

Name: _____ Date: _____

Laboratory Skills: Examining Cells

Materials Needed

- compound light microscope
- prepared slides of plant cells, including root, stem, and leaf cells
- prepared slides of animal cells, including blood, muscle, and epithelium cells

Getting Ready

In this activity, you are going to work with various substances and pieces of lab equipment. Which of the following safety precautions do you think you will need to take? (Check all that apply.)

- Wait for an adult to be present to perform the activity.
- Avoid practical jokes and horseplay.
- Keep your work area clean and uncluttered.
- Avoid eating and drinking anything while doing the activity.
- Wear safety goggles and a lab coat.
- Wear latex gloves.
- Wear close-toed shoes.
- Pull back any loose clothes and hair.
- Take off dangling jewelry.
- Check any electrical cords and gas tubes for damage.
- Keep any electrical cords or gas tubes out of the way.
- Use tongs to move the heated beaker.
- Clean the beaker in an autoclave.
- Smell the water by wafting it.
- Seal the beaker before heating it.

Have your teacher check your responses before moving on to the activity.

Procedure

1. Plants have four types of specialized tissues: epidermal tissue, vascular tissue, ground tissue, and meristematic tissue. Each of these tissues are made up of specialized cells that help the tissue perform its function. In the first part of this lab, you will be examining specialized plant cells and using your observations of their structure to determine their likely function. You will use your observations to infer which type of tissue the cells belong to.

Start by reading about the main functions of the four plant tissue types in the table below. Complete the table by predicting what kind of cell structures would enable each tissue to perform its functions.

Tissue	Main Functions	Predicted Cell Structures
Epidermal	Forms a protective barrier around the exterior of the plant, controlling the types of materials that are able to move into and out of the plant.	
Vascular	Carries substances from the roots, through the stems, to the leaves; Transports sugars from the leaves to all other plant parts.	
Ground	Roots: store nutrients Stems: provide structural support Leaves: perform photosynthesis	
Meristematic	Contains stem cells that allow the plant to grow new parts	

2. Examine the prepared slides of root cells, stem cells, and leaf cells with the microscope. Study individual cells using the low-, medium-, and high-powered lenses. Record your observations in the table below. Then, on a separate sheet of paper, draw a labeled diagram of a cell from each of the three slides. Be sure to include the magnification in your drawing.

Cells	Observations
Root	
Stem	
Leaves	

3. In this second part of the lab, you will examine some specialized animal cells. Like plants, animals have four types of specialized tissues: connective tissue, epithelial tissue, muscle tissue, and nervous tissue. Each of these tissues are made up of specialized cells that help the tissue perform its function.

Read about the main functions of the four animal tissue types in the table below. Complete the table by predicting what kind of cell structures would enable each tissue to perform its functions.

Tissue	Main Functions	Predicted Cell Structures
Connective	Provides structural support; stores energy in the form of fat; makes up blood	
Epithelial	Forms a protective barrier around the exterior of the body as well as body cavities; protects organs; makes up glands	
Muscle	Contracts and relaxes in order to cause movement	
Nervous	Detects and responds to stimuli; transmits and stores information	

4. Examine the prepared slides of blood cells, muscle cells, and epithelium cells with the microscope. Study individual cells using the low-, medium-, and high-powered lenses. Record your observations in the table below. Then, on a separate sheet of paper, draw a labeled diagram of a cell from each of the three slides. Be sure to include the magnification in your drawing.

Cells	Observations
Blood	
Muscle	
Epithelium	

Questions

1. When you looked at the slides of plant root and stem cells, do you think all the cells belonged to the same kind of tissue? Explain.

2. Examine the three drawings you made of plant cells. Which type of tissue do you think each cell belongs to? Justify your answer.

Root cell: _____

Stem cell: _____

Leaf cell: _____

3. Pick one of the specialized plant cells you drew. How does its structure help with its function? Explain your answer.

4. Examine the three drawings you made of animal cells. Which type of tissue do you think each cell is an example of?

Blood cell: _____

Muscle cell: _____

Epithelium cell: _____

5. Pick one of the specialized animal cells you drew. How does its structure help with its function? Explain your answer.
