

STEAM Subject: Botany
Lab: Re-Growing Veggie Scraps

Grades: 2-8

Learning objective:

Students will be able to:

- re-grow vegetables without planting seeds or using soil
- find solutions to reduce food waste.

ENGAGE:

Ask students the following questions:

- When we eat vegetables, what part of the plants are we eating?
 - It depends on the vegetable. See the image below for some examples of common vegetables that show the different parts of the plants we can eat.
- What are the parts of a plant?
 - Roots, stalks/stems, leaves, flowers, fruits, and seeds.
- Try and think of a vegetable that is each one of these parts!
 - Examples of vegetables for each part of the plant:
 - Roots: carrots, radish, potato
 - Stalks/stems: celery, green onions
 - Leaves: lettuce, spinach, cabbage
 - Flowers: broccoli and cauliflower
 - Fruits: Tomatoes, avocados, peppers
 - Seeds: Corn, peas, beans
- Can plants grow without soil?
- Can plants continue to grow even after they have been harvested?
 - The answer to both these questions is YES! Many plants can grow without soil, while others can grow without soil for some time, but may later need to be planted into the ground. Growing plants without soil is called hydroponics. Many plants can regrow after they have been harvested because plants are living things!

EXPLORE:

The Parts of Vegetables That We Eat:

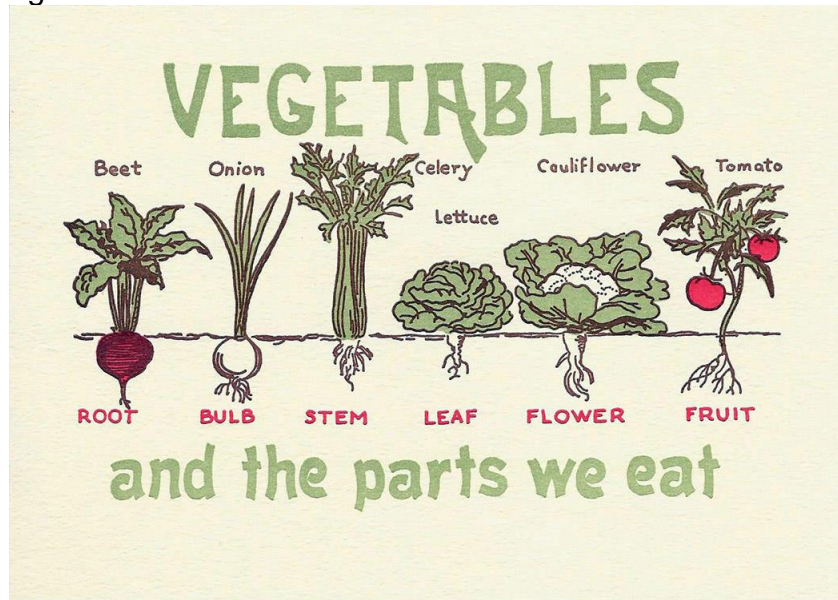


Image from: <https://www.luxepaperie.com/saturnpress31.html>

Vegetable Scrap Gardening Activity:

Students will participate in an interactive activity where they will reuse kitchen scraps and watch as they come alive again and produce more food.

Materials needed per student:

- Vegetable scraps
- A small glass vase, jar, or bowl
- Water
- A knife (requires adult supervision or assistance)
- A cutting board
- Toothpicks
- Soil (optional)

Directions:

1. Each student will choose a vegetable of their choice (see below for some options).
2. Using a knife and a cutting board (and an adult helper if needed), cut the vegetable so that the top or root can fit in the glass container.
3. If necessary, use toothpicks to keep the vegetable scrap stabilized on the top of the water.

4. Watch over time as the vegetable scrap begins to re-grow in front of your eyes! Some of these vegetables can then be harvested right from the glass container, but others may require being planted into the ground in order to continue to grow and produce more.

Here are some examples of common vegetables that can be easily re-grown:

Carrots: Use a carrot that has some greens growing off the top and cut the top off (about 1 inch to 1 ½ inches of the top). Place the carrot top in a glass bowl with about an inch of water in it and leave it in a sunny spot. The carrot greens will begin to grow higher and higher and can be harvested and utilized. Try using them in the place of parsley in a recipe.

Celery: Cut the base of the celery bunch off (about 2-3 inches) and place in a glass bowl half filled with water. Leave in a sunny location and watch as celery leaves and stalks begin to grow again!

Herbs: Place herbs (stem and leaves) in a jar with water in a sunny location and see as roots begin to form. Be sure to plant in the ground once the roots have formed!

Garlic: When you notice that a clove of garlic has a green spear shooting out of it, do not throw it away, regrow it! These are called garlic greens and they taste just as good as green onions. Simply place the budding clove in a bowl with a shallow layer of water. Once the greens begin growing, harvest them when they are about 3 inches tall, but leave some greens behind so that they can continue to reproduce.



Green onions: Cut off the end of a green onion (the part with the short roots), about 2 inches tall. Place in a small vase of water and see how everyday the green onions grow taller! Harvest once they are tall enough to use and keep it in the water to continue to regrow.

Lettuce: Cut off the base of a head of lettuce (about 2 inches) and place in a bowl of water or in a vase of water (just use toothpicks to keep it from falling). Leave in a sunny spot and watch new lettuce leaves grow. You can then plant the entire base of lettuce in soil and allow it to grow into a whole head of lettuce or harvest the baby lettuce and use immediately.

Anything with seeds: Harvest the seeds from the fruit and allow them to dry. Then plant as you would any seeds in the soil and watch them grow and reproduce over again!

EXPLAIN:

- Some of these food scraps will regrow quickly, within a few days, while others may take more time and work to start growing again. From this activity, we can see that food scraps are much more valuable and useful than we may have thought, but how are they able to grow without soil?
- Soil is an incredibly important resource, but it is not always necessary for plants to grow! What is necessary are the minerals and nutrients in the soil. Over a short period of time, plants can grow without soil as long as they are still getting water, sunlight, oxygen, and carbon dioxide. Because we are re-growing vegetables from their scraps over a short period of time, it is not necessary to use nutrient-rich soil, since we are harvesting the plant shortly after it is re-growing. Some plants, like potatoes or avocados, will eventually need soil in order to continue to grow because they take a lot of time to fully form.
- If you are wondering how the vegetables can regrow even after they have been harvested, it is because they are living things. Plants have the ability to continue to grow roots, stems, and leaves after they have been taken out of the soil. Carrots, for example, are a root, so by placing the carrot in the soil, the stems and leaves of the carrot greens can be revived and continue to grow. Green onions are stalks that are connected to a root, so by placing the root in water, the stalk can grow again.
- What is the point of growing vegetables without soil? Well, in many places on Earth, good, nutrient-rich soil is hard to come by, so hydroponics allows people to have access to fresh, healthy food even without soil. Hydroponics also does not rely on the seasons like normal gardening does, and it can be done indoors, allowing for fresh food year-round.

- Why is it important to use my food scraps? Growing food with food scraps is just one way to reduce the amount of food waste from your home. It can also save money on groceries. For example, one green onion root can regrow 3-5 new green onions! Growing food is also fun, engaging, and educational!
- Watch videos about plants growing from scraps.
 - How to grow food from food:
<https://www.bhg.com/gardening/vegetable/vegetables/regrowing-food/>
 - Crash course on hydroponics: <https://youtu.be/eCSlrlk0GTs>
 - Check out more vegetables to regrow:
<https://foodrevolution.org/blog/reduce-food-waste-regrow-from-scraps/>
- **Review STEAM Vocabulary:**
 - **Flower:** the bloom/blossom of a plant that holds the seeds, reproductive organ for most flowering plants/angiosperms (ex. Artichoke, broccoli, cauliflower)
 - **Roots:** one of the first structures to grow, they grow downward and hold the plant into the ground, also can be fleshy and enlarged and serve as a vegetable (ex. Carrot, radish, beet)
 - **Seed:** the small part of a flowering plant that grows into a new plant, can also serve as a nutrient dense food (ex. Corn, peas, beans)
 - **Leaves:** the main organs of photosynthesis and transpiration in plants, also can be eaten (ex. Lettuce, cabbage, spinach)
 - **Stem/Stalk:** a slender or elongated structure that supports a plant, can also be used as food (ex. Celery, green onions)
 - **Fruit:** A seed bearing structure of a plant (ex. Tomato, avocado, cucumber)
 - **Soil:** The upper layer of earth in which plants grow, consists of a mixture of organic remains, clay, and rock particles
 - **Hydroponics:** The process of growing plants in water without soil
 - **Nutrient-Rich:** Having a lot of nutrients

EVALUATE:

What else can you grow without soil? The next time you go for a walk, try taking a clipping of a plant in the neighborhood. Place the clipping in water and watch as it begins to root. This can then be planted outside or in a garden! It is possible to grow many plants without using soil, so give it a try!

Try and think of other ways to utilize vegetable and fruit scraps in order to reduce waste, such as composting! There are lots of amazing resources for finding uses for things that are often thrown away. Vegetable scraps can also be saved and frozen, then cooked into a hearty vegetable stock! Check out this website on how you can get more use out of your food scraps: <https://zerowastememoirs.com/baby-step-17-food-scrap/>

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