

## *Middle School Science Experiment*

# Comparing Animal and Plant Cell Structure

**Note:** This experiment is also included with the Biology Experiments that use the ProScope Digital USB Microscope.

During this experiment, you will work as a team to use the ProScope Digital USB Microscope and a computer to collect microscopic images from a variety of organisms. When you compare these specimens, you will be able to determine how they are alike and different by comparing their cellular parts.

### **Objectives**

In this experiment, you will:

- Use a computer and a digital microscope to collect images from a variety of cellular samples
- Use the images you collect to observe and compare cellular structures in plants and animals

### **Materials**

- Power Macintosh G3 or better
- ProScope Digital USB Microscope and software
- Onion cells, cheek cells, and elodea cells
- Tincture of iodine to stain onion and cheek cells
- Toothpick
- Slides

### **Procedure**

- 1** Prepare the computer for data collection by opening the USB Shot software and connecting the ProScope to one of the computer's USB ports.
- 2** Review the techniques for preparing wet mounted slides. To create the cheek cells slide, use the flat end of a toothpick to gently scrape the inside of your cheek, then spread the cells on a clean slide. Add a drop of iodine solution and add a coverslip.
- 3** Create a folder to save your data.

- 4 Using the ProScope Digital USB Microscope, create a still image of each cell type: onion, cheek, and elodea. Make sure that you are saving the images in your data folder. (Adjust the microscope's lens to increase the magnification.)
- 5 Using a word-processing application, create a table like the one in the following "Data" section.
- 6 Insert the images you selected in your table. Examine your samples and describe them and identify the cell structures you observed in your table.

## Data

Image	Description of cell structures observed

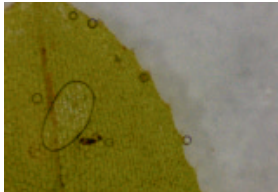


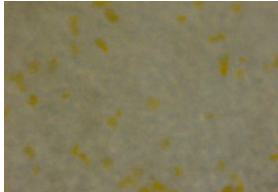
## Processing the data

1. Describe how the onion and cheek cells were similar in observed parts. What parts did they have in common?
2. Describe how the onion and elodea cells were similar in observed parts. What parts did they have in common?
3. Describe how the onion and cheek cells were different in observed parts. What parts did they have in common?
4. Describe how the onion and elodea cells were different in observed parts. What parts did they have in common?

## Extensions

1. Why do you think the onion cells lacked chloroplasts?
2. What structures do organisms that lack cell walls have to provide support?

## Sample results

Image	Description and cell structures observed
	<b>Elodea 100X</b> Cell wall, cytoplasm, and chloroplasts
	<b>Elodea 200X</b> Cell wall, cytoplasm, and chloroplasts
	<b>Onion stained with iodine 200X</b> Cell wall, cytoplasm, and nucleus
	<b>Human cheek cells with iodine 100X</b> Cell membrane, cytoplasm, and nucleus

## Answers to questions

### Processing the data questions

1. Both onion and cheek cells had a nucleus and both had cytoplasm.
2. Both onion and elodea cells had a cell wall and both had cytoplasm.
3. The onion cells had a cell wall but the cheek cells didn't. Both had a nucleus and cytoplasm.
4. Both onion and elodea cells had a cell wall and cytoplasm but the onion lacked chloroplasts.

### Extension questions

1. Onion is a storage organ for the onion plant. It is underground so it can't do photosynthesis.
2. They have a skeleton of some sort.

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