Cells Lab 2: Living Plant Cells: Onion Epidermis
Biology A

Name_____Per_____

Lab Partner_____

Introduction

Onions are very dead-looking when you buy them at the market. In reality, an onion is a bulb full of living cells, some of which grow into leaves and roots when the onion bulb is planted (or stored too long where it is damp). Other cells in the onion bulb, less obvious in their activity, form a layer of cells covering the bulb scales.

Materials

Compound microscope
Iodine or methylene blue solution
Slide and cover slip
Needle
Razor blade
Onion bulbs
Pipette
Paper towels
Forceps

Procedure

1. Cut the onion bulb into quarters as shown in Figure 1. You will discover that it separates neatly into layers, called scales or leaves. Hold one of the leaves so that the concave surface is toward you. Now break the leaf as shown in Figure 1. A transparent, paper-thin layer of **epidermis** pulls easily from the surface of the bulb scale. It comes off in a sheet, a bit like peeling skin after a bad sunburn.

2. Make a wet mount of the epidermis as follows:

   • Place a piece of the epidermis in a drop of water on a *clean* glass slide, **so that the outer face (the side of the epidermis that was closest to the outside of the bulb scale) is up.**

   • If the piece of epidermis is large, use a new, sharp razor blade to cut the epidermis (still in the drop of water) into a piece about 1 cm square. This will make a clean cut and usually will not wrinkle the specimen. Remove the excess material with forceps. Wrinkles can be removed with a dissecting needle if necessary.

   • Put on the cover slip and be sure the water comes to its edges but not beyond. Add water at the edge with a pipette, or remove excess water with paper toweling, as necessary.

3. Using the power low power of the microscope (what magnification is LOW power??), look at the cells of the epidermis. Then observe them under high power.

4. Now, take the slide of the stage of the microscope and run iodine or methylene blue stain under the cover slip in the following way: Place a drop of stain at one edge of the cover slip, then draw it under the cover slip by touching a piece of paper towel to the opposite edge, as shown in Figure 2.

5. Replace the slide to your microscope stage. Under low power, look for the nucleus in each cell. Switch to high power and look at the nucleus again.

6. In your results section, make a sketch of the *stained* onion epidermis at *high power*.

Figure 1:

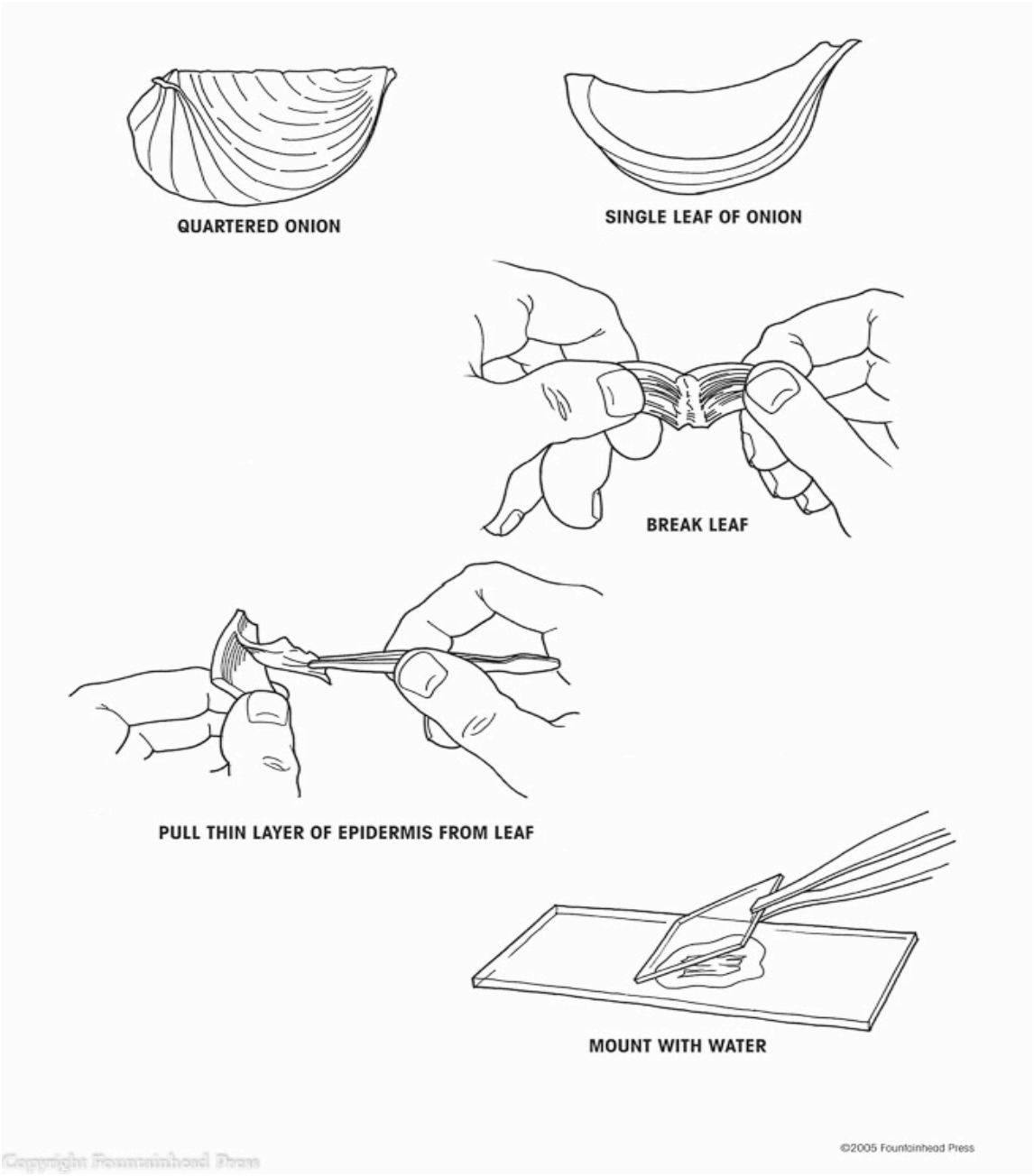

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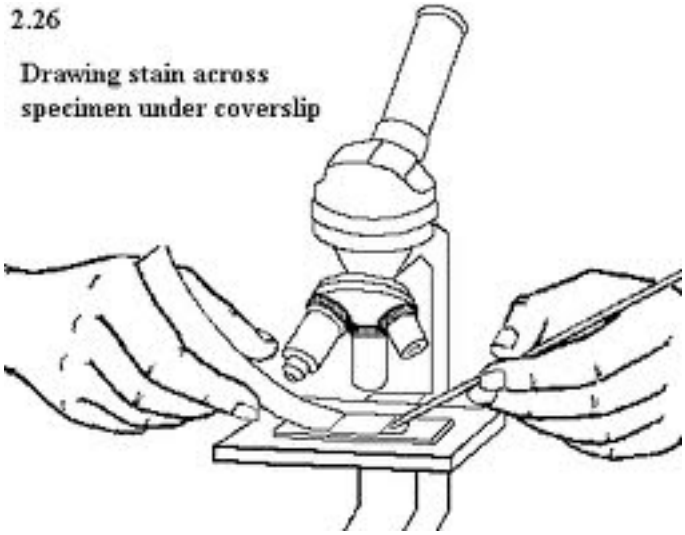
Figure 2:



Results:

Title: _____

Total Magnification: _____

Estimated width of one cell: _____

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For Lab Quiz: Be able to answer the following questions.

1. Do the cells have cell walls?
2. What evidence do you see that tells you these are living cells?
3. What is the location of the nucleus in the cell and what is its shape?
4. Look around the edges of the cell and you will find a fine granular substance that has been lightly stained. This is the cytoplasm. Does the cytoplasm fill the entire cell?
5. Compare the onion cells with the cells of cork.
    a. What are the obvious differences?
    b. How are they similar?