Osmosis Investigation
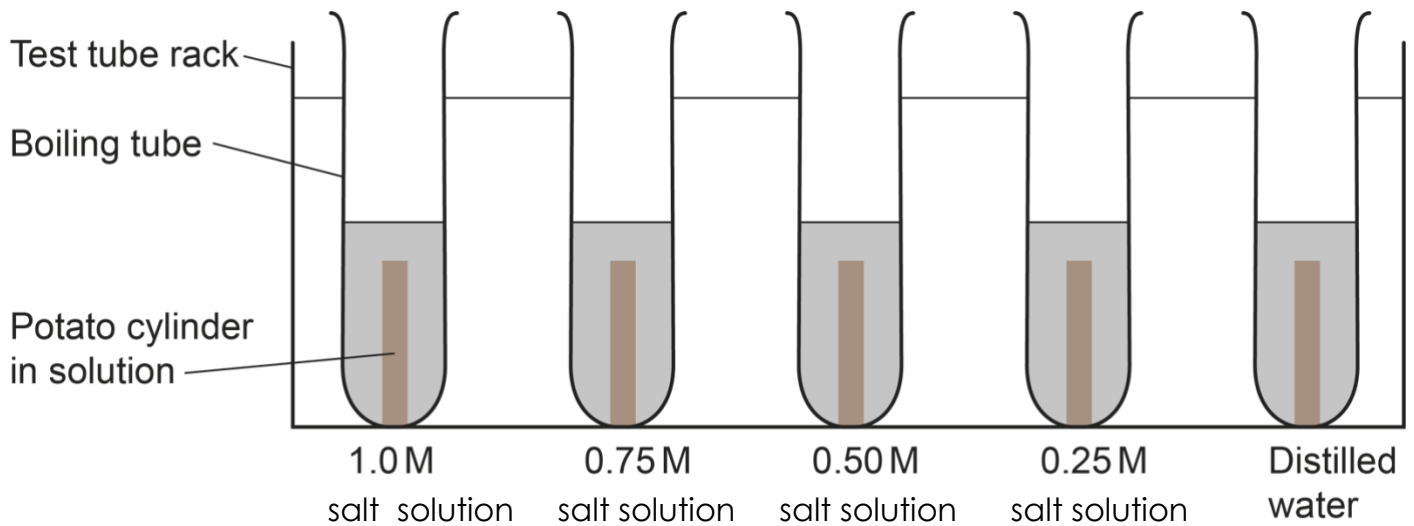
State the aim of the investigation:

_____

_____

_____

Apparatus:

- potato
- cork borer
- a 10 cm³ measuring cylinder
- labels
- three boiling tubes
- test tube rack
- paper towels
- sharp knife or scalpel
- white tile
- a range of salt solutions (1.0M - 0.25 M)
- distilled water
- a balance

Method:

1. Use a cork borer to cut five potato cylinders of equal diameter
2. Use the knife or scalpel to ensure the cylinders are the same length
3. Measure and record the mass of each cylinder
4. Measure 10 cm³ of 1.0 M salt solution and pour into a boiling tube
5. Repeat Step 4 for three different concentrations of salt solutions, ensuring that the boiling tubes are labelled with their concentrations
6. Repeat step 4 with distilled water and pour into the fifth boiling tube
7. Add one potato cylinder to each boiling tube
8. Record the initial masses of the potato cylinders in the table below
9. Leave the boiling tube for 30 minutes – 1 hour in the test tube rack
10. Remove the cylinders from the boiling tubes and blot dry with paper towel
11. Measure the new mass of each cylinder and record the new masses in the table
12. Calculate the change in mass and the percentage change in mass for each cylinder
13. Plot a graph of your results with 'change in mass (g)' on the y-axis against 'concentration of salt solution' on the x-axis

Test tube rack

Boiling tube

Potato cylinder in solution

| 1.0 M salt solution | 0.75 M salt solution | 0.50 M salt solution | 0.25 M salt solution | Distilled water |

Results:

	1.0 M salt solution	_____salt solution	_____salt solution	_____salt solution	Distilled water
Initial mass (g)					
Final mass (g)					
Change in mass (g)					
Percentage change in mass					

Conclusion:

_____

_____

_____

Science
Mastery

Questions:

1. State the independent variable in this experiment.

   _____

   _____

   _____

2. State the dependent variable in this experiment.

   _____

   _____

   _____

3. State the control variables in this experiment.

   _____

   _____

   _____

4. Why are the cylinders blotted dry?

   _____

   _____

   _____

5. Why is percentage change calculated?

   _____

   _____

   _____

6. A pupil followed the same method as above using a piece of carrot instead of potato. They recorded an increase in mass as a positive percentage change and a decrease in mass as a negative percentage change. Their results are seen in the table below.

a. Draw a graph of the pupils results on the graph paper below. You must:

- Choose a suitable scale and label for the y-axis.
- Plot the results.
- Draw a line of best fit

Concentration of salt solution (mol/dm³)	Percentage change in mass (%)
0.0	+ 3.5
0.2	+ 2
0.4	+ 0.75
0.6	- 1
0.8	-2.5

Concentration of salt solution (mol/dm³)

0.0   0.2   0.4   0.6   0.8
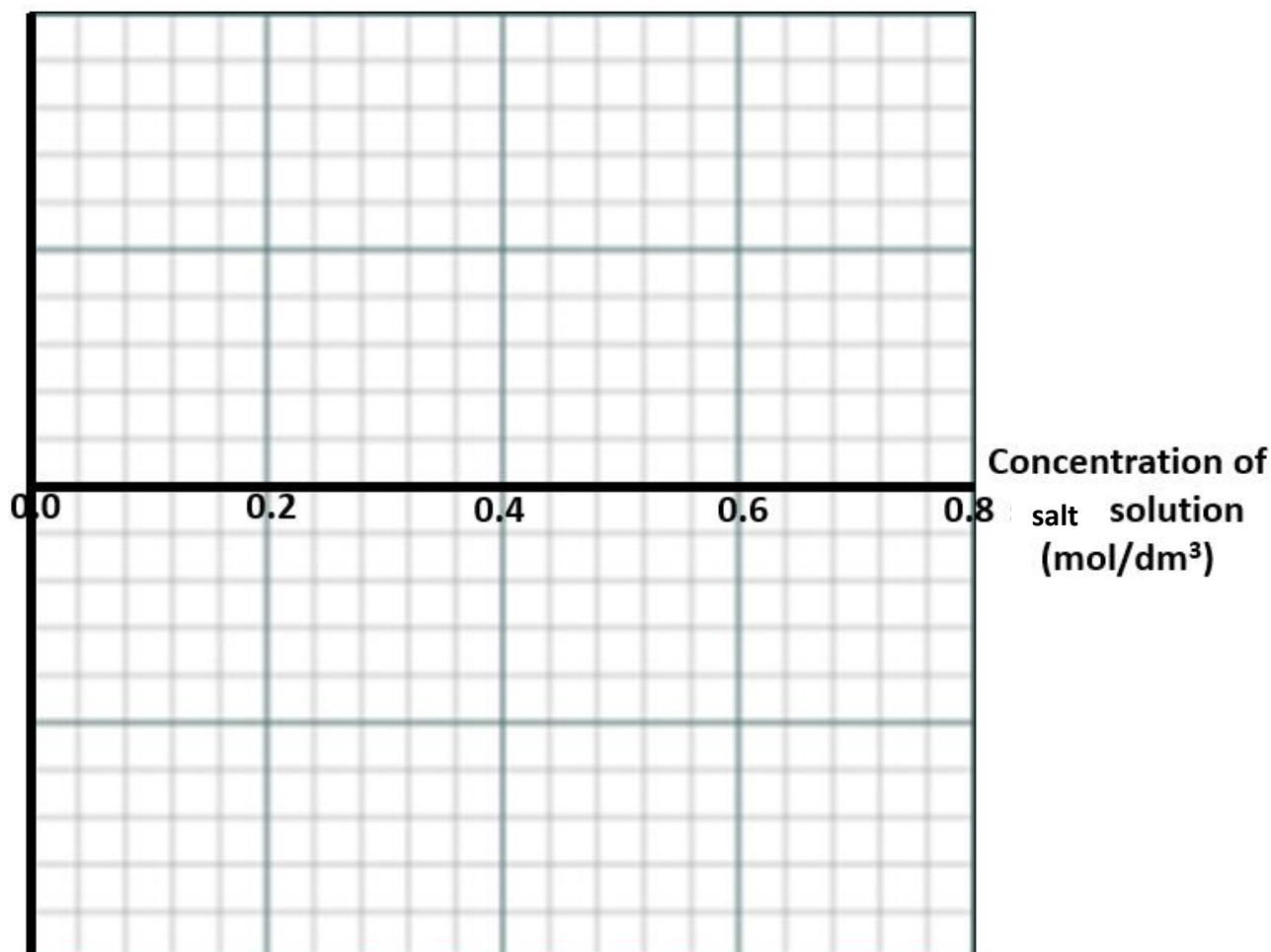
b. Use your graph to estimate the concentration of salt solution inside the carrot cells.

_____