Cells Under Glass

Use microscope observations and measurements to compare cells.

BOT.1.2 "Using microscopes, observe, identify, record, and analyze (e.g., see and draw) cells and cell structures unique to plants. Use data measurements obtained from microscopy to compare the plant cells and organelle sizes between various..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline observations about cell shapes and structures in the passage. Circle the measurements in the table so you can use both kinds of evidence in your answers.

Three Samples, One Microscope

1. A class viewed three wet mounts under a light microscope. A calibrated eyepiece scale let them measure the longest dimension of ten cells from each sample. They also measured visible chloroplasts. The table gives sample averages in micrometers (µm). "Not seen" means the structures were not visible in that preparation, not that every cell of that species lacks them.

2. In onion bulb epidermis, the students saw rectangular outlines with clear interiors and, after staining, some nuclei. Elodea leaf cells had rectangular walls and many small green chloroplasts near the cell edges. In Chlorella, a green alga, each small round cell showed one curved chloroplast filling much of its interior.

AVERAGE DIMENSIONS MEASURED IN THE THREE SAMPLES

Sample	Cell longest dimension (µm)	Chloroplast longest dimension (µm)
Onion bulb epidermis	300	Not seen
Elodea leaf	80	5
Chlorella	10	7

3. Chloroplasts contain pigments that absorb light for photosynthesis. Cell walls give these samples distinct borders. A microscope view captures only a thin plane, so a chloroplast can be hidden or out of focus. When comparing sketches, keep the scale consistent, label what is actually visible, and distinguish a measured dimension from an estimated one.

2 ANSWER WITH EVIDENCE

Use the passage

1. An unknown sample has round cells about 10 µm across, each with a curved green structure. Which sample is the best match? Use its size and structure to explain.

2. How many times as long is the average onion epidermis cell as the average Elodea cell? Show your calculation.

3. Compare the average chloroplast dimensions in Elodea and Chlorella. Which is larger, and by how much?

4. Should a sketch of the observed onion bulb cells show green chloroplasts? Explain, and name one structure the sketch could label.

3 YOUR TURN

Your own words

Draw labeled sketches of one Elodea cell and one Chlorella cell at the same scale: 1 cm in your sketches represents 20 µm. Label each cell wall and a chloroplast, then write two sentences comparing their measured cell and chloroplast sizes.

ANSWER KEY

Cells Under Glass

HIGH SCHOOL · BOT.1.2

PART 1 · READ AND MARK

Underline observations about cell shapes and structures in the passage. Circle the measurements in the table so you can use both kinds of evidence in your answers. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	An unknown sample has round cells about 10 µm across, each with a curved green structure. Which sample is the best match? Use its size and structure to explain.	**Chlorella. Its cells average 10 µm across and contain one curved chloroplast.**
2	How many times as long is the average onion epidermis cell as the average Elodea cell? Show your calculation.	**300 ÷ 80 = 3.75, so the onion cell is 3.75 times as long.**
3	Compare the average chloroplast dimensions in Elodea and Chlorella. Which is larger, and by how much?	**The Chlorella chloroplast is larger by 2 µm: 7 µm minus 5 µm.**
4	Should a sketch of the observed onion bulb cells show green chloroplasts? Explain, and name one structure the sketch could label.	**No chloroplasts were seen in that preparation. The sketch could label a cell wall or a stained nucleus.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Elodea panel: elongated cell 4 cm long, labeled cell wall, several chloroplasts near the edge, one labeled chloroplast 0.25 cm long. Chlorella panel: round cell 0.5 cm across, labeled cell wall, one curved chloroplast 0.35 cm across labeled. The Elodea cell is eight times as long as the Chlorella cell is across. The Chlorella chloroplast is 2 µm longer than the Elodea chloroplast in these samples.

Accept sketches with approximately scaled dimensions and the observed shapes and structures. The onion result applies only to the preparation described; "not seen" does not establish that all onion cells lack chloroplasts.