

# Coursework:

## Introduction:

Osmosis is the passage of water from a region of high water concentration through a semi-permeable membrane to a region of low water concentration. A selectively permeable membrane is one that allows unrestricted passage of water, but not solute molecules or ions.

On the side of the membrane with higher free water concentration (i.e. a lower concentration of solute), more water molecules will strike the pores in the membrane in a give interval of time.

More strikes equates to more molecules passing through the pores, which in turn results in net diffusion of water from the compartment with high concentration of free water to that with low concentration of free water.

The key to remember about osmosis is that water flows from the solution with the lower solute concentration into the solution with higher solute concentration. Pure water has a molecular weight of 18 grams/mole, so its concentration is approximately 55 Molar.

Solutes take up space that would otherwise have been occupied by water in a solution, and they also associate with a number of the water molecules, further lowering its activity (effective concentration).

When you put an animal or plant cell into a liquid containing water one of three things will happen:

- 1 If the medium surrounding the cell has a higher water concentration than the cell (a very dilute solution) the cell will gain water by osmosis.
- 2 Water molecules are free to pass across the cell membrane in both directions, but more water will come into the cell than will leave. The net (overall) result is that water enters the cell. The cell is likely to swell up.
- 3 If the medium is exactly the same water concentration as the cell there will be no net movement of water across the cell membrane.

Water crosses the cell membrane in both directions, but the amount going in is the same as the amount going out, so there is no overall movement of water. The cell will stay the same size.

If the medium has a lower concentration of water than the cell (a very concentrated solution) the cell will lose water by osmosis.

Again, water crosses the cell membrane in both directions, but this time more

water leaves the cell than enters it. Therefore the cell will shrink.

### **Hypothesis:**

My hypothesis is that the one in water will grow because it has a higher concentration but the one in sugar has a lower concentration so therefore it won't grow.

### **Palimery test:-**

Length of time: 45 minutes

Borer size: 3

Chip size: 30mm

Container: test tube

Solutions size: 10ml

Solutions used: 0.0m and 1m

Statuses of test: successful

### **Apparatus:-**

Bore size 3x1

Patatox1

Test tube x6

Sugar solutions 0.0m – 1m

Knife x1

Ruler x1

### **Method:-**

- 1) Six potato chips were cut with a borer size 3.
- 2) They were cut and ended to 30mm
- 3) Each chip was placed into 10ml of each solution in a test tube 0.0, 0.2, 0.4, 0.6, 0.8, 1m
- 4) They were left for 45 minutes
- 5) The chips were taken out of the solution and re-measured.

### **Safety: -**

Goggles

Gloves

**Dependant variables:-** thing we will keep the same 10ml of solution per test tube, the same size of chip will be used in all test tubes & all test tubes will be left for the same amount of time.

**Independent variables:-** the variables that we will change is the amount of sugar in the s solution the range will be 0.0m – 1m

Number and range:-

<u>Solution</u>	<b>Size of chip</b>	<u>Solution</u>	<u>+/- Mm after test</u>	<u>Difference +/- Mm</u>
0.0m	30mm	10ml	3.1mm	1mm
0.2m	30mm	10ml	3.2mm	2mm
0.4m	30mm	10ml	3.1mm	1mm
0.6m	30mm	10ml	2.9mm	-1mm
0.8m	30mm	10ml	2.9mm	-1mm
1.0m	30mm	10ml	2.9mm	-1mm

<u>Solution</u>	<b>Size of chip</b>	<u>Solution</u>	<u>+/- Mm after test</u>	<u>Difference +/- Mm</u>
0.0m	30mm	10ml	3.2mm	2mm
0.2m	30mm	10ml	3.2mm	1mm
0.4m	30mm	10ml	3.5mm	5mm
0.6m	30mm	10ml	3.3mm	3mm
0.8m	30mm	10ml	3mm	0mm
1.0m	30mm	10ml	3mm	0mm

<u>Solution</u>	<b>Size of chip</b>	<u>Solution</u>	<u>+/- Mm after test</u>	<u>Difference +/- Mm</u>
0.0m	30mm	10ml	2.3mm	-7mm
0.2m	30mm	10ml	3.4mm	4mm
0.4m	30mm	10ml	3.2mm	2mm
0.6m	30mm	10ml	3.5mm	5mm
0.8m	30mm	10ml	3.3mm	3mm
1.0m	30mm	10ml	3.2mm	2mm

