

A3 Skill Builder

Cell Drawings

A scientific drawing can help you record your observations and communicate your findings. Cell drawings should be clear, simple, and easy to understand (Figure 1.18).

1. Using a pencil and a sheet of paper, draw the cell membrane or cell wall using clear, firm lines. Do not sketch. You can shade darker areas if necessary.
2. Draw the nucleus.
3. Draw any other organelles that are present. Remember to draw only what you see.
4. Use a ruler to draw label lines pointing to each cell structure. Make sure the lines do not cross. Label all structures clearly.

5. Title your drawing with the name of the specimen. Record the objective lens you used to observe the image.

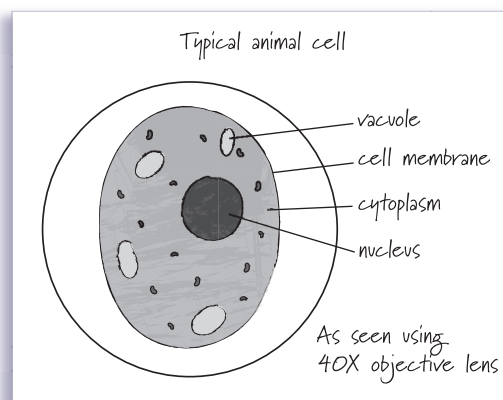


Figure 1.18 A cell drawing should clearly show your observations.

A4 Inquiry Activity

Toolkit 10

SKILLS YOU WILL USE

- Using appropriate equipment and tools
- Observing and measuring

Observing Mitosis

In this activity, you will be observing different phases of the cell cycle and stages of mitosis in onion root tip cells. The slide of onion root tip cells was prepared by slicing through a live root tip, staining the cells, and preserving it for future observation (Figure 1.19). When you look at cells on a prepared slide, keep in mind that the cells are no longer living. What you see is a snapshot of the cells that were dividing when the slide was prepared.

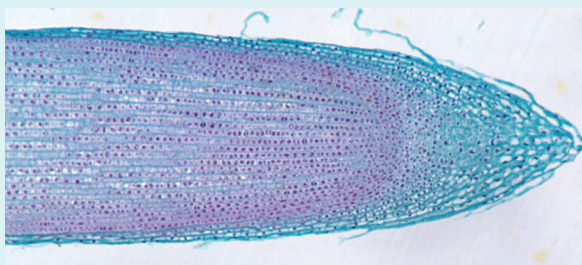


Figure 1.19 Root tips have areas of rapidly dividing cells. The phases of the cell cycle and stages of mitosis can be easily observed.

Initiating and Planning

How can we recognize the phases of the cell cycle and distinguish between the stages of mitosis?

Materials & Equipment

- compound microscope
- prepared slide of onion root tip

Performing and Recording

1. Set up the microscope and ensure that the lowest-power objective lens is in position and the diaphragm is open to the widest position.
2. Obtain a prepared slide of an onion root tip and place it on the stage of the microscope. Move the slide around until you see the coloured area of the slide through the lens. Use the coarse adjustment knob to bring your specimen into focus.

A4 Inquiry Activity (continued)

- Centre the image of the root tip in your field of view, and then carefully switch to the medium-power objective lens. Use the fine adjustment knob to focus the image. Look for cells undergoing cell division. The cells' chromosomes are stained to make them easier to observe. Carefully switch to the high-power objective lens and use the fine adjustment knob to focus the image.
- Identify cells that are in interphase. Make a sketch of a cell in interphase.
- Identify cells that are in each of the four stages of mitosis: prophase, metaphase, anaphase, and telophase (Figure 1.20). Make a sketch of a cell in each stage of mitosis.
- Identify cells that are in cytokinesis. Make a sketch of a cell in cytokinesis.
- Count the total number of cells in the field of view. Record this number in your notebook.
- Create a table similar to Table 1.1 and record the number of cells in each phase of the cell cycle and stage of mitosis. The total number of cells should equal the sum of the number of cells at each phase or stage.
- Assume that the percentage of cells in each phase or stage represents the relative amount of time it spends in that phase or stage. Create a graph that shows the percentage of time spent in each phase or stage.
- In what stage of mitosis were the majority of the cells?
- Based on your observations, does cell division occur as a continuous process or as a series of separate events? Explain.
- Did you observe any stages of mitosis that were difficult to identify or classify? Explain how you decided in which phase or stage it was.
- As with all living organisms, the onion plant began life as a single diploid cell. If the original cell had 16 chromosomes, how many chromosomes were in each of the cells you observed?

Communication and Teamwork

- Compare your results with another lab group. Were your percentages of the number of cells at each phase or stage similar? Explain.
- How well did you and your lab partner(s) work together? How did you decide on a role for each group member?

Table 1.1

Cell Phase or Stage	Number of Cells
Cytokinesis	
Interphase	
Prophase	
Metaphase	
Anaphase	
Telophase	

- Be sure to put the low-power objective lens back into place when putting away the microscope.

Analyzing and Interpreting

- Calculate a percentage for the number of cells at each phase or stage.

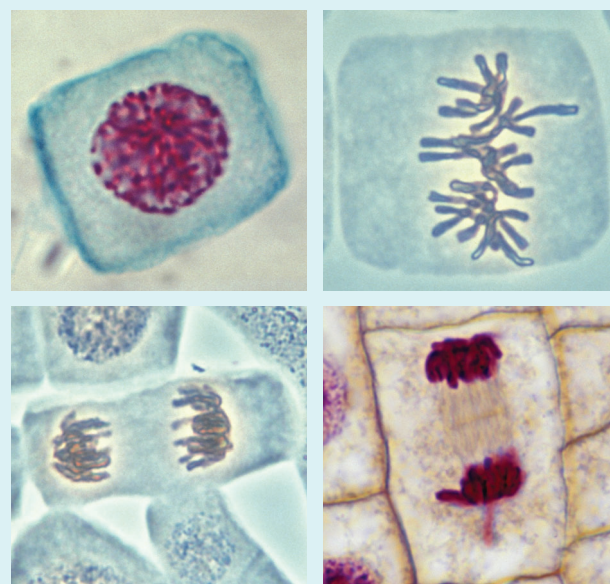


Figure 1.20 Onion root tip cells in each stage of mitosis