

What do plants need to survive?

MY OWN FOOD CHAIN PROGRAM (K-2)

Plant Needs of Life **(ILS 12A, 12B)**

Overview

This curriculum explores the relationship between people and the food they eat. It aims to give children in grades K-2 a basic understanding of the flow of energy through the food chain, and the place of people in the food chain. If teachers complete the entire curriculum, their classes will explore food chains in nature, focusing on its individual links and looking at the flow of energy as a whole. Students will then look at the place of people in the food chain, and discover how people have appropriated nature's systems in agricultural practices – making the food chain our own. Classes will compare traditional and sustainable agricultural practices.

Sustainable Agriculture, for the purpose of this curriculum, shall be defined as "a system of food production, supported by consumers, where farming operations, practices and technologies work in harmony with the natural systems that sustain life on earth."

Suggested Grade Level

This curriculum is designed for kindergarten through second grade levels. The topics covered can be built upon in complexity throughout that age range.

Approximate Time

30 minutes.

Objectives

1. The students will learn that all plants need sun, soil, air and water to survive.

Activity Abstract

In this lesson, students will answer riddles to discover what plants need to survive. They will create experiments to see if plants can survive without these needs.

Background Information

All living things need to obtain things in order to survive. As people, we need oxygen to breathe, food to give us energy, shelter to protect us from cold and heat. Plants have a different set of needs, but whether on a farm, in our yards, or in the forest, plants have certain needs that they must meet in order to survive.

Plants need **sun**. Green plants can produce their own food – and ours, too. The process is called photosynthesis. But plants need sunlight in order to catalyze some of the reactions that are involved in making food.



Plants need **soil**. From soil, the roots of a plant can suck up the nutrients that the plant needs to live. The soil also anchors the plant, and helps them meet their next need...

Plants need **water**. They take it in through their roots (from the soil!) and it travels throughout the plant in xylem and phloem (for higher order plants). Water carries all minerals and nutrients to all parts of the plant, and it is one of the inputs of photosynthesis.

Plants need **air**. Specifically, plants use carbon dioxide in photosynthesis to help them create food. Carbon dioxide enters the plant through small holes in the leaves called stomata.

The process of photosynthesis takes place in the leaves of the plant. Carbon dioxide (CO₂) and water (H₂O) are recombined – using sunlight energy – to form sugar (CH₂O) and oxygen (O₂ – which people breathe).

Materials

- Riddle cards (See Appendix).
- 10 seeds, all the same type. Wheat grass or lentils work great, and can be bought in the grocery store as food.
- Shoe box.
- Water.
- Small plant pots (10) with soil.
- 2 Jars, air tight, that pots fit into.

Procedure (Session 1)

1. **Tap prior knowledge.** Ask students if they remember what a food chain is. Ask, can you live without food? Explain, food is a need of life. We can't survive without having food.
2. **Share with neighbor.** Ask, What are some other needs of life? (Air, water, shelter.) Review needs vs. wants if necessary.
3. **Introduce scientific principle.** Explain, plants have needs of life, too. Some of them are the same as our needs, and others are different. Today we are going to discover what plants need to survive. We'll do some simple experiments to see if plants really need all these things.
4. Discover plant needs. Around the classroom or outside along a trail, hang four riddles (Appendix A). Have students travel to riddles and guess answers.
5. Review principle. Write 4 plant needs on board.
6. **Introduce hands-on experience.** The class will do an experiment to see if plants can grow without these needs. Explain that we'll plant some seeds with access to all 4 needs of life. They'll be in soil, in light, in air, and get watered.
7. Explain that to have an experiment that works, you need to only change the one thing you're testing. For older students, explain that this is the "variable." So if we want to test to see if seeds grow without light, we need to have the same soil, air, water, pot, temperature, etc. Therefore we could plant two seeds in exactly the same way, but put one in a shoe box where no light gets in. Then, the only difference will be from the light.



8. How could we test if the seeds need water to grow? (Same conditions, don't water one...)
9. Soil? (Put in pot with no soil) Air? (Air is hard, because if you put the plant in a sealed jar, you can't open it for anything, including to water it. However, if the jar is air tight, no water can escape into the atmosphere and it will recycle in the jar.)
10. Demonstrate seed planting. Split into groups (5 or 10) and plant 10 seeds in pots. Make sure two are planted without soil!
11. Set up experimental conditions. Place two seeds in light-less box. Place two in the jars and seal, after watering.
12. Water the seeds each day (except the waterless seeds). Compare how they're growing.
13. **Conclusion/Wrap-up.** After several weeks, compare results. See if plants really do need the things we discovered. (Plants will probably grow in the sealed jar. Discuss why – there was enough air trapped in there for the plant to use. It couldn't live there forever because it would run out, unless there are little bugs in there that are making air, which is quite likely. Little bugs are everywhere!)

Literature Links

Literature Link: Read the book *The Dandelion Seed* by Joseph Nathony, Cris Arbo illustrator. Talk about how that seed met all four needs before it could grow. Another good book by the same authors, *In a Nutshell*, describes the life cycle of a plant and is an excellent lit link as well.

References

Plant Needs. <http://www.dnr.state.md.us/forests/education/needs.html>



Appendix A: Needs of Life riddles – two versions.

To stay green and healthy all year round,
Plants must drink this from the ground.
They use their roots just like a straw to
Get their daily fill of _____.

It's warm and bright up in the sky.
It gives us energy from way up high.
Before each and every day is done
Plants must get a little _____.

It's brown and gooey to the touch
But filled with wonderful nutrients and stuff.
Plants must live in this or they'll spoil
It looks like dirt but we call it _____.

You take it in through mouth or nose,
Plants get theirs through little holes.
Without it nothing has a prayer
To breathe we all must have some _____.

Or

It's warm and bright up in the sky.
It gives us energy from way up high.
Under the dirt we cannot see it
But to grow leaves, plants need to feel it.
Seeds all need this thing to grow,
What is it, I bet you know!

You take it in through mouth or nose,
Plants get theirs through little holes
But either way we have to breathe,
To grow and live with and survive with ease
Seeds all need this stuff to grow,
What is it, I bet you know!

It's brown and gooey to the touch
But filled with such wonderful nutrients and stuff
We take them in through our roots
(that is why we can't wear boots!)
Seeds all need this stuff to grow,
What is it, I bet you know!

Liquid of life, I always say,



We need some almost every day.
It's clear and wet and good to drink
For plants and people, I would think.
Seeds all need this stuff to grow,
What is it, I bet you know!

