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ENGL 21007 Professor Brown

Photosynthetic Floatation Lab Draft

**Abstract**

The objective of this lab was to compare the effects of lower and higher wattage light bulbs and see how many leaf disks would float. The hypothesis tested during this lab is that the 100-watt lightbulb will have more disc floating than the 60-watt lightbulb because more light gives more energy. This lab is based on the process of photosynthesis and how the effects of light and water impact plants.

**Introduction**

During the process of photosynthesis, plants use energy from the sun, water, as well as carbon dioxide from the air to store carbon and energy in the form of glucose molecules. In this lab, the results of the 100-watt and 60-watt lightbulbs will be compared based on how many discs float. During this lab we tested if the 100-watt lightbulb will have more disc floating than the 60-watt lightbulb because more light gives more energy.

**Materials**

* Baking soda
* Gram scale
* Water
* Liquid dish soap
* Spoon or other implement (for mixing solution)
* Soda straw or hole punch
* Spinach leaves or ivy leaves
* 10-mL syringe (without a needle)
* Clear plastic cup (1-cup size) or 250-mL beaker
* 100-watt equivalent lightbulb
* 60-watt equivalent lightbulb
* Notepaper and pencil (or similar) to record results

**Procedures**

1. Make a 0.1% bicarbonate solution by mixing 0.5 grams baking soda with 2 cups (500 mL) water.
2. Add a few drops of liquid dish soap to this solution and mix gently, trying to avoid making suds in the solution.
3. Using the straw or hole punch, cut out 10 circles from your leaves.
4. Remove the plunger from the syringe, and remove the cover from the tip, if there is one. Put the leaf disks into the barrel of the syringe and tap them down to the tip. If you have a straw, you can blow the discs gently into the plunger.
5. Replace the plunger into the syringe, being careful not to touch or damage the leaf disks.
6. Pour 150 mL of bicarbonate solution into the cup avoid making suds.
7. Draw about 6–8 mL of bicarbonate solution into the syringe. The leaf disks should float in the solution.
8. Hold the syringe with the tip up and expel the air by gently pushing on the plunger.
9. Plug the tip of the syringe tightly with your finger, and gently pull on the plunger, creating a slight vacuum. You should see tiny bubbles coming out of the leaf disks. Hold the vacuum for a few seconds, and then release the plunger, letting it snap back. Some of the disks should begin to sink.
10. Repeat the previous step several times, until all of the disks have sunk to the bottom of the solution.
11. When all the leaf disks have settled to the bottom of the solution, carefully remove the plunger, and pour the disks and solution into the cup. They should settle to the bottom of the cup. If any leaf disks float, remove them from the beaker.
12. Set up your light fixture so that it is suspended about 12 inches (30 cm) above the table. You may want to use a ring stand for this.
13. Place one beaker under the 100-watt light and one under the 60-watt light.
14. Observe the amount of leaf disks that float to the top of the beaker every 5 minutes for 60 minutes total.

**Data/Observations**

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|  **100-Watt Light Bulb** |
| **Time****(min)** | **5** | **10** | **15** | **20** | **25** | **30** | **35** | **40** | **45** | **50** | **55** | **60** |
| **# of leaf****disks** **floating** | **0** | **2** | **7** | **10** | **10** | **10** | **10** | **10** | **10** | **10** | **10** | **10** |

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|  **60-Watt Light Bulb** |
| **Time****(min)** | **5** | **10** | **15** | **20** | **25** | **30** | **35** | **40** | **45** | **50** | **55** | **60** |
| **# of leaf****disks** **floating** | **0** | **1** | **1** | **3** | **5** | **7** | **7** | **8** | **8** | **8** | **8** | **8** |

**Conclusion**

Overall, the results of the experiment supported the hypothesis. The disks underneath the 100-watt light floated to the top of the beaker at a faster rate than the 60-watt light. This lab shows the importance of photosynthesis, as well as how crucial it is for the survival of plants. This lab also demonstrates the process of photosynthesis and how the effects of light and water impact plants.

**Resources**

* bozemanbiology. “Photosynthesis Lab Walkthrough.” YouTube, YouTube, 30 Oct. 2011, https://www.youtube.com/watch?v=ZnY9\_wMZZWI.
* “Photosynthetic Floatation.” Exploratorium, 2 Oct. 2020, https://www.exploratorium.edu/snacks/photosynthetic-floatation.