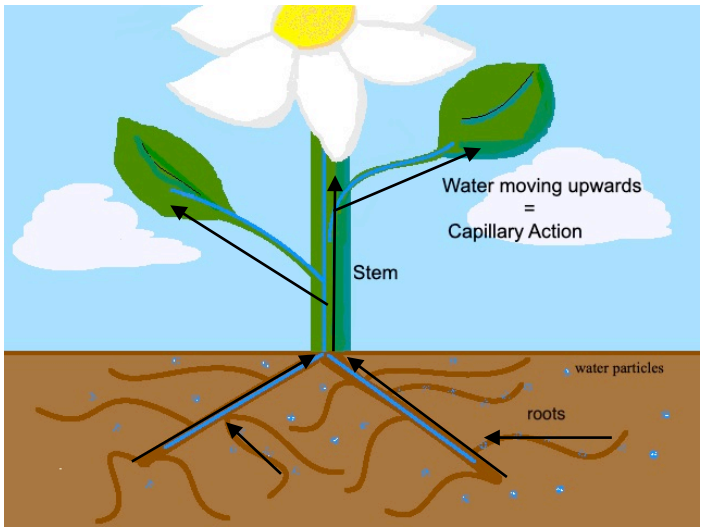
Capillary Action Activity

We're back with another Learning Together Tuesday this week! With all of this rain we're getting, have you ever wondered how plants drink up water? They don't have a mouth and a throat like humans and animals do, but they still need to take in water to stay alive. We know that water can flow down but did you know it can flow *up* too? Let's get started!

How do Plants Drink?

Plants have **roots**. The roots of most plants grow underground, so we don't usually see them. Roots collect from the soil all the water that a plant needs. The water travels up the stem of the plant to the leaves and flowers. For this to happen, water is pulled **upwards** against gravity! When water is pulled upwards it's called **capillary action** and it is what we will be experimenting with in our activity! **Capillary action** occurs when liquid moves up through narrow spaces in spite of other forces such as gravity pushing it down. There are two main forces that allow us to understand how capillary action works; these forces are called Cohesion and Adhesion. **Cohesion** is what attracts water molecules to other water molecules. So, it holds water together. **Adhesion** is what attracts water molecules to another substance besides water. When adhesion is stronger than cohesion, capillary action takes place. For example, water is more attracted to the narrow channels inside the roots and stem of a plant (adhesion) than to the other water molecules (cohesion). Because of this, some water can break free from the rest and climb up inside the roots and stem of the plant, preforming capillary action and bringing water to the rest of the plant. So, while we might not be loving all this rain, the plants sure do!

The arrows show the way the water moves and how the plant drinks!



Activity 1: Rainbow Walking Water

This activity **beautifully** demonstrates capillary action in action!

Materials**:**

- 7 cups or glasses
- Water
- Red, yellow, and blue food colouring
- Paper towels (the half-sized pick-a-size paper towels may work the best)

Method:

1. Start by placing the 7 cups in a row on a table or another flat surface. Fill the 1st, 3rd, 5th, and 7th cup with water (you should have every second cup filled with water).
2. Add red food colouring to the 1st and 7th cup. Add yellow food colouring to the 3rd cup and add blue food colouring to the 5th cup. **Add the same amount of food colouring to each cup** and mix it well!
3. Fold your paper towel twice lengthwise so that it is long and narrow. Dip one end in the 1st cup and the other end in the 2nd empty cup, so that the paper towel is bent over the 1st and 2nd cup. Do this again over the 2nd and 3rd cup, then the 3rd and 4th, 4th and 5th, 5th and 6th, and finally the 6th and 7th cups. **You should have 6 pieces of paper towel bent over each cup connecting the cups that have water in them to the cups that are empty.**

Discussion:

Over time, watch what happens. Do you know why the water looks like it has moved by itself? The paper towel absorbs the water through capillary action and the colours start to mix and you can see a rainbow! The paper towel acts like a plant stem and the water molecules are more attracted to the paper towel than other water molecules, so the adhesion is stronger than cohesion and **capillary action** takes place!

Activity 2: Colourful Daisies

Materials**:**

- Daisy/daisies (try not to use any wilted daisies, as it may not work as well)
- Warm water
- Food colouring (choose a different colour than your daisy)
- Clear glass for your daisy

Method:

1. Start off by trimming the stem(s) of your flower(s). **Note:** the longer the stems the longer it will take for the capillary action to take place! You can repeat the activity and experiment with different length stems, measuring how long capillary action takes for each.

2. Put about half a cup of warm water in your glass. Add 20-30 drops of food colouring to the water (the more colour, the better!)

3. This step is a little tricky, but it will help make sure that your daisy changes colour! Make a slanted cut at the end of the stem underwater. If you make the cut underwater, it will ensure no air bubbles get stuck in the stem, so that the daisy can still take up water. The cut should be slanted because a straight cut can prevent the stem from taking up water if it sits flat at the bottom of the glass.

Discussion:

Give your flower some time and make notes on the changes you see! What did you see and why do you think it happened? Your daisy should change colour! Write down how long it took to notice a different colour on the petals of your daisy. If you used more than one colour, take note of which colour was noticeable on the daisy first. The flowers should start to change colour after a few hours, but for some flowers, the change can take up to a day. This activity shows how plants take up water through capillary action. Even though the flower had no roots, its stem can still collect water because of the force of adhesion! The water molecules are more attracted to the stem than to the rest of the water. The petals of the daisy will change colour due to the food colouring in the water that it absorbed. **Tip:** If your flower is taking a while to change colour you can always use a magnifying glass and see if you can see the water travelling up the stem like a straw!

We hope you had fun with these activities! We'd love for you to share your findings with us by Facebook or email! Have a great week!