



Topic: Plant Growth Lab

Summary: Students will learn how photosynthesis is used by a plant to make sugars. These sugars are then used to perform cellular respiration to make energy. The sugars are converted into larger molecules like cellulose to help build the structure of plant cells. Students should also recognize that plants grow by cell division.

Goals & Objectives: Students will be able to how many processes are involved for plants to grow. Students will be able to design a guided inquiry experiment.

Standards: NGSS: HS-LS1-4, LS1-5, LS1-6, LS1-7
Common Core: RST 9.10.3, 9.10.5, 9.10.7
Common Core: WST 9.10.1b, 9.10.1e, 9.10.2a, 9.10.7, 9.10.9

Time Length: 5 partial periods for writing procedures, watering and observations, graphing, and writing the conclusion

Prerequisite Knowledge: Students should have already been introduced to the following concepts: cell division, photosynthesis, sugars, cellular respiration, and metabolism.

Materials:

- Grow light
- Graduated cylinder for measuring amount of water / solution
- Germinated seeds, preferably seeds that grow fast like the Mung Bean
- Pot / beaker or other container to hold soil
- Cola or energy drink solution
- Coffee solution
- Fake urea solution (ammonia)
- Sugar solution
- Weak acid solution (vinegar)
- Saline solution

Accommodations: Students with an IEP should work in a group with strong experimental design skills. Notes about the main concepts can be provided so they have easy access to science concepts.

Name: _____ Row: _____

Plant Growth Lab

Date: _____ Period: _____

Driving Question:

In this lab, you will be discovering how a disruption in photosynthesis can affect how a plant grows.

Materials:

- germinated seeds
- light source
- soil
- container for soil
- water and graduated cylinder
- student determined solution

Background:

There are many processes involved in order for a plant to grow. Photosynthesis, cellular respiration, and cell division are all required for plants to grow. On top of the processes just listed, plants need to make cellulose from their food. This process is called metabolism. Cellulose is a carbohydrate that make up the cell wall of plant cells. Cellulose helps to make plant cells rigid (stiff) by allowing the cell to hold a lot of water but not too much. Having a lot of water is important for plant cells because water is required for photosynthesis.

Hypothesis:

Procedures:

[illegible]

Variables:

Independent: _____

Dependent: _____

Constants:

Control Group:

Data Table: Include both experimental and group group data

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Graphing: Create a line graph to display your data. Include both experimental & control groups
Experimental Errors:

Conclusion:

Do you confirm or reject your hypothesis? _____
What *evidence* supports why you confirmed or rejected your hypothesis?

Challenge Questions:

1. What process did the plant use to grow taller? _____
2. Why did the plant need to perform photosynthesis in order to grow? _____
3. What organelle did the plant use to perform photosynthesis? _____
4. Explain how the plant got the energy needed to grow? _____
5. What organelle did the plant use to perform cellular respiration? _____
6. What else were the sugars used for besides cellular respiration? _____
7. Explain how the plant used all the processes discussed to grow. _____
