

BIO 183 LAB SIGN OFF PAGE — UNIT 2

Name _____

Please staple all of your lab pages for this Unit together with this page as the top. You will use this page to get your Labs for Unit 2 signed off by the Biology Learning Center staff. You need to have all of the following steps initialed by a staff member before you can receive your 25 lab points for Unit 2 and be allowed to take the Unit 2 Exam.

After you have obtained all of your sign offs for this Unit, be sure that a BLC staff member indicates on your Lab Card that you are OK to take the Unit 2 Exam. Also, keep this sign off page, along with your completed lab worksheets, as proof of your lab completion. If your Lab Card indicates that you have not completed the required Labs for this Unit and you believe that you have, it is up to you to provide proof that you have indeed completed the Labs. Keep this page!

_____ Unit 2, Step 2A: "The Importance of Surface Area" Lab Activity

_____ Unit 2, Step 2B: "The Importance of Surface Area" Lab Activity

_____ Unit 2, Step 2C: "The Importance of Surface Area" Lab Activity

optional Unit 2 Step 3: "Primary Production" Internet Lab Activity

_____ Unit 2, Step 4A: "Osmosis and Diffusion" Lab Activity

_____ Unit 2, Step 4B: "Osmosis and Diffusion" Lab Activity
[Do not initial until student brings Kit 102 up to front desk!]

*BLC Staff: After the student receives his/her last initial on this page, please indicate on his/her Lab Card that s/he is OK to take the Unit 2 Exam.

STEP 2: WORKSHEETS FOR "THE IMPORTANCE OF SURFACE AREA" LAB ACTIVITY

For lab points, do the lab activity entitled "The Importance of Surface Area." There are worksheets for this activity later in this packet. Directions are on the Biology 183 website. This lab must be done in the Biology Learning Center. When you have completed the lab activity, take your results to the front desk in the Biology Learning Center to receive lab points.

BEFORE CLEANING UP YOUR EXPERIMENT, GO TO THE FRONT DESK AT THE BIOLOGY LEARNING CENTER AND HAVE ONE OF THE STAFF COME TO YOUR DESK TO SEE YOUR RESULTS AND TO CHECK YOUR WORKSHEETS FOR THE FIRST SET OF LAB POINTS. DO NOT PUT ANYTHING AWAY UNTIL AFTER YOU HAVE RECEIVED LAB POINTS!

(Bio 183, Unit 2, Step 2A)

Table 1. Size of cells and percentage fed.

Cell #	Before Feeding		After Feeding		% Fed		
	Length of one surface of entire cell in mm	Volume of entire cell (V_e) in mm^3	Length of one surface of unfed portion of cell in mm	Volume of unfed portion of cell (V_u) in mm^3	$V_e - V_u$	$\frac{V_e - V_u}{V_e}$	%Fed
1							
2							
3							

WHEN YOU HAVE COMPLETED THE CALCULATIONS FOR TABLE 1, BRING YOUR WORKSHEETS TO THE FRONT DESK IN THE BIOLOGY LEARNING CENTER FOR LAB POINTS.

(Bio 183, Unit 2, Step 2B)

Table 2. Surface to volume ratio of cells.

Cell #	Length of one surface of entire cell in mm	V_e in mm^3 (from Table 1)	Surface area (SA) in mm^2	SA/V_e	$SA:V_e$ ratio

Answer the following questions:

- As the volume of the cell increases, how does the surface area change?
- As the volume of the cell increases, how does the surface area to volume ratio change?
- As the volume of the cell increases, how does the percentage fed change?
- If the agar cubes were living cells and the vinegar was a vital nutrient, which cell would be most likely to survive?
- Which cell would be most likely to die of starvation?
- Explain in your own words why cells do not grow any larger than they do.

WHEN YOU HAVE COMPLETED THE CALCULATIONS FOR TABLE 2 AND ANSWERED THE QUESTIONS, BRING YOUR WORKSHEETS TO THE FRONT DESK IN THE BIOLOGY LEARNING CENTER FOR LAB POINTS.

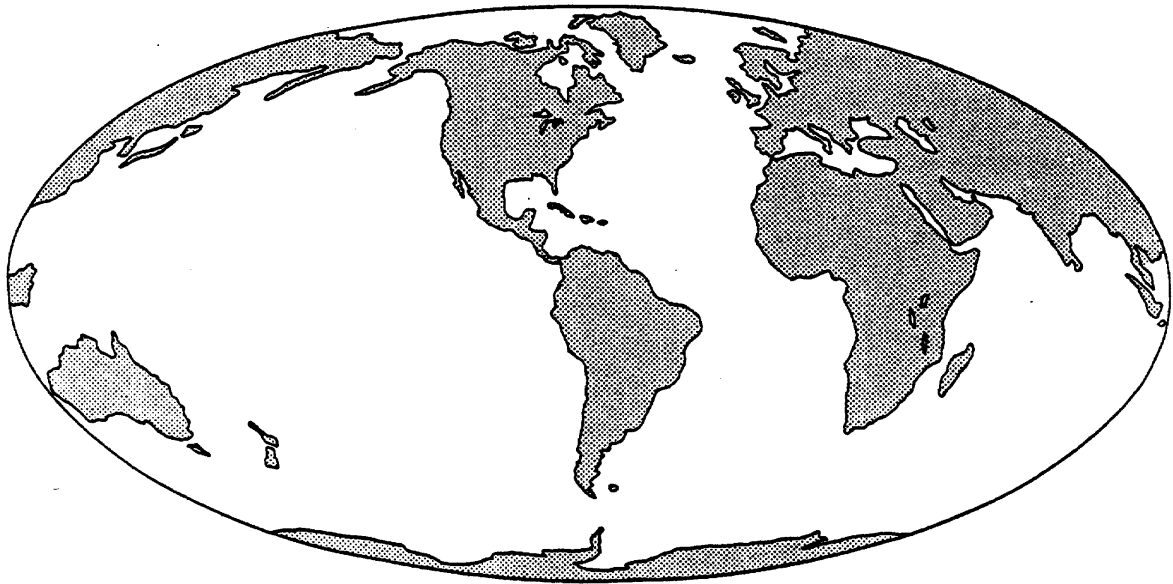
(BIO 183, UNIT 2, STEP 2C)

STEP 3: WORKSHEETS FOR "PRIMARY PRODUCTION" LAB ACTIVITY

Do the lab activity entitled "Primary Production." This activity can be completed anywhere you have Internet access. Directions are on the Biology 183 website. When you have completed the lab activity, check your results on the class website.

Although this activity is optional, the material it covers will be on your exam!

1. On the map below, sketch the highest productivity zones in the ocean. Label them "H". Also outline the lowest productivity zones in the ocean. Label them "L."



2. What are the four essential factors for primary productivity? Which one is **never** limiting?
3. Which of the four essential factors for primary productivity is never limiting in the ocean but can be critically limiting on land? _____
4. When it comes to primary production, the land is essentially a two-dimensional system with all of the factors coming together in a relatively thin zone where the soil meets the atmosphere. By contrast the oceans are a very three-dimensional system, affected by large-scale oceanic circulation, which can increase and decrease at least one of the four essential factors. Which one? _____

5. Look at the very high productivity zones in the ocean. One area is close to the coasts of the continents (especially on their west sides) and another is close to the north pole. Think about the high productivity at the coasts—This high productivity is driven by an abundance of one of the three essential factors that are important in the ocean. Which one?
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6. Why? (What physical processes are involved?) [You may want to look at your answer to the last question on your textbook worksheets to help you answer this question.]
7. Why do the ocean areas close to the north pole have very high primary productivity (as indicated by chlorophyll concentration) whereas areas near the south pole have very low levels of primary productivity?

WHEN YOU HAVE COMPLETED THIS ACTIVITY, CHECK YOUR ANSWERS ON THE CLASS WEBSITE.

(Bio 183, Unit 2, Step 3)

STEP 4: WORKSHEETS FOR "OSMOSIS AND DIFFUSION" LAB ACTIVITY

For lab points, do the lab activity entitled "Osmosis and Diffusion." Go to the Bio 183 website for the instructions for this activity. This lab must be completed in the Biology Learning Center. When you have completed the lab activity, take your results to the front desk in the Biology Learning Center to receive lab points.

PART A. DIFFUSION

1. Diffusion across a cell membrane (like the red dye in the mock cell) also is called _____ transport.

2. With respect to the purple dye in the mock cells, why do you think the purple dye did not diffuse across the membrane? (There are several possible reasons; just name one).

3. Name two processes (besides simple diffusion) that a cell can use to move the molecules it needs across its membrane and into the cell. Give an example of each one.

a) process: _____
does this process require the cell to do work? _____

b) process: _____
does this process require the cell to do work? _____

BRING YOUR WORKSHEETS TO THE FRONT DESK IN THE BIOLOGY LEARNING CENTER FOR LAB POINTS.

(Bio 183, Unit 2, Step 4a)

PART B: OSMOSIS

4. Which cell(s) do you think will gain water?

Which will lose water?

Will any cells stay the same?

Table 1.	Start time:	A	B	C
Inside "cell" concentration	Outside beaker concentration	Starting weight of "cell"	Weight after 10 minutes	Weight after 20 minutes
Medium ("brackish")	Fresh			
Medium ("brackish")	Medium ("brackish")			
Medium ("brackish")	Salty			

Use the weights from Table 1 to help you complete the calculations in the table below.

Inside "cell" concentration	Outside beaker concentration	Total weight change (C - A)	% weight change $((C - A)/A) * 100$	Was the outside solution hypertonic? Isotonic? Or hypotonic?	Did water go into the cell, out of the cell, or stay the same?
Medium ("brackish")	Fresh				
Medium ("brackish")	Medium ("brackish")				
Medium ("brackish")	Salty				

5. Which cell(s) stayed the same weight?

Which one(s) gained water?

Which one(s) lost water?

6. Based on the results of this experiment, predict what would happen to the cells of an osmoconformer if it was put in a fluid with a lower solute concentration than that of the inside of its cells (e.g., if you put the osmoconformer in a beaker of fresh water).

7. Based on the results of this experiment, predict what would happen to the cells of an osmoconformer if it was put in a fluid with a higher solute concentration than that of the inside of its cells (e.g., if you put the osmoconformer in a beaker of super-salty water).

8. Give **ONE** example of how marine osmoregulators deal with osmotic problems in the marine realm. (There are many examples, just pick one. Use your textbook as a resource.)

WHEN YOU HAVE COMPLETED THIS LAB ACTIVITY, BRING YOUR WORKSHEETS TO THE FRONT DESK IN THE BIOLOGY LEARNING CENTER FOR LAB POINTS. DO NOT PUT ANY LAB MATERIALS AWAY UNTIL AFTER YOU RECEIVE YOUR LAB POINTS.

(Bio 183, Unit 2, Step 4b)