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Water Uptake Experiment

Grades: 5-8

Materials needed:

- 2-liter pop bottle or a clear plastic container approximately 10-12 inches tall
- Potting soil
- Water
- Ruler
- A cutting utensil (to cut the pop bottle)
- A scale that will measure in grams
- Poplar tree cuttings

Objective

The Water Uptake Experiment is designed for a 5th – 8th grade learning level. This project allows students to learn more about the amounts of water needed for plant growth and survival. The Water Uptake Experiment also exposes the students to a more advance data collection process, as well as touching on the important use of the scientific method.

Experiment procedure:

1. Plant the poplar cutting in a clear container to allow the students to see the roots form and the tree grow.

The students should each provide a clear 2-liter pop bottle. Remove the label, then measure 10 inches up from the bottom of the 2-liter bottle and make a mark. The mark is where the students should cut the top of the bottle off, leaving them with an open container to plant their poplar cutting. Finally poke a few holes in the bottom of the bottle as drainage holes for excess water.

2. Have the students hold their poplar cutting in their container, at this time the students can start filling the container with the potting soil. Make sure the students leave one or two leaf buds (approximately 1-2 inches) above the soil. The buds should point up, not down.

3. After the students have the trees planted in their containers, have them weigh their containers to get a total weight of the container, potting soil, and poplar cutting.
4. Have the students water their poplar cutting with enough water so that it starts to run out of the bottom of their container through the drain holes.
5. Once again have the students weigh their containers, this time to find the total weight of the container, poplar cutting, potting soil, and water. Next subtract the total weight found in Step #3 from the total weight found in Step #5. The difference in weight will tell the student precisely how much water they put into the container.

You should have all of the students start out watering their containers the same amount. This will ensure that all of the students are starting out with an accurate baseline to start the experiment. By establishing a baseline of data to work off of, the student will produce a much more accurate set of results.

6. Have the students set their containers in the window where they all will receive approximately the same amount of sunlight. Wait for the leaves to start growing (1-3 weeks usually).
7. After the leaves have started to grow, have the students reweigh their containers every 1-3 days. Then have the students subtract the new weight from the weight they calculated in Step #5. The new number is the amount of water that the plant is using. After a couple of times the students can start to see changes in the water uptake of the tree as it moves through the growth cycle.

A scientific way to show the comparison is by a graphical representation. To do this the students should start by laying out a piece of graph paper with the Y-axis showing the amount of water that the poplar cutting is taking up (represented by numerical values). The X-axis should show the dates or days the students recorded data or made calculations. After this is completed the students should have a precise graph in which they then can start to create hypotheses about why the poplar tree may be taking up water at different amounts at different times of its growth cycle.

8. The procedure described in Step #7 should be repeated at least 4-6 times in order for the students to gather enough data to show an appropriate graphical change in their results. To gather enough data the experiment should last at least 3 weeks if you have the students take a reading every 1-3 days. The students' graphs should show a curve in the water uptake of the poplar cutting as a plant develops. Make sure as the experiment progresses that the students add water if the soil becomes dry. The students must make sure that if he or she adds water that they reweigh the container and subtract it from the last calculation that was taken so they know how much water they add. If the students don't reweigh their containers after they add water the results which they record from that point on will be inaccurate.

Conclusion

Ecolotree would like to thank you for the purchase of a “Buffer In A Bag.” Hopefully your students will have fun and learn a little more about how water affects plant growth.

If you have any questions, please contact Aaron Shultz at Ecolotree, Inc. (aaron-shultz@ecolotree.com), or by phone (319) 665-3547).



To order trees please mail a check to Ecolotree Inc. at 3017 Valley View Lane NE, North Liberty, IA 52317.
If more information is needed please email (aaron-shultz@ecolotree.com) or call (319) 665-3547

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