HOW IN THE WORLD… Is there Transport in Plants??

Several factors contribute to the plant being able to transport materials.

1. **At the Roots**
* osmosis
* root pressure
1. **In the stem**
* cohesion/adhesion
1. **At the stomata in the leaves**
* turgor pressure at stomata
* transpiration pull at stomata

****

1. ***At the Roots***

**Osmosis**

* There is higher solute concentration and lower water concentration INSIDE of the roots than outside, therefore water enters the roots through



**Root Pressure**

* As water continues to move into the roots through osmosis there will be a buildup of water in the roots. There will be so much water that it will increase the pressure in the roots called . The pressure in the roots will help to push the water up. (Like a geyser)



1. ***In the Stem***
* **Cohesion**= attraction of water molecules to other molecules
* Cohesion will cause the water molecules to stick together so when water is drawn up the molecules will all draw up together
* **Adhesion**= attraction of water molecules to
* Adhesion will cause the water molecules to stick to the sides of the stem and be drawn up the stem



1. ***At the Leaves***
* **Transpiration:** the process of water vapor
* This process pulls water up the stem. (remember that all the water molecules are connected with cohesion so it is like pulling up a long chain)
* When Transpiration causes the water molecules to be pulled up the stem it is called
* **Turgor Pressure:** the guard cells will adjust to either open or close the stomata through turgor pressure.
* If the guard cells are full of water they are turgid and have a
* When the guard cells are they will be far apart therefore the stomata will be
* If the guard cells are low on water they are and have
* When the guard cells are limp they will be collapsed therefore the stomata will be



**Phloem**

* The mechanism of transport is a critical process for multicellular plants.
* It takes the products of photosynthesis from the place where they are produced, the leaves to places where they will be .
* In other words they are taken from a high concentration (a source) to a low concentration (a sink)
* At the leaf, the source of food, the phloem becomes loaded with sugar molecules from the sites of photosynthesis.
* Water then moves into the cells by osmosis.
* The water and sugar molecules then move into the sieve cells.
* The increased water pressure in the sieve cells pushes the water and sugars through the phloem to other parts of the plant.
* This movement of water and sugar is called the .

**Plasmolysis:**

When a plant cell is put into a HYPERTONIC solution, water will leave the through . This results in a ‘shrivelled up’ plant cell. This process is called .

When would a plant cell ‘be in’ a hypertonic solution?

Draw a picture of a plant cell with plasmolysis

 Transport in Plants

1. Grab a piece of poster paper.
2. Draw a large plant with roots.
3. Show and explain the ***movement of water*** up the plant, starting from the root and ending at the leaves.
4. Label and explain ***how water moves*** from the roots to stem and up into the leaves. Use the following processes to explain this:

At the Roots

-osmosis

-root pressure

In the stem

-cohesion/adhesion

At the leaves

-include function of stomata

-include explanation of turgor pressure

-transpiration pull

1. Identify ***why water*** needs to be used in the leaves. Use the following words/definitions to help you:

-photosynthesis

-chloroplasts