



**Subject: Biology**

**Worksheet : Osmosis**

**Name:**

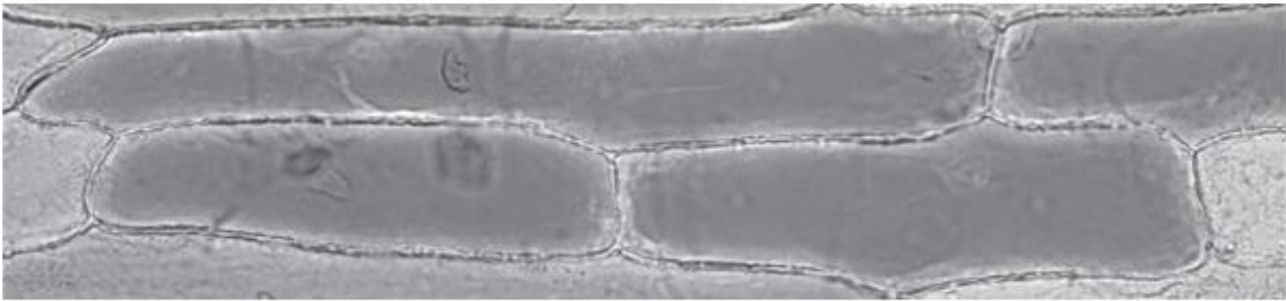
**Date:**

**Grade 9 IB**

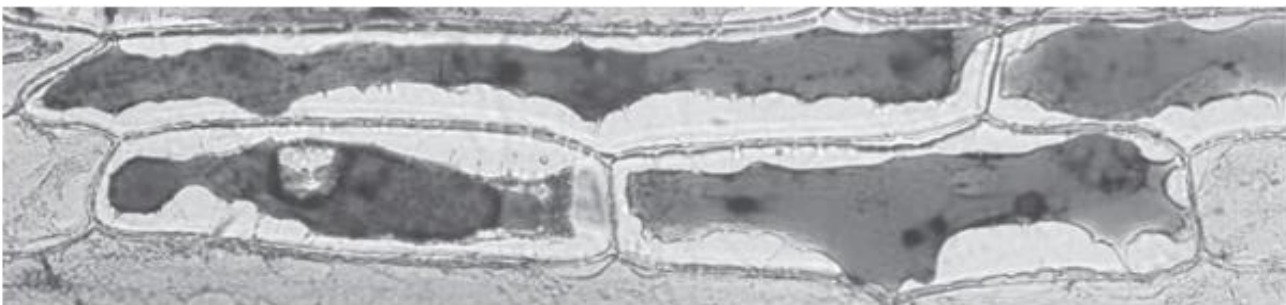
**Question 1 :**

A student prepared some plant cells taken from an onion. She placed the cells in a few drops of distilled water. She then used a camera attached to a microscope to photograph the cells.

She then added a few drops of concentrated salt solution to the cells and waited a few minutes. She then took another photograph of the same cells.



**photograph of cells in distilled water**



**photograph of cells in concentrated salt solution**



(a) Describe the differences in the appearance of the cells in concentrated salt solution compared with the cells in distilled water.

(2)

**In concentrated salt solution :**

**The cell becomes plasmolysed as the cell membrane peels away from the cell wall..**

**In distilled water :**

**The cell becomes turgid**

(b) The student thought that the differences in the cells were caused by osmosis.

What is meant by the term **osmosis**?

(2)

**osmosis is the movement of water molecules from a solution with a high concentration of water molecules to a solution with a lower concentration of water molecules, through a cell's partially permeable membrane.**

(c) Explain what happens to the cells in concentrated salt solution to change their appearance.

(3)

**When a plant cell is placed in concentrated salt solution, water concentration inside the cell is greater than that which is outside the cell. Therefore, water moves through the cell membrane into the surrounding medium.**

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(d) Another student investigated the appearance of red blood cells in distilled water and in concentrated salt solution.

Use your knowledge of osmosis and the structure of red blood cells to describe and explain what the red blood cells would look like

(i) in distilled water

(2)

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**Distilled water on the other hand is hypotonic to red blood cells. The red blood cell will therefore become lysed**

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(ii) in concentrated salt solution.

(2)

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**Red blood cells placed in a solution with a lower water concentration compared to their contents will become shrivelled .**

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## Question 2:

A student wants to investigate osmosis using potato tissue.

The student puts 90 cm<sup>3</sup> of glucose solution of different concentrations into six different plastic cups. He then puts one raw potato chip into each cup. The diagram shows one of the plastic cups.



The potato chips were all the same mass and shape at the start of the investigation. After 12 hours the chips are removed and the volume of solution in the plastic cups is measured. The table shows the results.

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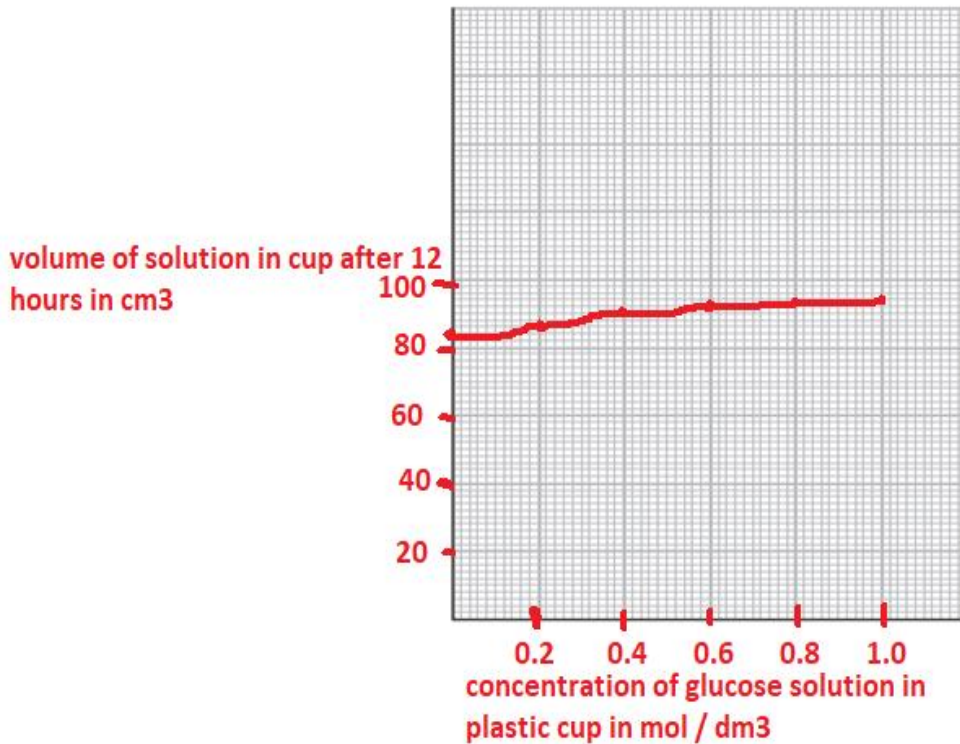


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Cup	Concentration of glucose solution in plastic cup in mol/dm <sup>3</sup>	Volume of solution at start in cm <sup>3</sup>	Volume of solution in cup after 12 hours in cm <sup>3</sup>
1	0.0	90	84
2	0.2	90	88
3	0.4	90	93
4	0.6	90	95
5	0.8	90	95
6	1.0	90	95

Use the information in the table to plot a graph on the grid to show the volume of solution remaining in the cup after 12 hours in each concentration of glucose. Use a ruler to join your points with straight lines.

(5)



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(ii) Use your graph to estimate the concentration of the cytoplasm in the potato cells.

(1)

concentration **0.28** mol/dm<sup>3</sup>

(iii) Complete the table by ticking the boxes to show the cups in which the potato chips lost water.

(1)

Cup	1	2	3	4	5	6
Tick			✓	✓	✓	✓

(c) (i) Name the independent variable in this investigation.

**concentration of glucose;**

(ii) Name a controlled variable in this investigation.

**volume of solution / mass/shape/size/surface area of chip / variety of potato / temperature / time /**

(iii) Suggest two reasons why the volume of solution measured by the student may not be accurate.

**1. water left on chip;**

**2. water left in cup / water spilled;**

**3. evaporation from cup;**

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