Diffusion and Osmosis

Introduction: Diffusion is a type of passive transport, or it is a net movement of molecules in and out of the cell across the cell membrane from a high concentration to a low concentration. Osmosis is the movement of water to that may be hypotonic (low concentration of dissolved substances) to hypertonic (higher concentration of dissolved substances) or is isotonic (stays the same) across a semipermeable membrane. To test each one of these we there were two questions asked. To test diffusion rate the question that was tested was "How does the concentration of Methylene blue affect diffusion rate?" the hypothesis that was made was that a high concentration of MB (Methylene blue) will increase the rate of diffusion. To test osmosis the question asked was "how does salt concentration affect osmosis in plant cells?" the hypothesis made for osmosis was that plant cells will shrink in salt water But will stay the same in tap and pond water.

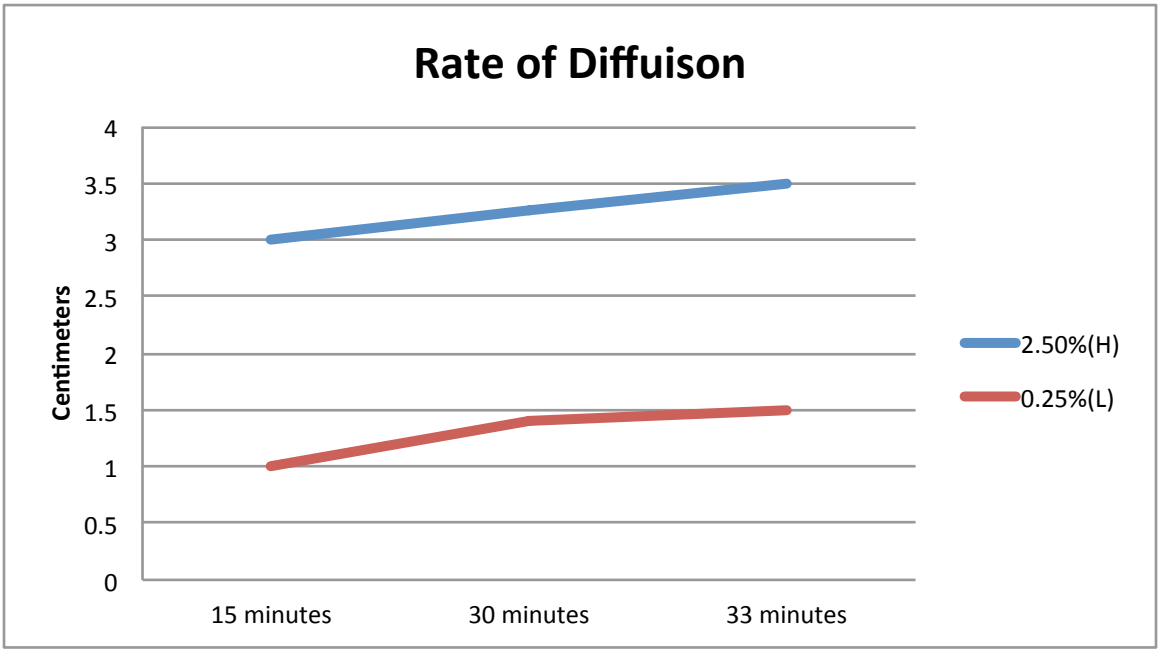
Materials:

1. 2 Petri dishes filled with agar
2. Cork borer
3. 2.5% methylene blue
4. .25% methylene blue
5. Sharpie
6. Microscope
7. Ruler
8. Slides and cover slips
9. Elodea
10. Droppers distilled water
11. Aquarium or pond water
12. 10% Salt water
13. Pipette
14. timer

Diffusion experiment procedure:

1. Label each petri dish one with low concentration (.25%) the other with high concentration (2.5%).
2. Two group mates put hole in both agar plates with cork borer at the same time.
3. One group mate place three drops of low concentrated MB (.25%) in dish labeled low concentration. While another group mate places three drops of high concentrated MB (2.5%) in dish labeled high concentration. Try to do at the same time.

4. Set timer for 15 minutes.
5. After 15 minutes measure the length of the MB with ruler using centimeters. Record the results and repeat the time and measurement two more times.

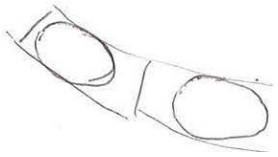


The graph shows the purple is the high concentration and the orange is the low concentration. Each line is showing the growth in length after a certain period of time.

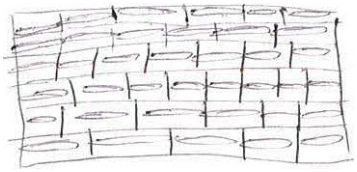
Osmosis experiment procedure:

1. Collect three slides
2. On the first slide put a small piece of elodea on the slide and put three drops of the pond water on the slide with a pipette. Cover with cover slip.
3. Sketch how the plant looks underneath the microscope.
4. One the second slide put a small piece of elodea on the slide and place three drops of NACL (10% salt water) with a pipette and cover with cover slip.
5. Sketch how the plant looks in salt water under the microscope.
6. On the last slide place a small piece of elodea on the slide place three drops of tap water on the slide with a pipette and cover with slip.
7. Sketch how plant looks in tap water underneath the microscope.

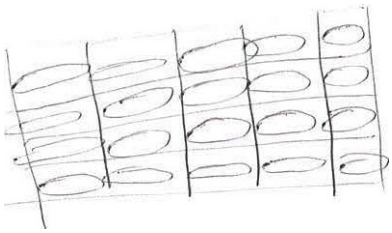
Elodea plant, that is in pond water under microscope.



Elodea plant, that is in salt water



Elodea plant, that is in tap water



Conclusion:

In the experiment my first hypothesis was correct. The high concentration of MB did actually move faster than the lower concentration of MB. After a matter of minutes the length of MB in high concentration was bigger than the length of low concentration. For the osmosis lab my hypothesis was not correct. The plant cells shrunk in salt water but also shrunk in tap water. In both tap and salt water the plant cells changed in almost the same way.

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Work Sample Evaluation

Subject Area: Biology
Task Title: Water Works: Cells & Osmosis
Student Work Sample Title: Diffusion and Osmosis

The document was scored using the *CCR Task Bank Rubric for Scientific Research Plans and Reports.* The final scores are indicated in the following chart.

Scoring Criteria	Insufficient Evidence	Developing	Progressing	Accomplished	Exceeds
Hypothesis Development		**X**			
Research Plan				**X**	
Results and Interpretation			**X**		
Communication			**X**		
Organization			**X**		
Accuracy		**X**			

Annotations: The following evidence from the work sample and the reviewer's comments support the scores above. Page and line numbers refer to the original work sample.

Scoring Criteria	Page #	Line #	Commentary about the work sample
Hypothesis Development: *Locating resources in order to develop a thesis or hypothesis*	1	6-11	The work sample has a clearly defined hypothesis, but lacks any reference to outside resources.
Research Plan: *Planning, conducting, and describing an experiment or study*	1	6-11	The student demonstrated an understanding of how to design the experiment in order to answer the questions.
Results and Interpretation: *Describing and interpreting results in relation to the hypothesis*	2	3-5	The student created a good graph and some aspects of data presentation were explained quite well.
	3	1-5	The drawings in the work sample need more written explanations in order to understand the points being made.
	3	9-13	The student needs to provide a discussion that demonstrates their reasoning as to the how and why of the results turned out as they did.
Communication: *Using subject appropriate language and considering audience*			The work product uses discipline-specific language.
			Overall, the work product maintains a professional tone, in spite of the grammatical errors.
Organization: *Structuring main ideas and incorporating supporting information*			The conclusion refers to the introduction, thus showing how the original hypotheses were confirmed or disproved.
Accuracy: *Attending to detail, grammar, spelling, conventions, citations, and formatting*	All		Most of the requirements for the assignment were present in the work sample, however an introduction and explanations of the information in the sketches is needed.
	All		The work sample has little regard for English grammar. Run-on sentences and sentence fragments are present throughout.
	2	4	The graph indicates that data samples were taken after 15, 30, and 33 minutes. The last data point at 33 minutes is incorrectly spaced in the graph; it appears as if 15 minutes passed since the previous data point.