**Name:**

**Part 1: Transport in Celery**

**MATERIALS NEEDED:**

|  |  |  |
| --- | --- | --- |
| Celery stalk with leaves intact |  | Metric ruler |
| 400-mL beaker |  | Distilled water |
| tray |  | Red food coloring |
| Razor blade |  | Stirring rod |

**PROCEDURE:**

1. Fill the beaker with **100 mL** of distilled water. Add drops of red food coloring, stirring with the stirring rod, until the water is a dark red color. Set this aside.

2. There is distilled water in a tray. While holding the bottom end of the celery stalk under water, cut off the bottom two centimeters of the celery stalk.

3. Quickly place the freshly cut celery stalk upright in the beaker of colored water. Record the beginning time on your **DATA TABLE**

4. Allow the celery to remain in the food coloring until the color is visible in the upper stem and leaves. Record the ending time on your **DATA TABLE**, and remove from the beaker of food coloring.

**MOVE ON TO PART TWO OF THE LAB (TRANSPIRATION) WHILE YOU WAIT FOR THIS TO OCCUR.**

5. Measure the length the red color traveled up the celery stalk in centimeters. Record on your **DATA TABLE**

**DATA TABLE:**  
Beginning time: \_\_\_\_\_\_\_\_\_\_\_

Ending time: \_\_\_\_\_\_\_\_\_\_\_

Length food color traveled up stalk. \_\_\_\_\_\_ **cm**

**CALCULATIONS:**

6. Time for color to reach the top of stalk. = \_\_\_\_\_\_\_\_\_ **minutes**

7. Calculate the **rate of travel** of the food coloring up the celery stalk in **centimeters per minute**.

|  |  |  |
| --- | --- | --- |
| **Rate of Travel** | **=** | **length of celery stalk (cm)**  **time for color to reach top of stalk (min)** |

**Rate of travel = \_\_\_\_\_\_\_\_\_ cm / min**

8. What type of tissue moves water upward in a plant stem?

**Part 2: Transpiration Lab**

**1: Go to** [**http://www.mhhe.com/biosci/genbio/virtual\_labs/BL\_10/BL\_10.html**](http://www.mhhe.com/biosci/genbio/virtual_labs/BL_10/BL_10.html)

**2: Hypothesis: Based on your knowledge of Transpiration, which of the 4 factors (lamp, fan, heater or normal temperature) will cause the plant to have the highest rate of transpiration?**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**3. Read directions on left and fill out the data table below**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Amount of Water Transpired in 1 Hour(mL)** | | | | |
| **Plant Name** | **Normal** | **With Lamp** | **With Fan** | **With Heater** |
| Arrowhead |  |  |  |  |
| Coleus |  |  |  |  |
| Devil’s Ivy |  |  |  |  |
| Dieffenbachia |  |  |  |  |
| English Ivy |  |  |  |  |
| Geranium |  |  |  |  |
| Rubber Plant |  |  |  |  |
| Weeping Fig |  |  |  |  |
| Zebra Plant |  |  |  |  |

**Analysis Questions**: **Write in complete sentences and be detailed in your responses.**

1. Describe the process of transpiration in vascular plants. Through which structure does it occur?

2. What environmental factors that you tested increased the rate of transpiration? Was the rate of transpiration increased for all plants tested?

3. Which species of plants that you tested had the highest transpiration rates? Why do you think different species of plants transpire at different rates?

4. Suppose you coated the leaves of a plant with petroleum jelly. How would the plant's rate of transpiration be affected?

5. Why is it important to a plant to have the ability to lose water through transpiration?