosophy.

This lesson describes four important environmental factors plants need in order to grow healthy and strong. Students will have a better understanding that plants do not grow independently, but because different factors of nature and human actions influence if and how it will grow.