

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Plant Transpiration – Virtual Lab

Go to [https://www.classzone.com/books/hs/ca/sc/bio\\_07/virtual\\_labs/virtualLabs.html](https://www.classzone.com/books/hs/ca/sc/bio_07/virtual_labs/virtualLabs.html)  
Under Labs, select virtual labs. Select Plant Transpiration from the list of labs.

### **Background:**

Transpiration is the evaporation of water from plants. It occurs chiefly in the leaves while their stomata (tiny openings in the undersurface of a leaf) are open for the passage of CO<sub>2</sub> and O<sub>2</sub> during photosynthesis. Air that is not fully saturated with water vapor (100% relative humidity) will dry the surfaces of cells with which it comes in contact. So the photosynthesizing leaf loses substantial amount of water by evaporation. This transpired water must be replaced by the transport of more water from the soil to the leaves through the xylem of the roots and stem. Transpiration accounts for approximately 10% of all evaporating water on this planet. As leaves transpire, the outward flow of water lowers the pressure in the leaf, creating a vacuum that pulls water upward. This force is responsible for most of the water flow in plants, including lifting water to the tops of trees.

**Purpose:** To determine how different environmental conditions can affect the rate of plant transpiration

**Materials:** Get from the Checklist on the Explore part of the virtual lab. Select the name of each item in the lab, then click on the item as it's highlighted. Read the description that appears for each item. Once you have selected all the items (8 total), click Procedure to start the lab.

**Procedure:** Follow the steps to the lab given on the screen until you complete all thirteen (13) steps.

### **Data/Results:**

Table 1. Predictions for Plant Transpiration Lab

Rank	Prediction
1	
2	
3	
4	

Table 2. Transpiration Amounts with Different Environmental Conditions

Conditions	0 minutes	10 minutes	20 minutes	30 minutes
Normal				
Windy				
Warm				
Humid				

Table 3. Rate of Transpiration with Different Environmental Conditions

Conditions	Total Water Loss (ml)	Total Surface Area of Leaves (cm <sup>2</sup> )	Total Surface Area of Leaves (m <sup>2</sup> )	Rate of Transpiration (ml/m <sup>2</sup> )
Normal				
Windy				
Warm				
Humid				

**Discussion:**

1) Operational Definition. An operational definition is a description of the exact way in which you will measure the dependent variable. Your operational definition will help you determine how you will do your experiment. What is the operational definition for the rate of transpiration?

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2) Conclude. How do your predictions compare with your observations?

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3) Analyze. For each environmental factor (windy, warm, humid), explain why the rate of transpiration increased or decreased from the control conditions.

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4) Evaluate. Why is it important to calculate the surface area of the leaf?

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5) Quantify. Review the graph that you created. By how much did the rate of transpiration decrease for humid conditions?

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6) Analyze. Why do you think it is necessary to have an air-tight seal in the photometer?

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7) Hypothesize. Roots play an important role in water transport. Which plays the most important role in the movement of water through a plant – the absorption of water by the roots or the evaporation of water from the leaves? Explain/Support your answer.

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