**Online Textbook and Scope Webquest**  Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Per:\_\_\_\_\_\_\_\_\_\_\_\_

This activity will lead you through how to access the textbook online, how to use the virtual labs and activities and some basic information about microscopes. Good luck!

* Log on to the school computer. It should be a username of your first initial and your last name.
* Use your password from last year or try your student ID. If you’re having trouble, call me over.
* Open Chrome for your browser. Some of the features won’t work on Firefox or Explorer.
* Go to the virtual compound microscope at [http://virtuallabs.nmsu.edu](http://virtuallabs.nmsu.edu/micro.php)
* Click on “using the microscope.” You may turn on the volume if you have headphones, or just read.

1. What level of magnification do the microscopes have? \_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_, or \_\_\_\_\_\_\_\_ .
2. List each part of the microscope and describe what it does.
   1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   8. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is the first step to using a microscope?
4. How do we calculate total magnification of a scope with an eyepiece of 10X and an objective of 10X? SHOW YOUR WORK.
5. What kind of sample are you looking at? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. How is the slide secured? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. What are two ways to adjust the amount of light that shines through your sample?
8. What are the two focus knobs and how are they used?
9. Which adjustment knob is always used first? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Why?
10. Before switching to high power, where should you focus the slide? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. What is the total magnification of the 40X objective on this scope? SHOW WORK.
12. Which focus knob is used on high power? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. What do we need to do before switching to the 100X objective?
14. Clean up the microscope and describe the steps for cleaning the scope and the slide.

**Now go to** [**www.cellsalive.com/howbig.htm**](http://www.cellsalive.com/howbig.htm) and click on “Start the Animation.” Advance using the arrows.

How big is the head of the pin? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Items are listed on the right hand side from largest to smallest. Draw the items below and circle the one that is the largest. Label the magnification power needed for each.

Ragweed pollen red blood cell Ebola virus rhinovirus (which causes the common cold)

What is the highest power we can reach in our class with a 10X eyepiece and a 100x objective? SHOW YOUR WORK.

Which if these items do you think we can see with our microscopes? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Explain why.

Some things are so small that we cannot see them with a normal compound microscope. In these cases, we have to use electrons to scan the image or transmit through the image—sort of like an X-ray. Go to YouTube and watch the video **THIS IS A BUTTERFLY (scanning electron microscope)—part 2**

Go to <http://virtual.itg.uiuc.edu/training/EM_tutorial/> to learn about the Scanning Electron Microscope.

What is the basic organization of the microscope? Describe below. Is it bigger or smaller than a regular scope?

Click on part 2. How are primary and secondary electrons used to make an image?

Go to **Google Images** and search “Scanning Electron Microscope Images” to see what objects look like under the SEM. Describe what they all have in common.

Choose one to sketch and label with its sample name.

Go to **Google Images** and search “Transmission Electron Microscope Images.” Describe what they all have in common.

Choose one to sketch below and label with its sample name.

Now try the Transmission Electron Microscope at <http://school.discoveryeducation.com/lessonplans/interact/vemwindow.html> and identify and classify the specimens.

How is a Transmission Microscope (TEM) image different from a Scanning Microscope (SEM) image?

Decide whether a light microscope (LM), scanning electron microscope (SEM), or transmission electron microscope (TEM) would be best for looking at the following (use the abbreviations in the blanks):

1. The feeding habits of unicellular organisms? A \_\_\_\_\_\_\_\_\_\_\_ microscope would be best because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. The 3D surface of a red blood cell? A \_\_\_\_\_\_\_\_\_\_\_\_\_\_ microscope would be better because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. The *interior* structures of a cell? A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_microscope would be best because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

If you still have time, check out the photomicrography contest sponsored by Nikon at <http://www.nikonsmallworld.com/galleries/photo/2014-photomicrography-competition>.

Click on the images to see what they are. Which interest you? Which do you think are the most beautiful?

Sketch your favorite here and color it: