

## STATISTICAL ANALYSIS OF LEAF DISC ASSAY

(Modified from: Bob Kunh)

Students conducted an experiment to determine the effect of light intensity on the rate of photosynthesis. They punched 10 leaf disks from English Ivy leaves and used a syringe partially filled with bicarbonate to pull the gases from the leaf disks so that all leaf disks sunk to the bottom of the syringe. Ten (10) leaf disks from the syringe were placed in cups and covered with 150 mL of the solutions as indicated below. All leaf disks were resting on the bottom of the cups when the experiment began. The volume of liquid in each cup and the temperature of the solutions were held constant. All cups were placed 0.5 meters from the designated light source. A control cup of water and 10 leaf disks were also tested.

### EVIDENCE

The ET50 was used as a way of comparing leaf disk rate across lab groups and classes. The ET50 is the time estimate for 50% of leaf disks to rise in the experiment. Students tested either young or old leaf disks and were working with the essential question of *How does age of the leaf affect photosynthetic rate?* For each class, young and old ET50 averages were determined.

TABLE 1: Leaf disk assay data from 4 classes testing young versus old leaves for photosynthetic rate.

| CLASS PERIOD | Young leaves<br>(Average ET50<br>Minutes) | Old leaves<br>(Average ET50<br>Minutes) | Control<br>(Average ET50<br>Minutes) |
|--------------|-------------------------------------------|-----------------------------------------|--------------------------------------|
| 1            | 10.00                                     | 11.00                                   | 0                                    |
| 2            | 9.33                                      | 8.67                                    | 0                                    |
| 3            | 5.25                                      | 9.50                                    | 0                                    |
| 4            | 10.50                                     | 6.35                                    | 0                                    |
| AVERAGE      |                                           |                                         |                                      |
| STDev        |                                           |                                         |                                      |
| SE           |                                           |                                         |                                      |
| Mean + SE    |                                           |                                         |                                      |
| Mean - SE    |                                           |                                         |                                      |

### CLAIM

1. WRITE A NULL HYPOTHESIS FOR THIS EXPERIMENT (See Essential question above)
2. Use the data above to quantitatively support or reject your NULL HYPOTHESIS in a 2-3 sentence statement.
3. Complete the statistical analysis of this data.
4. Construct a graph of the data. (Remember rules for making graphs!)
5. Write a summary 2-3 paragraphs that supports or refutes the claim. You must include "Statistically significant" difference and/or similarities in your conclusion