

**Station A: 59 - 3: Root Hair**

This is the tip of a root of a plant about 1/16 of an inch from the end. The fine hair-like extensions are root hairs. They help the root absorb soil water containing dissolved minerals. Each root hair is part of a cell of the outer surface of the root tip. They serve to give the root an enormous surface area for the absorption of water. In transplanting a plant, careless handling destroys millions of these root hairs. Until it develops new root hair, the plant does not grow well.

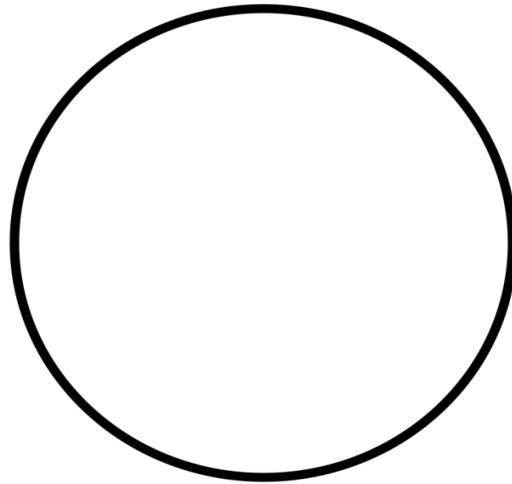


Figure 1.1: \_\_\_\_\_

Magnification 35X

- 1.) Why should you be careful when transplanting plants?

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**59-4: Vascular Bundles**

This is a cross-section of a corn stalk looking down into a bundle of tubular cells. The bundle (A) is called a vascular bundle. Its cells form continuous tubes from roots to leaves. The smaller cells (B) are called phloem, and their function is to carry manufactured food (sugars) from one place to another, usually downward from the leaf. The larger cells (C), called xylem, specialize in carrying soil water upward. The minerals dissolved in the soil water are necessary for the metabolism of the plant. Most of the corn stem is made up of cells (D), the ground tissue that is used for storage.

**Make sure to indicate A, B, C and D**

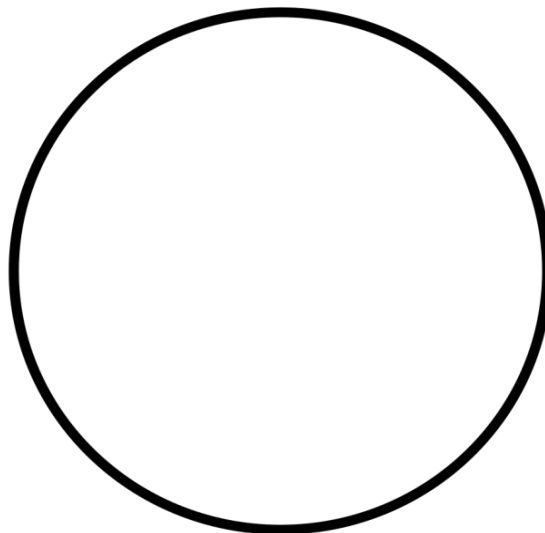


Figure 1.2: \_\_\_\_\_

Magnification 145X

- 1.) Xylem and Phloem are what type of tissues? \_\_\_\_\_
- 2.) What does Phloem transport? \_\_\_\_\_
- 3.) What does Xylem Transport? \_\_\_\_\_

### 59 - 5: Leaf-With and Without Sunlight

This slide shows the results of an experiment, the objective of which was to determine the effect of sunlight on a green leaf. The right half of the coleus leaf was deprived of sunlight for three hours by covering it with black paper. The entire leaf was then placed in hot alcohol to remove the chloroplasts and then stained with iodine, which turns starch black. Note that the side which was deprived of sunlight is much lighter in colour. This is due to the half of the leaf which was deprived of sunlight could not make starch, while the part that was exposed to sunlight manufactured starch.

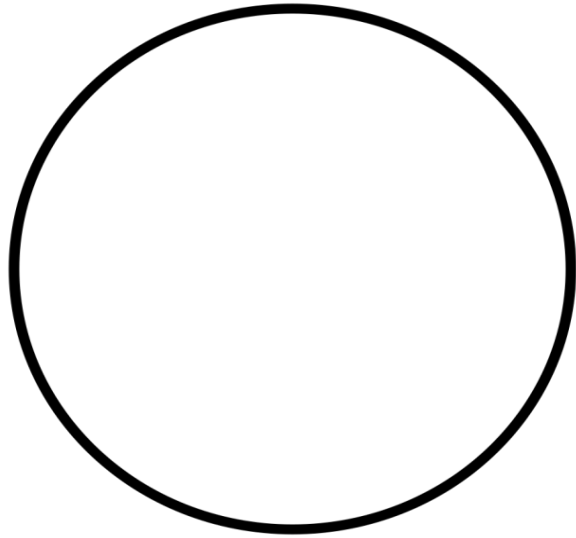


Figure 1.3: \_\_\_\_\_

Magnification 35X

- 4.) A) Is the production of starch a Light reaction or a part of the Calvin cycle? \_\_\_\_\_  
B) How do you know?

### Station B: 90 – 1: Pore In Leaf Epidermis Surface View – stained (430x)

When you draw air into your lungs, you cannot avoid taking in whatever pollutants are present. This is also true for plants. While they do not have lungs, their leaves have a network of air spaces. The leaf is covered with a tough epidermis that protects the delicate working cells inside. However, hundreds of pores called stomata penetrate the epidermis and allow air to reach the air space and circulate around the working cells. One such stomata can be seen at (S) in this microslide. Notice the two banana-shaped guard cells (G). As these cells become more curved, the pore opens wider and as they straighten they close.

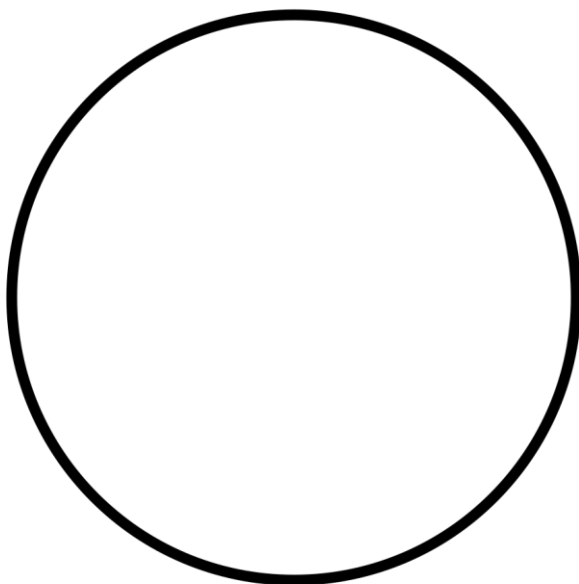


Figure 1.3: \_\_\_\_\_

Magnification 430X

- 5.) Label the guard cells and stomata.  
6.) How do the stomata open? \_\_\_\_\_  
7.) How do the stomata close? \_\_\_\_\_

**Station C: 102 – 5: Green Leaf Cells**

This is a cross section of a green leaf. The leaf and all other parts of a tree are made of many different kinds of cells. The cells at the top and under sides of the leaf seem to be about the same, with the exception of the two cells at S. Leaves breathe through openings in their under side called stomata. The two cells of the stomata at S are different because they must open and close the stomata. A leaf needs water to live. The cells at V are different, they form a vein through which water flows. We see them as though we are looking down into the hole in a hose. A green plant also needs chlorophyll to help manufacture food. The chlorophyll is the dark green dots near the outer edges of the green cells.

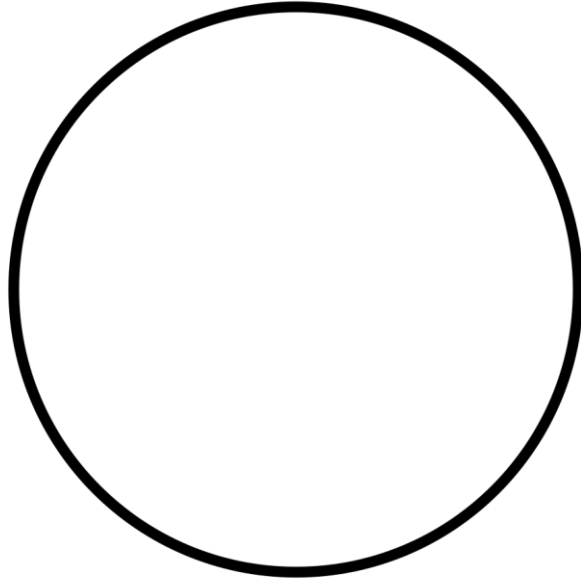


Figure 1.5 \_\_\_\_\_

Magnification 275X

8.) Where is the chlorophyll located in this leaf cross section? \_\_\_\_\_

9.) Label the stomata, xylem and chlorophyll.

**Station D: 77 – 1: Buttercup Root**

A root is built of three types of plant tissue:

- 1.) Inner vascular tissue for conduction of water, minerals and nutrients. (S)
- 2.) Middle ground tissue for storage. (C)
- 3.) Outer epidermal tissue for protection. (E)

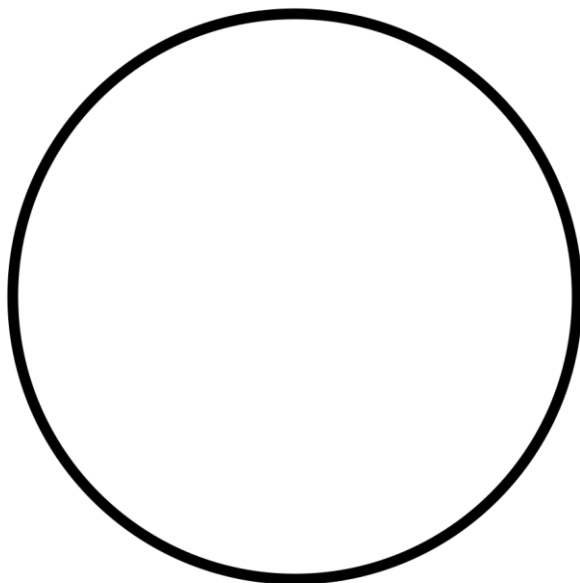


Figure 1.6 \_\_\_\_\_

Magnification 40X

10.) Draw and label the different plant tissues.

**77-4: Root cap and Meristem**

This micro slide shows the very tip of a young root cut lengthwise. The meristem (G) is an area where cells divide most rapidly. The constant production of new cells results in the growth of the root in the direction of the arrow. The very delicate young cells need protection as the root tip forces its way through the coarse soil. This protection is provided by the root cap (R) of tough walled cells covering the tip of the growing zone where division is most active.

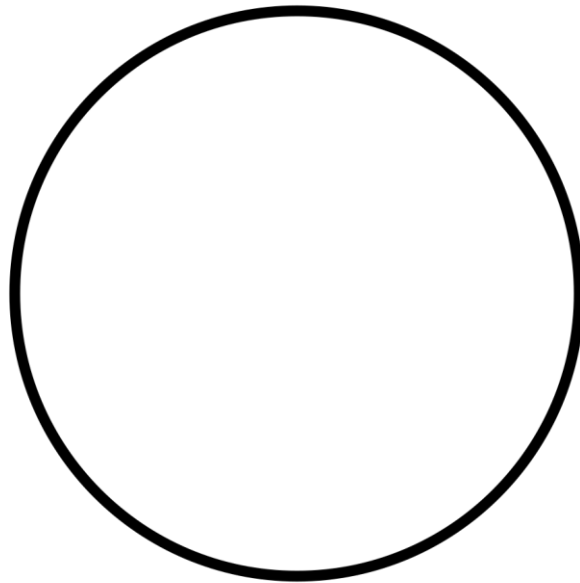


Figure 1.7 \_\_\_\_\_

Magnification 34X

11.) Label the meristem and root cap.

**77-7: Root Tip – Root Hairs**

This is a collection of root hairs (H) growing out of the epidermis Zone M. These root hairs play an important role in the absorption of water and dissolved minerals. Root hairs are really an outgrowth of the epidermal cells, yet they may grow up to 1cm. Biologists estimate that some plants may have up to 14,000,000,000 root hairs that cover surface areas of up to 4,000 square feet.

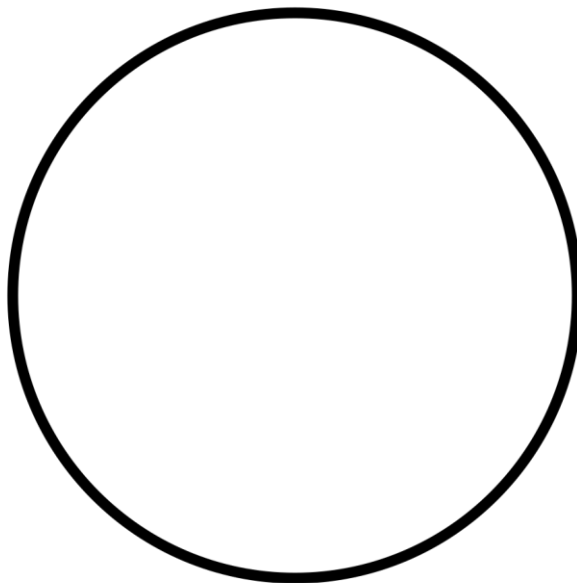


Figure 1.8 \_\_\_\_\_

Magnification 20X

12.) How many root hairs do you estimate are visible in this tiny segment root? \_\_\_\_\_

13.) After looking at the image of the root hair would you say that they are efficient or not efficient? Explain why.

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