**F.4 Biology Ch.11 Transport of substances and Support in Plants**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_( ) F. 4 \_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Title: Factors that affect transpiration rate

**Objective:** To find out the effect of the following treatments on the transpiration rate of a leafy shoot.

**Principle:**

Transpiration from the leaf surface is mainly due to two physical processes, \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_, therefore any change in the environment affecting the rates of these two processes will also affect the rate of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. In addition, transpiration mainly takes place through stomata, the \_\_\_\_\_\_\_\_\_ of stomata, which is in term affected by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will also affect the transpiration rate. The stomatal density on both sides of the leaves are also \_\_\_\_\_\_\_\_\_\_\_\_\_for most terrestrial plants. Therefore the transpiration rates of a leafy shoot under different treatments can be measured and compared using a potometer.

Different types of photometer are used in this practical to determine the rate of transpiration after different treatments. When a bubble potometer is used to measure rate of transpiration, we assume

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**Apparatus and Materials**: refer to p.11 to 6-11.7

**Procedure**: refer to p.11-6 to 11-7

**Results:**

Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Group | Potometer | Treatment | Transpiration rate before treatment  (cm3/min) | Transpiration rate after treatment  (cm3/min) |
| 1 | bubble | Plastic bag |  |  |
| 2 |  | Plastic bag |  |  |
| 3 |  | Hair dryer |  |  |
| 4 |  | Hair dryer |  |  |
| 5 |  | lamp |  |  |
| 6 | weight | lamp |  |  |
| 7 |  | Adhesive tape on upper surface |  |  |
| 8 |  | Adhesive tape on lower surface |  |  |

**Discussion:**

1. The leafy shoot has a \_\_\_\_\_\_\_\_\_\_\_\_\_ transpiration rate after it is wrapped by a plastic bag because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. The leafy shoot has a \_\_\_\_\_\_\_\_\_\_\_\_\_ transpiration rate after it is blown by a hair dryer because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. The leafy shoot has a \_\_\_\_\_\_\_\_\_\_\_\_\_ transpiration rate after it is put in front of a lamp because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. The leafy shoot with adhesive tape covering the \_\_\_\_\_\_\_\_\_\_\_ surface has a transpiration rate higher than that with adhesive tape covering the \_\_\_\_\_\_\_\_\_\_\_ surface. This shows that this plant has a higher stomatal density on the \_\_\_\_\_\_\_\_\_\_\_ surface. For most terrestrial plant, having \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the lower surface than the upper surface can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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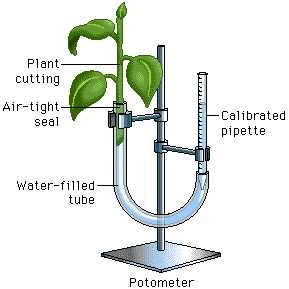
1. What are the possible limitations when using the above potometers to determine the transpiration rate of a plant?

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**Conclusion:**

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**Notes: In addition to the bubble potometer and the weight photometer, the following two photometer is also used:**

