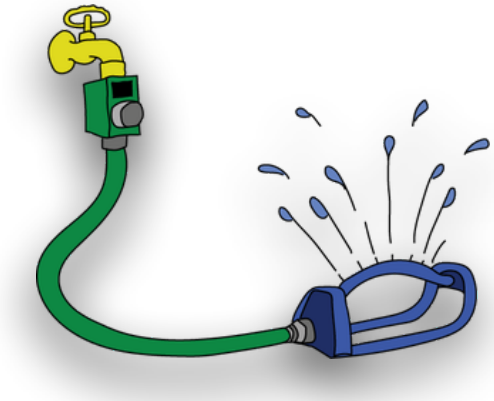
# VICTORY GARDENS

## Lesson and Activities Suggestions for Middle School

## The Ins and Outs of Watering

Plants need a few things to survive; sunlight, nutrients and water. Let's talk about water. Without water plants can't survive. It seems simple enough to water your plants, right? Actually, there are certain techniques to best water your plants. Did you know you could actually do harm by watering too much? There are also different times of the day that are most beneficial to water your plants. Plants will need different amounts of water throughout its life cycle. When they are a seedling, their root systems are shallow, so they only need little water. As they grow, and their roots grow deeper, they will need more water. There are a few simple tips to live by when it comes to watering your Victory Garden.



There are several ways to water your plants, you could use a sprinkler, a water can or a hose. Not all plants need the same amount of water. We want to be mindful to conserve water while watering our plants. Why care about conserving water when 75% of the world is covered in the blue stuff? Well, of all the water on Earth, 97% is salt water and only 3% is fresh. We really need to use only what we need when it comes to water.

So, let's dig a bit deeper to learn how to properly water your Victory Garden by watching, "5 Watering Mistakes You're Probably Making" and taking notes over each mistake. As you watch the video takes notes on each mistake and circle if you were guilty of any of the mistakes. If you were, good! It's something to learn from. At the bottom of your Notes page create a "Watering Action Plan" to help guide you into the summer months with your Victory Garden and watering it so it will flourish!

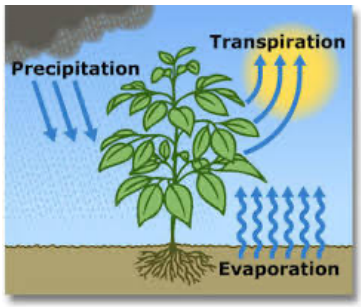
Directions: Watch, "5 Watering Mistakes You're Probably Making" by Epic Gardening at https://youtu.be/VaTkzYv8sMo.
As you watch, take notes over each section and circle if you're guilty of making this mistake. After taking your notes, write a Watering Action Plan, for the future of your Victory Garden.

| 5 Watering Mistakes | Notes |
|---|---|
| 1. Watering the Wrong Time of Day | Guilty? YES or NO |
| 2. Watering Over the Top | Guilty? YES or NO |
| 3. Over or Under Watering | Guilty? YES or NO |
| 4. Watering All Plants the Same | Guilty? YES or NO |
| 5. Not using Mulch | Guilty? YES or NO |

**Watering Action Plan**

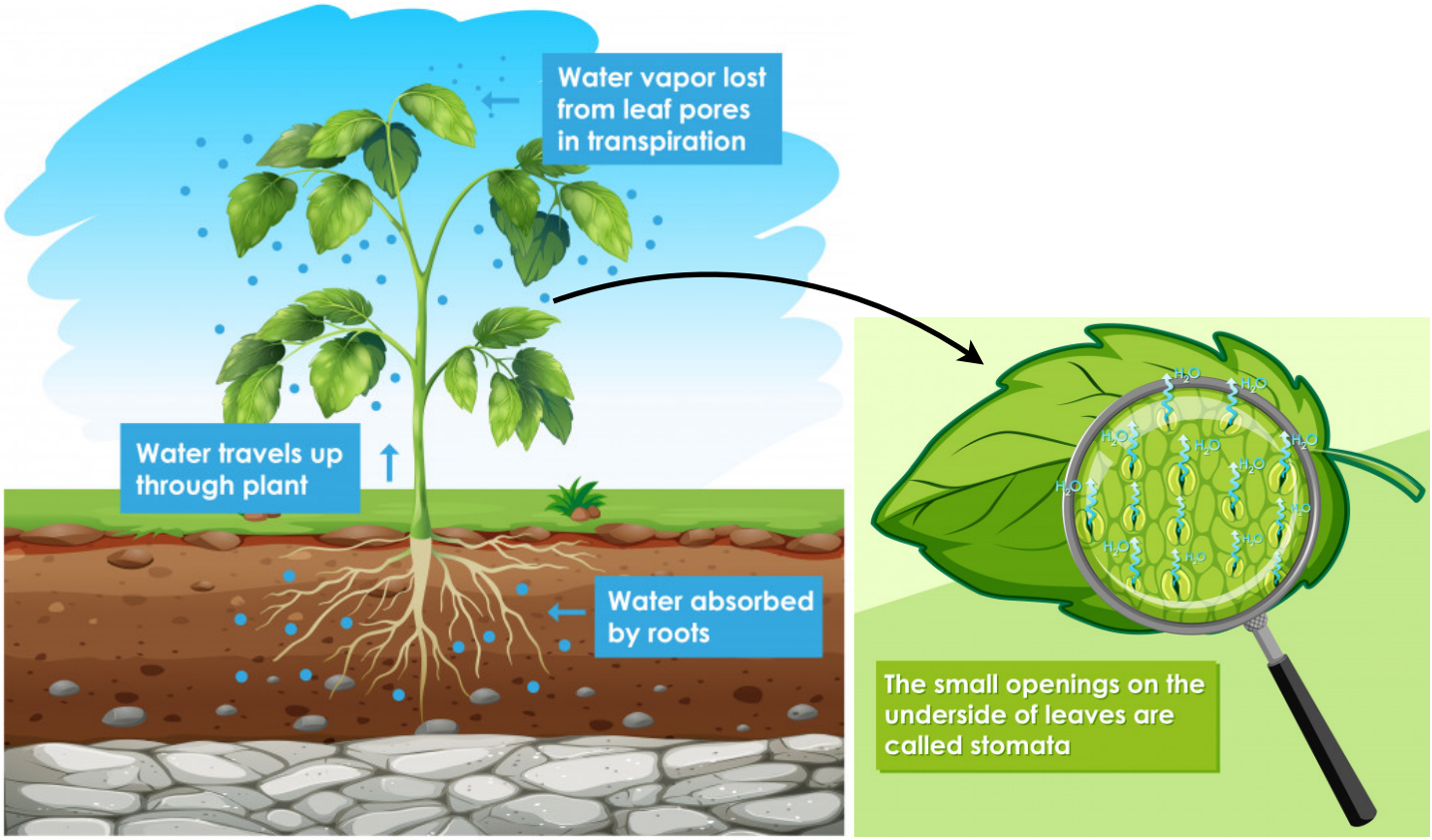
## How Does a Plant Drink Water?

In the simplest terms, plants have straws that run from their roots up and out through their leaves. The plant sucks the water moisture out of the soil and up through its body. When it reaches the leaves, it evaporates into the air. If you remember when we talked about the water cycle, you know that the evaporated water vapors then collect in the sky and become clouds, the clouds produce precipitation and the cycle continues. Here is a new word for you to add to that cycle: TRANSPIRATION.




You learned in an earlier lesson that when water turns to vapor from the ground or bodies of water, it is called **evaporation**. But you are now ready to learn that there is a more specific term to use when plants absorb water through the roots and then give off water vapor through pores in their leaves.That process is called **transpiration**.

Here's one more new word for you: STOMATA. The pores on the leaves that give off the water vapor are called **stomata**. You are getting smarter every day! Your plants thank you!



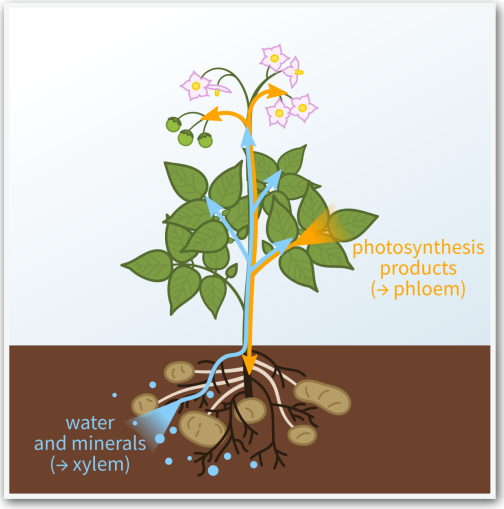
## So How Do Plants Drink Up the Water?

Just like we have veins that circulate blood around our body, plants have their own types of vascular and circulatory systems. **Veins - Vascular** **Circulation = Circulatory = Circulate**

The main parts you will hear a lot about are called **XYLEM** and **PHLOEM.**

The **xylem** of a plant is the system of tubes that circulates water and nutrients from the roots up through the stem and into the leaves. If your leaves need water and they are 100 feet above the ground, it is time to put the xylem into action! Xylem tissue dies after one year and the plant develops a new layer. This can easily be seen when a tree is cut down. Counting the number of xylem rings in the trunk tells you its age. These xylem rings also give the plant support.

**Phloem** cells are laid out end-to-end in a vascular system throughout the entire plant. They work to transport the nutritious sugars created in the leaves during photosynthesis to other parts of the plant. It can be observed in many trees when they are cut or a hole is drilled into them and sap "bleeds" out. What happens is that the cut went through some of the tree's phloem, allowing the sugary sap to run out. Similarly, if one of your veins gets a cut, blood will run out. Did you know that the sap from maple trees is collected and turned into the maple syrup we love on our pancakes!




**Phloem** carries nutrients **from the leaves** to other parts of the plant; it can flow both up and down the plant.

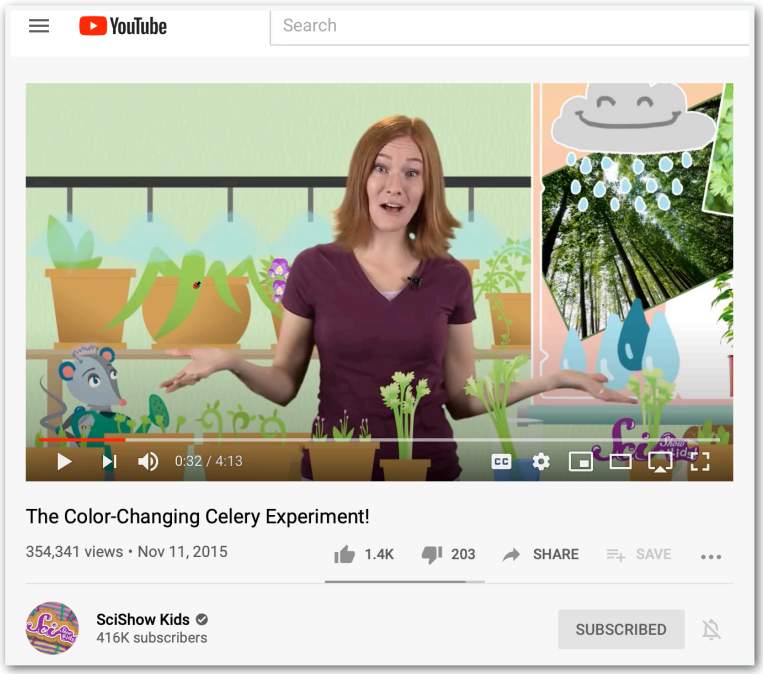
**Xylem** carries nutrients upwards **from the roots**; it can only flow up the plant.

### What have you learned? Fill in the correct words below.

1. The process of water moving through the plant system is __ __ __ __ __ __ __ __ __ __ __ __ __.
2. Leaves give off water through small openings or pores called __ __ __ __ __ __ __.
3. I can find out how old a tree is by counting its __ __ __ __ __ rings.
4. Plant sugars are transported from leaves throughout the plant by __ __ __ __ __ __.
5. The tubes that carry water and nutrients from the roots to the leaves are called __ __ __ __ __.
6. When the __ __ _ __ __ __ of a plant is cut, I may see its sugary sap bleed out.

## Seeing is Believing

In this experiment you will be able to see the xylem works! Watch this YouTube video titled "The Color-Changing Celery Experiment!" By SciShow Kids. It can be found at https://www.youtube.com/watch?v=Klug9Foou3s. Then, do the simple experiment yourself!




*You can also try this experiment with Napa cabbage leaves.*

**Materials Needed:**
Cup(s) of water
Food dye(s)
A head of celery stalks

**Directions:**
1. Fill cups with water and food coloring, as if you were going to color Easter eggs.
2. Cut off the ends (white part) of stalks of celery.
3. Place them in the cups with the top (leaf end) up and the newly-cut stalk down in the colored water.
4. Let it sit overnight.
5. Observe and record your findings!

## Want more rainbows in your life?

You can learn about different liquid densities through this rainbow experiment.
https://yellow-scope.com/blogs/news/20-minute-labs-rainbow-in-a-jar