

Nutrient Absorption Experiment

Grade 1-3

Objective

Students will see how plants absorb nutrients through their **roots** and distribute them through their **stems**, **leaves** and/or **flowers**.

Materials

- 5 leafy stalks of celery or flowers (slightly wilted works best)
- 5 different colors of food coloring (avoid yellow as it is harder to see)
- 5 clear 8 oz. plastic cups, or mason jars
- Water
- Ruler
- Knife

Introduction

“Why are plants important?”

Answers: Plants provide us, and many other living things with oxygen and food so we can survive. Plants use and store carbon dioxide, this helps reduce the amount of this greenhouse gas in the atmosphere. Trees reduce humans’ energy use in the summer by providing cooling shade.

“What are the different parts of the plant? What is the purpose of each part?”

- **Roots;** help to anchor the plant in the ground, suck up water and nutrients from the soil
- **Fruits;** a home for the seeds and attracts animals (like us!)
- **Leaves;** catch the sun and turn it into food for the plant
- **Seeds;** for replanting and re-growth
- **Flower;** produces fruit by attracting pollinators
- **Stem;** carries water to other parts of the plant, keeps leaves/flowers in the light

“Plant parts are very good for us. They help us to stay healthy by giving us energy to play, and vitamins and minerals for our brains to think, bones to be strong, and our muscles to grow. So, remember to eat plant parts every day.

Today we are going to focus on the stem and roots of the plants. We are going to watch a plant drink! It’s not like when me and you take a drink, it takes a lot longer for plants to drink and they don’t use their mouths, they use their roots.”

Activity

Preparation: Prior to starting this activity, cut the ends of the celery or flowers, and using a ruler, cut them to 15 cm in length.

1. Divide the students into 5 groups. Hand out food colouring and one plastic cup or mason jar to each group.
2. Have students fill their cup halfway with water and add 10 drops of food colouring.

3. Using the celery stalk or flower, stir until the water is well mixed.
4. Put one celery stalk or flower into each container. Make sure the container is stable enough to not tip over. If using a plastic cup, you may have to prop it up against something to keep it from tipping and spilling.
5. Over the next few days, observe the plant as the food colouring gets sucked into its stalk, leaves, and/or flower. If using celery, you can use a ruler measure its progress up the stalk. Every day, have a small discussion about what they observe – Where has the color stopped? What are the water levels like in the cups?
6. Have student record their finds every day. Measure how far up the colored water has travelled. Is the water a different color? Is the celery limp? Does it smell?
7. On the last day, take the plant out the water and cut the bottoms off; if you used celery, you should be able to see the capillaries of the celery very clearly. This is how plants transport nutrients.

Discussion

What kinds of nutrients do plants need?

Where do they get those nutrients from?

How does the plants get water if we aren't pouring water on them in the aquaponics system?

Does the water stay forever in the plant?

What happens after it drinks the water?

What happens to the plant is the water is polluted?

Do you think plants in an aquaponics system drink less water or more water than plants in soil?

Since we don't water the plants with a watering can do you think an aquaponics system uses more or less water?

Table 1: Ontario Curriculum Links

Grade	Subject Area	Ontario Curriculum Links
1	Science and Technology	<p>Needs and Characteristics of Living Things</p> <p>Specific Expectation:</p> <p>1.1 identify personal action that they themselves can take to help maintain a healthy environment for living things, including humans</p> <p>2.4 investigate the physical characteristics of plants (e.g., basic parts, size, shape, color) and explain how they help the plant meet its basic need</p> <p>2.3 investigate and compare the physical characteristics of a variety of plants and animals, including humans</p> <p>3.2 identify the physical characteristics (e.g., size, shape, color, common parts) of a variety of plants and animals</p> <p>3.7 describe how the things plants and animals use to meet their needs are changed by their use and are returned to the environment in different forms</p>
2	Science and Technology	<p>Air and Water in The Environment</p> <p>Specific Expectation:</p> <p>1.2 assess personal and family uses of water as responsible/efficient or wasteful, and create a plan to reduce the amount of water used, where possible</p> <p>2.3 investigate, through experimentation, the characteristics of water</p> <p>2.4 investigate the stages of the water cycle, including evaporation condensation, collection, precipitation</p> <p>3.2 identify water as a clear, colorless, odorless, tasteless liquid that exists in three states and that is necessary for the life of most animals and plants</p> <p>3.3 describe ways in which living things, including humans, depend on air and water</p>
3	Science and Technology	<p>Growth and Changes in Plants</p> <p>Specific Expectation:</p> <p>1.1 assess ways in which plants are important to humans and other living things, taking different points of view into consideration</p> <p>2.2 observe and compare the parts of a variety of plants</p> <p>2.5 use scientific inquiry/experimentation skills and knowledge acquired from previous investigations, to investigate a variety of ways in which plants meet their basic needs</p> <p>3.1 describe the basic needs of plants, including air, water, light, warmth, and space</p> <p>3.2 identify the major parts of plants, including root, stem, flower, stamen, pistil, leaf, seed, and fruit, and describe how each contributes to the plant's survival within the plant's environment</p>

		<p>3.6 describe ways in which plants and animals depend on each other</p> <p>3.7 describe the different ways in which plants are grown for food (e.g., on farms, in orchards, greenhouses, home gardens), and explain the advantages and disadvantages of locally grown and organically produced food, including environmental benefits</p>
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