Names: _____   Date: _____

Student Exploration: Cell Types

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. What are you supposed to be learning in this activity?

    _____

    _____

2. Why do you think learning this is important to everyday life?
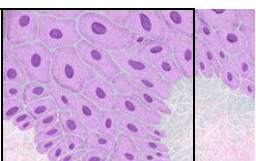
    _____

    _____

Gizmo Warm-up
In the *Cell Types* Gizmo™, you will use a light microscope to compare and contrast different samples. On the LANDSCAPE tab, click on the ***Elodea* leaf**. (Turn on **Show all samples** if you can't find it.) Switch to the MICROSCOPE tab to observe the sample as it would appear under the microscope. By default, this microscope is using 40x magnification.

1. Drag the **Coarse focus** slider until the sample is focused as well as possible. Then, improve

    the focus with the **Fine focus** slider. What do you see? _____

    _____

2. Select the 400x magnification. If necessary, adjust the fine focus, and click "Show labels." Now, what do you see?

    _____

    _____

    The individual chambers you see are **cells,** the smallest functional unit of an organism.

| Activity A:

Observing cells | Get the Gizmo ready:
• On the LANDSCAPE tab, click on the woman's right arm to choose the **Human skin** sample.
• Select the MICROSCOPE tab. | |

Introduction: Complex organisms are made up of smaller units, called cells. Most cells are too small to be seen by the naked eye. Microscopes are used to magnify small objects, so here you will use a **compound light microscope** to observe the cells of different organisms.

Question: What are similarities and differences between cells from different organisms?

1. Manipulate: With 40x selected, use the **Coarse** and **Fine focus** sliders to focus on the sample. Then, choose 400x and focus on the sample using the **Fine focus** slider.

   Turn on **Show labels**. What structures can you see in human skin cells?

   _____

2. Observe: An **organelle** is a cell structure that performs a specific function. Observe the samples below under the highest magnification. Click the **Show labels** checkbox to label the organelles. List the organelles and approximate size of the cells in each sample.

Sample	Organelles
Mouse skin	
Fly muscle	
Maple leaf	
Elodea	
Fungus	

   What do all of these samples have in common? _____

   _____

   In **eukaryotic** cells, genetic material is contained inside a nucleus. Plant and animal cells are eukaryotes.

3. Observe: Click on the cow and observe ***E. coli*** under the highest magnification. Notice the microscope magnification is larger for this organism, and notice the scale bar is smaller.

   A. What organelles are present in *E. coli*? _____

   _____

   B. What organelle is missing from *E. coli*? _____

      E. coli is an example of a **bacteria**. Bacteria are **prokaryotic** cells because their DNA is not contained in a nucleus.

| Activity B: Specialized cells | Get the Gizmo ready:
 • On the LANDSCAPE tab, click on the woman's head to choose the human neuron sample. | |

Question: How do a cell's specialized structures relate to its function?

1. <u>Collect data</u>: Use the microscope to observe the samples listed in the table below. For each sample, estimate the cell size and check off the organelles that are present. If there is no column for an organelle, list it in the **Special structure(s)** column.

Sample	Estimated size (µm)	Nucleus	Cell membrane	Cytoplasm	Special structure(s)
Human neuron					
Human skin					
Human muscle					
Human blood					

2. <u>Observe</u>: Select the human **neuron** sample. Focus the cells at 400x. Turn on **Show labels**.

   A. Click on the axon label to read the description. What is its function? _____

   _____

   B. What is the function of a dendrite? _____

   Neurons transmit messages in the form of electrical and chemical signals, through axons and dendrites, from one part of the body to another.

3. <u>Compare</u>: Select to the human **muscle** sample. Observe the sample at 400x.

   A. What is a striation and how does it help muscle cells function? _____
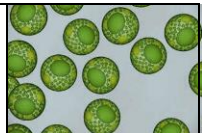
   _____

4. <u>Compare</u>: Select the human blood sample. Observe at 400x. Look under **Show information** on the right-hand side of the Gizmo.

   A. What is the function of **red blood cells**? _____

   _____

   B. What is the function of **white blood cells**? _____

   _____

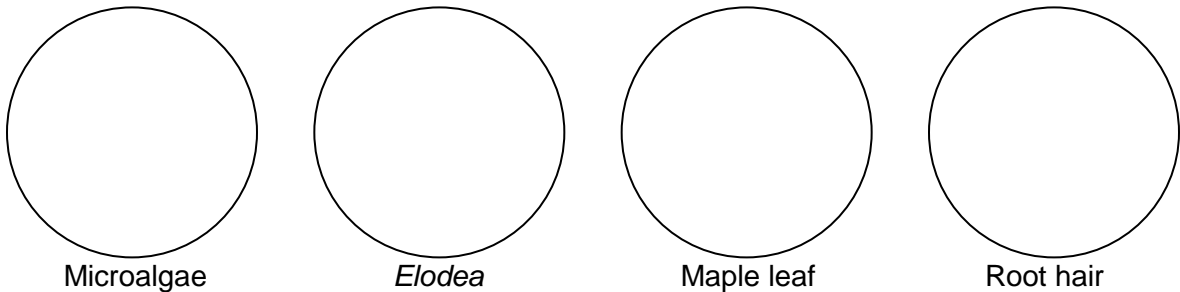   C. What organelle is missing from the red blood cells? _____

5. <u>Extend your thinking</u>: Many types of cells, such as the ones in this activity, live together in groups, called **tissues**. A tissue is a group of similar cells that together carry out a specific function. Describe how the skin cells, neurons, muscle cells, and blood cells you have observed relate to the functions of skin, nerve, muscle, and blood tissue.

_____

_____

_____

| **Activity C:**

Plants and unicellular life | <u>Get the Gizmo ready</u>:

• On the LANDSCAPE tab, select the **Microalgae** sample. | |

Introduction: Most of the animals and plants we are familiar with are **multicellular**, they are made up of many cells. However, many living things only consist of a single cell. These microscopic organisms are **unicellular**.

Question: How are unicellular organisms similar to multicellular organisms?

1. <u>Observe</u>: Compare the microalgae, the *Elodea* leaf cells, the maple leaf cells, and the root hair cells at 400x. Sketch at least two cells from each below. Include labels:

| Microalgae | *Elodea* | Maple leaf | Root hair |

A. What structures do all of these cells have in common? _____

_____

B. What structures are missing from the root hair cells? _____

C. What is the purpose of this structure, and why do you think it is missing from the root

hair cells? _____

_____

Photosynthesis is the ability of some organisms to generate food from sunlight. Cells that are not exposed to sunlight will not take part in photosynthesis.

D. How are the algae cells different from the other cells? _____

_____

Microalgae are examples of unicellular organisms. Each cell is a single organism.

2. Explore: Which other samples in the Gizmo represent unicellular organisms?

3. Observe: Switch to the **Protist** sample. Protists are unicellular organisms common in ponds On the MICROSCOPE tab, select the 100x radio button and focus the image.

   A. Watch the motion of the protists at 100X and 400X. What structures allow each protist to move?

   Amoeba: _____ *Euglena*: _____ *Paramecium*: _____

   B. In the table below, draw the structures that allow the protists to move on their images on the left and describe the structures in the spaces on the right:

	Amoeba	
	Euglena	
	Paramecium	

4. Compare: On the LANDSCAPE tab, click on the cow to switch to the ***E. coli*** sample. On the MICROSCOPE tab, select **2500x**, focus the image and turn on **Show labels**.

   A. Find two structures that help *E. coli* move and describe them below:

   Name: _____ Description: _____

   Name: _____ Description: _____

Summarize and Reflect:

   A. What did you learn about cell specialization (Activity B)? _____

   B. What did you learn about the difference between unicellular and multicellular organisms?