Diffusion Online Lab

Name: _____

Go To: http://phet.colorado.edu/en/simulation/membrane-channels

Part 1. Add 50 green particles (this does not need to be exact so don't worry if you are off by a few).

1. Slow the animation down and describe the motion of the green particles. Is the movement of the particles random or are they moving around with a purpose? Explain your answer. _____
2. What happens when the particles hit each other? _____
3. What does the membrane do to the particles? _____
4. Click on the "show concentrations" box. How would you describe the concentration of the green particles on the top half of the membrane? Is it high or low? _____
5. How would you describe the concentration of green particles on the bottom half of the membrane? Is it high or low? _____

Part 2: Add 3 evenly spaced, green, gated channels to the membrane. Speed up the animation again and then click the Open Channels button.

6. The process you are observing is the process of diffusion. Describe the process using the key words *particle*, *movement*, *low concentration*, and *high concentration*. _____
7. Closely observe the motion of the particles again and describe why diffusion takes place. _____

Part 3: Click on the reset all button and add the 50 green particles again. Now add 50 blue particles too. Add 3 blue and 3 green gated gates.

8. Speed up the animation to full speed. Open both gates and observe the concentrations. Wait for at least 1 minute. What happens to the concentration lines on both sides of the membrane? _____

_____This is called the equilibrium point. The concentrations will change somewhat on either side of the membrane but they will stay relatively equal.

LIVEWORKSHEETS

Name: Period

Conclusion Play with the simulation as necessary to help you answer the following questions.

9. What factors determine how quickly particles can reach equilibrium? _____

_____

_____

10. What factors limited the diffusion of particles through the membrane? _____

_____

_____

11. Why do particles move down a concentration gradient? _____

_____

_____

12. How do you think this simulation is a good model of the cell membrane? _____

_____

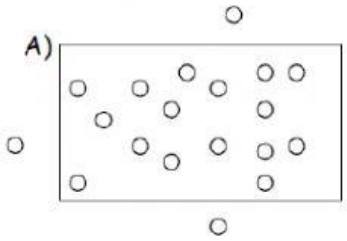
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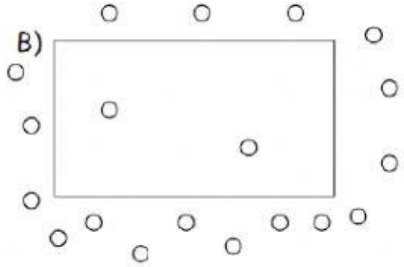
How do you think this simulation is a poor model of the cell membrane? _____

_____

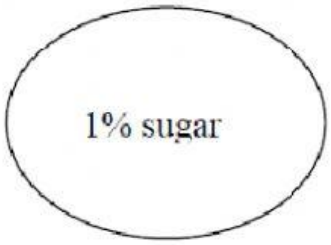
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13. Use arrows to indicate the direction of diffusion in each case below. The circles are molecules that can pass through the cell membrane. The square is the cell membrane.

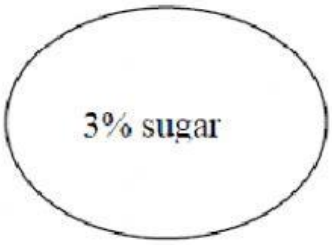




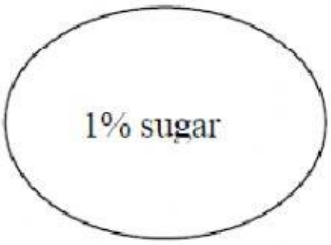
14. For each of the situations below use an arrow to indicate the net movement of sugar into our out of the cell. (Assume that the sugar molecules can pass through the cell membrane in each case.)



5% sugar



1% sugar



1% sugar

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