

Experiment Guide

Regrow Vegetables

Objective

Regrowing vegetables from what you would normally be discard is an easy way to start growing new vegetables. This activity uses cuttings from vegetables to propagate new vegetable plants.

Introduction to Kids' Lab

Welcome to the BASF Kids' Lab. BASF is the world's largest chemical company and run Kids' Lab programs like this all around the world. Can anyone think why? BASF wants children all over the world to understand and enjoy experimenting with chemistry!

Has anyone heard that word before: Chemistry? What do you think it means?

Chemistry is the science of matter. Have you heard the word "matter" before? What is matter? Matter is anything that takes up space and has a weight here on earth. So basically, matter is a scientific word for stuff.

Chemistry is a science that explores the composition of substances and their properties and reactions. In other words, Chemistry is a science that explores how different stuff behaves.

Matter comes in a few different forms or states: Solids, Liquids and Gases are the most common.

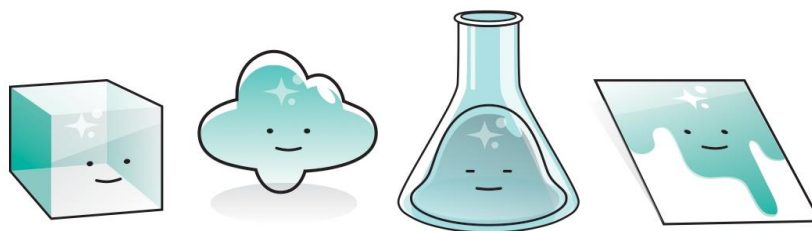
Chemistry is all around us. For example:

Who takes a vitamin? How do vitamins help you? (Grow big and strong, boost immunity) BASF makes chemicals that go into vitamins.

Raise your hand if you play a sport or ride a bike. What should you do to be safe? (Wear a helmet, pads, etc.) What materials make up the helmets that you wear? (Plastics and foam) BASF makes chemicals that go into the plastics and foams in helmets and padding.

Besides helping you grow strong and keeping you safe when you are playing your favorite sport, BASF chemistry keeps farmers crops safe, cleans water for those in need and keeps babies clean and dry.

Let me introduce you to morph, the face of Kids' Lab. morph can move through the three states of matter with ease. Is there a substance that you know of, like morph that can easily shift from solid to liquid to gas (and back again)? Water! That's right! You know that water is usually liquid but what happens when you freeze water? Water becomes a solid ice cube. When you boil water, it becomes a gas. Water is one of the most important substances on earth.



Water is essential for all living things especially plants.

morpH and I would like you to try to grow your own vegetables from vegetable scraps.

Experiment Introduction

Most of the time, inedible pieces of fruits and vegetables are discarded or composted. These vegetable scraps are excellent for compost but some can also be used to regrow more vegetables. For this activity, we are isolating the portion of the plant that is usually discarded and propagating new edible plants. Taking cuttings like these and rooting them can be used for a variety of plants (not just vegetables) and is also known as **vegetative propagation**.

Additional Background Information

Vegetative propagation is often used to create or clone plants that are genetically identical to the original plant. Why would you want to clone plants? What if grew the perfect lettuce? It looks good, it tastes good, it stays fresh and resists fungal infections. You could wait until the lettuce flowers and rely on the seed which may introduce some genetic information that does not result in the same qualities. But, the best way to reproduce the same qualities is to take a cutting and essentially keep growing the same plant.

Root vegetables grow underground. Examples of root vegetables are potatoes, carrots, beets, turnips, jicama, rutabaga and sweet potato. Leafy vegetables like lettuce, spinach, arugula and cabbage grow above ground. What are some other examples?

In the United States, tomatoes and potatoes are consumed more than any other kind of fruit or vegetable. What are some foods that contain potato or tomato? (pizza sauce, ketchup, spaghetti sauce, potato chips, French fries, etc.)

Potatoes were first domesticated in South America almost 10 thousand years ago. European travelers took potatoes back to Europe in the 1500s. Now potatoes are a major staple food across the world.

For this activity, transplanting vegetables that have sprouted to soil or outdoors will have the best results. If transplanting outside, wait until spring or summer and check to be sure the vegetable grows well in your local climate.

Other vegetables to try in the activity: Romaine lettuce, sweet potato, avocado seeds, carrots, onions and garlic.

Safety Guidelines

Lab safety is a must! In order to safely explore Chemistry, we need to follow proper lab safety. How do you think we are going to do this? Biologists follow very strict procedures to protect themselves and they include:

- Gloves

- Safety glasses
- Lab aprons or lab coats

Before we get started:

- Be sure everyone including instructors and helpers are wearing safety glasses and gloves. An apron or lab coat are also recommended for this activity.
- Point out any safety features in the classroom (ie. Eyewash or emergency shower; emergency exits).
- Mention housekeeping rules – NO EATING OR DRINKING.
- Mention location of bathrooms.

The Experiment: Regrow Vegetables

All of the vegetables selected for regrowth should be cut by an adult beforehand. It will take a while to observe the plants growing and could be several weeks or months before harvesting these vegetables.

Materials

- The root end of a green onion or leeks
- A small piece of fresh ginger or potato
- The root end of celery or fennel
- The root end of an onion, about ½ in thick
- A cup or bowl of water for rooting

For green onion or leeks:

Instead of composting or tossing the root end of these vegetables, cut off the root portion and place the cutting in a jar with enough water to cover it. Within a week, you will have enough of the vegetable to reuse. You can even plant outdoors and start the process over again!



For ginger:

Don't throw out what you don't need! Soak it in water overnight, then plant in moist soil. Your plant will sprout in about 10 days and that root will regrow. Use your ginger as a houseplant and harvest as needed.



For potato:

Who hasn't discovered a bag of potatoes in the pantry that has begun to regrow? Find some large "eyes" on those old potatoes, cut it out with about 2 inches of the potato flesh around it. Let it dry in the sun for a few days and then plant in in 7-8 inches of soil. Viola! A new potato plant will grow!

**For celery or fennel:**

We usually compost or toss the root end of celery or fennel. Instead, place it in a shallow bowl of water. In a few days, you will see new roots and leaves emerging. Transplant into soil so that the new leaves are just above the soil level.

**Follow up:**

For optimal results, place your container in a sunny location inside and replace the water if it is low. After the scraps have spouted, you could also plant the material outside in soil in a sunny location. If outdoors, keep well-watered until the plants are established.

Observations:

How long does it take for each cut piece to grow roots (in the water)?

How long does it take to grow new shoot? What do the new shoots look like?

Measure how tall the new shoot is every day. How fast is the new shoot growing?

How long does it take to harvest edible vegetables? Does one of these vegetables grow faster?

How long do you think you could continue to grow these vegetables in water? Why? Is there an advantage to growing your cuttings in soil? Compare the cuttings you placed in water to the ones you transferred to soil.

Summary:

Regrowing vegetables from what you would normally throw away or compost is easy. Give it a try and see what you can harvest to eat.