

Table 1: Enter your measurements from Part 2 of the lab. Make sure to use the correct formula and cell references for the conversion factors!

Table 1: Calibrating the ocular micrometer

Measurements	Objective	
	10x	40x
measurement on stage micrometer (μm)	100.00	100.00
ocular micrometer units (OMU)	10.00	40.00
"Conversion factor (μm per micrometer unit; e.g. $"=E9/E10)"$ "	10.00	2.50

Table 2: Enter your measurements in ocular units; calculate the mean measurement for each using Excel's 'Average' formula; calculate the standard deviations in ocular units using the Stdev formula; and convert the mean length and standard deviations from ocular units to μm using the appropriate conversion factors in Table 1. Remember to use cell references and formulas!!!. Do NOT enter numerical values directly. OMU = ocular micrometer units

Table 2: Elodea

Objective	Cell length (in OMU)			Mean length (OMU)		Standard deviation length (OMU)	
	1	2	3	Mean length (μm)*	Standard deviation length (μm **		
10x	10.0	12.0	13.0	11.7	1.5	116.7	15.3
40x	21.0	23.0	29.0	24.3	4.2	60.8	10.4

*For mean diameter in μm , use formula =Cell1*Cell2 where Cell1 is cell containing MEAN LENGTH IN OCULAR UNITS and Cell2 is the cell containing the APPROPRIATE CONVERSION FACTOR (i.e. cell E11 or F11 for 10x or 40x, respectively)

**For standard deviation in μm , enter formula =Cell1*Cell2 where Cell1 is cell containing standard deviation in ocular units and Cell2 is the cell containing the appropriate conversion factor.

Objective	Chloroplast length (in OMU)			Mean length (OMU)		Standard deviation length (OMU)	
	1	2	3	Mean length (μm)*	Standard deviation length (μm **		
40x	0.9	1.0	1.0	1.0	0.1	2.4	0.1

* and ** See notes above

Number of your unknown 89

Identity of your unknown* (hypertonic/hypotonic/isotonic) hypotonic

*based on your observations

Questions: Answer all questions below in the spaces provided.

1. Compare the 10x and 40x measurements for Elodea cell length. Make sure you are comparing the averages in μm for the two objectives. How similar are the measurements?

Elodea cell length: 10x has an average cell length of 116.7 μm , and 40x - 60.8 μm . The differences between the two numbers are quite large. Thus, this leads to the fact that there were errors during the procedure.

0.25 pts

2. Assuming that at least some of the measurements differ, which should you trust more (10x or 40x) and why?

I would trust more 40x because it gives the image of the Elodea cell bigger and cleaner. The measurements from 40x is more accurate since 40x is high power.

0.25 pts

"3. Compounds that are not membrane permeable cause osmosis as we saw in this lab. Compounds that ARE membrane permeable themselves diffuse through the membrane and, therefore, do not cause osmosis. Formulate a hypothesis to address whether a newly-discovered compound is membrane permeable. In your hypothesis, make up a name for your compound. Remember that your hypothesis must be testable, e.g. using osmosis! Be specific: Your compound must have a name, and you must state what system you are going to test it on (it can't just be ""cells"")"

Hypothesis: The effect of temperature on the permeable membrane of onion cells.

0.25 pts

Independent variable: different temperature.

0.25 pts

Dependent variable: the permeable membrane of onion cells.

0.25 pts

Negative control: room temperature.

0.25 pts

Table 1 including formulas and cell references (1 pt):

Table 2, incl. correct formulas, cell refs for means and std devs (0.5 pts):

Table 2, Conversion to OMU using formulas and cell references (0.75 pts):

Identification of unknown (0.25 pt):

Total for Questions (1.5 pts):

TOTAL PTS (4 possible):

0.00