Membrane Diffusion Lab

In this investigation, you will explore the process of diffusion across a semi-permeable cell membrane.

Part 1:

1. Go to the following website: http://phet.colorado.edu/en/simulation/membrane-channels
2. Click "Run Now" (bright green)
3. Add 5 blue "Gated Channels" – space them out evenly
    a. Make sure the channels are closed
4. Let the green dots represent solute (like salt) and the blue diamonds represent water molecules
5. Add 20 green dots and 20 blue diamonds into the top section of the cell (let this be the inside of the cell)
6. Add 40 blue diamonds to the bottom section of the cell (let this be the outside of the cell)
7. Is the cell "hypotonic", "hypertonic" or "isotonic" to the surrounding fluid? Explain.

    _____

    _____

8. You are about to open both of the channels at the same time, what do you expect to happen?

    _____

    _____

    _____

9. Open both types of channels at the same time and begin a timer for 15 seconds.
10. After 15 seconds, pause the simulation and count how many green dots and blue diamonds are one each side of the cell membrane.

	Inside of Cell (top of simulation)		Outside of cell (bottom of simulation)	
	Solute (green dots)	Water molecules (blue diamonds)	Solute (green dots)	Water molecules (blue diamonds)
0 seconds	20	20	0	40
15 Seconds				
30 Seconds				
45 Seconds				
60 Seconds				

11. If you could see this cell and could watch this happen, what would you see the cell do?

    _____

    _____

Part 2:

12. Click the "Clear Particles" icon
13. Add 20 green dots and 40 blue diamonds into the top section of the cell (let this be the inside of the cell)
14. Add 20 blue diamonds to the bottom section of the cell (let this be the outside of the cell)
15. Is the cell "hypotonic", "hypertonic" or "isotonic" to the surrounding fluid? Explain.

    _____

    _____

16. You are about to open both of the channels at the same time, what do you expect to happen?

    _____

    _____

17. Open both types of channels at the same time and begin a timer for 15 seconds.
18. After 15 seconds, pause the simulation and count how many green dots and blue diamonds are one each side of the cell membrane.

	Inside of Cell (top of simulation)		Outside of cell (bottom of simulation)	
	Solute (green dots)	Water molecules (blue diamonds)	Solute (green dots)	Water molecules (blue diamonds)
0 seconds	20	40	0	20
15 Seconds				
30 Seconds				
45 Seconds				
60 Seconds				

19. If you could see this cell and could watch this happen, what would you see the cell do?

_____

_____

Part 3:

20. Click the "Clear Particles" icon
21. Add 20 green dots and 40 blue diamonds into the top section of the cell (let this be the inside of the cell)
22. Add 40 blue diamonds to the bottom section of the cell (let this be the outside of the cell)
23. Is the cell "hypotonic", "hypertonic" or "isotonic" to the surrounding fluid? Explain.

_____

_____

24. You are about to open both of the channels at the same time, what do you expect to happen?

_____

_____

25. Open both types of channels at the same time and begin a timer for 15 seconds.
26. After 15 seconds, pause the simulation and count how many green dots and blue diamonds are one each side of the cell membrane.

	Inside of Cell (top of simulation)		Outside of cell (bottom of simulation)	
	Solute (green dots)	Water molecules (blue diamonds)	Solute (green dots)	Water molecules (blue diamonds)
0 seconds	20	40	0	40
15 Seconds				
30 Seconds				
45 Seconds				
60 Seconds				

27. If you could see this cell and could watch this happen, what would you see the cell do?

_____

_____

28. Construct a graph. But, before you do, answer the following questions:
    a. What do you think is the important information to graph?

    _____

    _____

    b. Is the data you chose to graph, relevant to our lab?

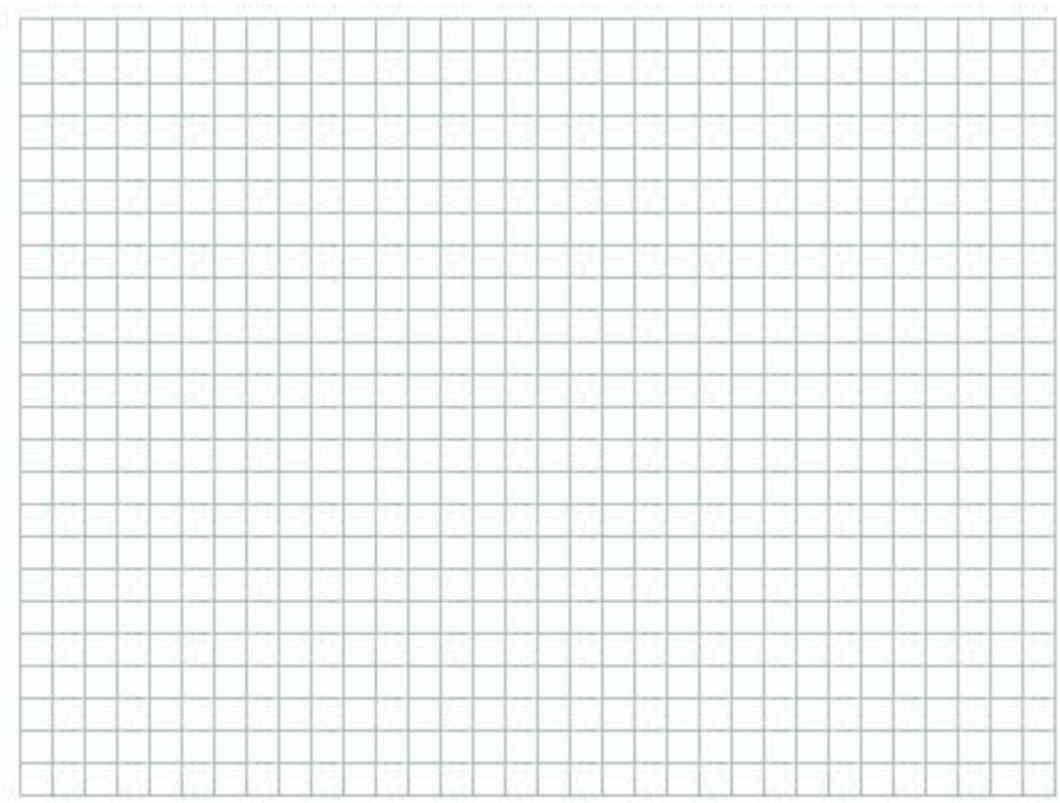
    _____

    _____

    c. What type of graph should you create (i.e. line graph, bar graph, pie chart, etc.)? Why?

    _____

    _____



29. What can you learn by looking at your graph?

    _____

    _____

30. Use your graph to make a claim about this investigation.

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