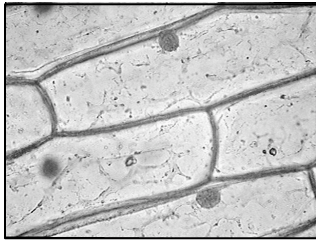


Name: \_\_\_\_\_

Date: \_\_\_\_\_ Class Name \_\_\_\_\_

### How Can We Observe Plant Cells?



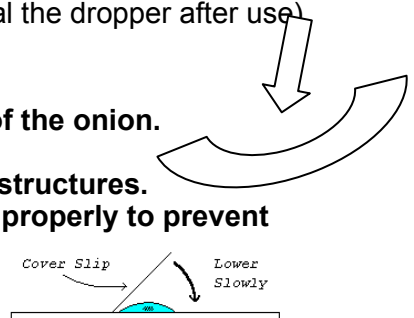
**Background:** Onion tissue provides excellent plant cells to study under the microscope. Some structures are easy to see when viewed with the microscope at low power (100X). For example, you will observe a large circular **nucleus** in each cell, which contains the genetic material (DNA) for the cell. Also visible in the onion cell, is a well-developed **cell wall** which surrounds a **cell membrane** (*not visible*) just beneath it.

**Purpose:** Be able to prepare and stain a slide; study the structures of plant cells

**Materials:** microscope, thin onion strip, glass slide, small plastic cover slip, iodine stain pipette, tweezers, paper towel strip, and a small beaker. Salt solution. (**Note:** iodine is toxic and will stain your clothes - handle with care; to prevent accidents, be sure to tightly seal the dropper after use)

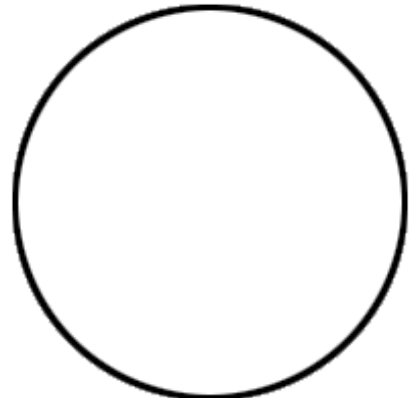
#### I. How to prepare an onion slide:

1. Using your tweezers (or finger), peel off a thin, transparent layer of the onion. (*It will look like Scotch tape!*) and place it flat on the drop of water.
2. Add one drop of iodine to the onion strip. This will stain your cell structures.
3. Place one edge of the cover slip on the slide and carefully lower it properly to prevent bubbles.
4. If necessary, use paper towel strip to soak up any excess liquid.



#### II: Viewing White Onion Cells

1. Set your objective to scanning power (4X; red). Place the slide on the stage; adjust your diaphragm.
2. Focus on one layer of onion cells. Each tiny onion "brick" that you see is one onion cell. Choose one cell and center it using your pointer.
3. Turn your nosepiece to the low power objective (10X; yellow). Draw EXACTLY what you see in the circle titled: **Low Power**. Label the total magnification of the sample on the line provided.  
Q: About how many cells fit *lengthwise* across your viewing circle on low power? \_\_\_\_\_



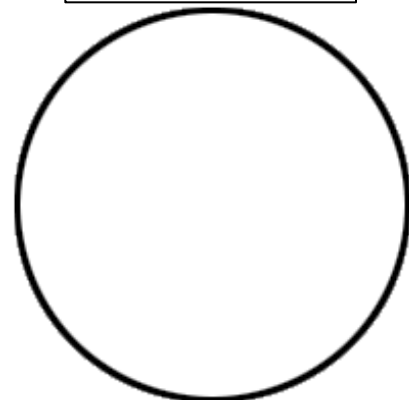
Low Power 100X

High Power:

4. Now, making certain one onion cell is still centered on the pointer, switch your objective to high power (40X; blue). Use the fine focus knob to focus your image. Draw your image in the circle to the right labeled "High Power."

Q: How many cells fit across your viewing circle on high power?  
\_\_\_\_\_

Q: Which cell parts are visible in both low and high power?  
\_\_\_\_\_



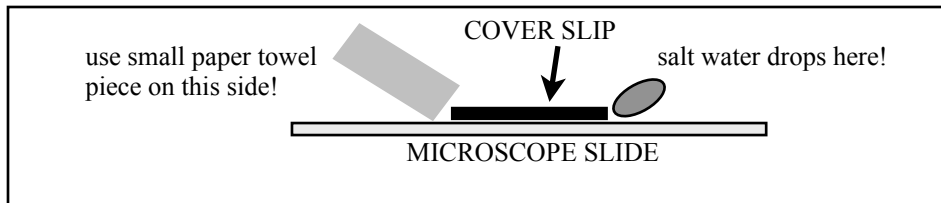
High Power 400X

**BEFORE STARTING PART III, WIPE THE WHITE ONION SLIDE INTO THE TRASH. RINSE AND DRY THE SLIDE AND COVERSLIP.**

### **III: OBSERVING OSMOSIS IN RED ONION**

1. Prepare a red onion sample by using a thin layer of purple skin and freshwater. This is our ISOTONIC sample.
2. Under scanning power find some cells that display purple cytoplasm. Then switch to HIGH POWER (400X)
3. Draw ONE CELL on the right and with your pencil, shade in the amount of purple cytoplasm you observe.

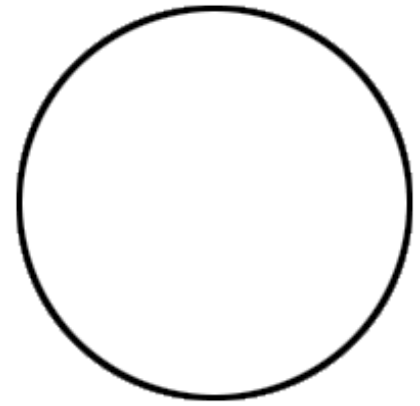
4. Next, we will replace the freshwater (isotonic solution) with the salty solution (hypertonic solution) without lifting the coverslip. To do this, take a small piece of paper towel and touch one side on the coverslip to absorb and move the freshwater out. At the same time, on the opposite side of the coverslip, squeeze a drop or two of salt solution so it passes under the slide. Continue until your small piece of paper towel is wet.



5. Under scanning power (4x) move and view your slide and find an area that looks affected by the hypertonic solution
6. Find one cell that has performed osmosis. Draw it under 400x on the right.

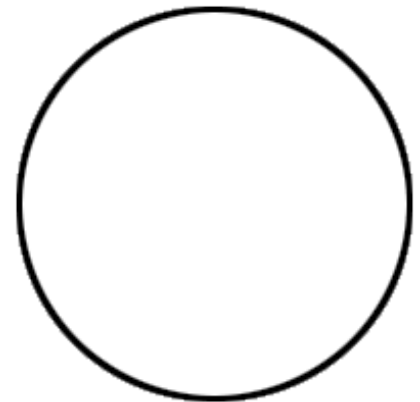
**CLEAN UP: CLEAN YOUR RED ONION SLIDE. SWITCH YOUR NOSEPIECE TO THE SCANNING POWER OBJECTIVE. PUT THE MICROSCOPE AWAY. WIPE YOUR TABLE CLEAN.**

ISOTONIC ONION CELL



High Power 400X

HYPERTONIC SOLUTION



High Power 400X

#### **Questions and Observations:**

1. How do you suppose the cell you observed today differ from the cells in your body?
2. What caused the change to the cells when adding the hypertonic (salt) solution?
3. If you wanted the red onion cells to burst instead of shrink, what would could you do?