



AGRICULTURE SCIENCE PROJECTS

TITLE: Various Science Projects, from the USDA, Agricultural Research Service, Sci4Kids

SUBJECT: Science

GRADE LEVEL: Varies, 4-8

MATERIAL(S): Varies

OBJECTIVE(S): To help students understand the value of asking the question “what if?” Students will be introduced to factors that can effect the growth of plants, such as popcorn, and will encourage Science Projects suitable for the classroom.

OVERVIEW: This section is from the USDA’s Sci4Kids Web site (<http://www.ars.usda.gov/is/kids/>) where you'll find a variety of teacher-ready activities which encompass a range of student levels. It will not only help students learn about agricultural research, but also strengthen reading skills and stimulate creative thinking!

INTRODUCTION: You don't have to live on a farm or even have a garden to do an agricultural science project. You just have to be interested in what goes into growing plants and animals or how this affects the world around you. These Science Project suggestions are intended to help students see what happens if...

Chemistry

How do different types of fertilizers affect plant growth?

Fertilizers differ in their amounts of the nutrients nitrogen, phosphorus and potassium. Get different fertilizers from a garden shop or nursery and apply them to groups of the same popcorn plant. Do the different fertilizers change how the plants grow? You could measure height, width, number of leaves, how fast the plants grow, number of flowers or yield.

What happens when you grow sweet potatoes next to other plants?

Compare how fast popcorn plants grow at different distances from sweet potatoes. Remember to grow some control plants completely away from the sweet potato. Check out the term allelopathy.

Understanding allelopathy:

Some plants prevent other plants from growing too close. They do this by making and releasing special chemicals called allelochemicals. Sweet potatoes contain many allelochemicals. ARS scientists are looking for ways to use these substances as natural weed killers.

There are several types of chemical allelopathy. In one type, the plants release allelochemicals from their roots. Nearby plants absorb these chemicals from the soil and die. Other kinds of allelochemicals

can slow down or stop a plant's process photosynthesis--its chemical machinery for converting the sun's energy into food.

Botany

How do different treatments change how fast seeds sprout?

You can find out how quickly seeds sprout under different temperatures, or after being soaked for different times or in different liquids. Or, see how one kind of treatment affects different types of seeds.

Environmental Sciences

How does soil pH affect the pH of water that touches the soil?

A pH meter can be found at almost any garden shop or nursery.

Gather different types of soil. Put some of each type in a cup and check out the pH. Then add water to the cups, and mix. Wait for the soil to settle and measure the pH of the water. Be sure you use water from the same source for each soil. Find out more about soil.

Understanding pH scale:

Just about every substance is acidic, basic or neutral. The acid or base nature of a substance is measured by a pH scale that runs from 0 to 14. Substances from 0 to 7 are considered acid; substances from 7 to 14 are basic. Seven, the pH of pure water, is considered "neutral." The pH of your blood is about 7.35. Most plants grow best around pH 7.0. Some--like blueberries, azaleas and rhododendrons--like acid soil with a pH from about 5 to 6.

Does soil type change how well crops grow?

Fill boxes with different types of soils and plant the same crop in all the boxes. What happens to the plants? You could measure height, width, number of leaves, how fast the plants grow, number of flowers, or yield of seeds or fruits.

How are different soil types affected by water running over them?

Farmers in many parts of the country have to irrigate--to water their crops rather than rely only on the rain. But water running over soil can cause it to wear away, or erode.

A simple experiment in soil erosion:

Find patches of different types of soil that are on slight slopes or hillsides. You could also look for patches of the same soil type with different amounts of plant cover, for example, bare soil and a grassy area.

For each test site make a sampling container. Cut the tops off plastic bottles such as soda bottles or milk jugs. Use the same size bottle for all sites. Bury each container so the lip is even with or slightly below the soil surface.

Weigh the soil that collects in the containers after each rain. Dry the soil in an oven before you weigh it; you don't want to weigh the water, just the soil. Record the differences to find out which test site had the most erosion.

Microbiology

It's easy to think of all microorganisms as germs, or bad things. But many microorganisms are very helpful, especially for agriculture. Some are even essential. Microorganisms are used to fight insects, diseases and weeds that make producing crops and raising livestock less efficient. Other microorganisms help make nutrients in the soil more available to plants.

What happens to the way plants grow if there are no microorganisms in the soil?

Take a sample of fertile soil from a field or garden and divide it into two portions. Bake one in an oven (to destroy the microorganisms). Leave the other portion alone as a control. Plant the same number of seeds in each soil sample. Remember to treat both samples the same while the plants are growing. Make sure all the plants receive the same amounts of water and light, and are kept at the same temperature. How do the plants differ as they grow?