

Tobermory High School

National 5 Biology

Transport Across Membranes

1. Define the term diffusion. (1)
2. Name 2 essential substances that enter an animal cell by diffusion. (2)
3. Name a waste material that diffuses out of a plant cell. (1)
4. Define the term osmosis. (1)
5. Why do red blood cells shrink when placed in a strong salt solution? (1)
6. Five thin cylinders of turnip were cut using a cork borer. These cylinders were then all cut to be 50mm in length. They were then placed in salt solutions of different concentrations. After 24 hours the cylinders were re-measured and the results are recorded in the table below.

Concentration of salt solution (M)	Initial length of cylinder (mm)	Final length of cylinder (mm)	Change in length (mm)	Percentage change in length
0.1	50	57	+7	+14
0.2	50	52		
0.3	50	47		
0.4	50	43		
0.5	50	37		

- (a) Copy the table and complete the last 2 columns. (2)
- (b) Draw a line graph of percentage change in length of the cylinder against the molar concentration of salt solution. Show the gains above and the losses below the x-axis. (4)
- (c) From the graph, estimate the concentration of salt solution which should show no loss or gain of water. (1)
- (d) Why do the cylinders need to be cut using the same cork borer? (1)

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7. Paramecium is a freshwater unicellular animal. It gains water by osmosis and any unwanted water is removed by contractile vacuoles. Every time a contractile vacuole fills and empties is called one pulsation.

In an experiment, specimens of Paramecium were placed in solutions of different salt concentration and viewed under a microscope. The table below gives the average results from the observations of the Paramecium.

Concentration of salt in bathing solution (%)	Average time for one pulsation (s)
0.1	95
0.3	154
0.5	204
0.7	381

- (a) Show the results from the table above on a line graph. (3)
- (b) What is the relationship between the salt concentration of the bathing solution and the time taken for one pulsation? (1)
- (c) Explain your answer to (b). (1)
- (d) Predict what would happen to the time for one pulsation if the Paramecium were to be placed in distilled water. (1)
- (e) Identify the variable in this experiment involving Paramecium. (1)
- (f) Name 2 other variables which must be kept constant to make the procedure valid. (2)
- (g) Why do we calculate the average time for each concentration? (1)

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8. Copy and complete the table below.

Decide if each of the following statements is TRUE or FALSE and tick the appropriate box. If the statement is FALSE, write the correct word in the correction box to replace the word underlined in the statement.

Statement	True	False	Correction
Molecules of carbon dioxide move out of a respiring cell by <u>diffusion</u> .			
Phagocytosis and pinocytosis are two examples of <u>exocytosis</u> .			
The carrier molecules that pump ions across a membrane are made of <u>phospholipid</u> .			
Red blood cells <u>shrink</u> when placed in distilled water.			
Plant cells walls are composed of <u>cellulose</u> .			
During active transport, energy is needed to move molecules <u>along</u> a concentration gradient from low to high concentration.			

(6)
Total - 30