Your teacher may watch to see if you can:

- measure accurately
- work carefully.

Osmosis is the overall movement of water molecules from a region where there are more of them in a particular volume to a region where there are fewer, through a **semi-permeable** membrane. The cells in a potato contain many substances dissolved in water. The cells are surrounded by cell membranes that are permeable to water. When a strip of potato is placed in a solution, the overall movement of water molecules between the potato cells and the solution will depend on which has the higher **concentration** of solutes. In this practical you will investigate osmosis in potato strips in terms of the percentage change in mass of potato in different solutions.

Aim

To investigate how solution concentration affects percentage change in mass of potato strips due to osmosis.

Prediction

1 For each of the solutions you will use, predict whether the potato strips will gain mass, lose mass or keep the same mass. Explain your predictions.

Method

Apparatus

- 4 potato strips
- accurate balance
- 4 boiling tubes and rack (or beakers)
- waterproof pen
- 4 sucrose solutions: 0%, 40%, 80%, 100%
- forceps
- paper towels

⚠ Safety

Do not drink any of the solutions or eat the potatoes.

A Using the waterproof pen, label each tube with the name of one of the solutions. Place the boiling tubes in the rack.

B Dry a potato strip carefully by blotting it with a paper towel. Measure its mass on the balance.

C Place the potato strip into one of the tubes. Record the label on the tube and the mass of the strip in your results table (see next page).

D Repeat steps B and C until all strips have been measured and placed in tubes.

E Carefully fill each tube with the appropriate solution, so that the potato is fully covered. Leave the tubes for at least 15 minutes.

F For each potato strip, use the forceps to remove it from its tube, blot dry on a paper towel and measure its mass again. Record all the masses in the results table.

Recording your results

2 Draw up a table with the following headings. Complete the first three columns with the solution descriptions and your measurements from the experiment.

Solution	A Mass of potato strip at start (g)	B Mass of potato strip at end (g)	C Change in mass (g) = B – A	% change in mass = $\frac{C}{A}$ × 100%

3 Complete column **C** by calculating the change in mass for each potato strip using the formula shown.

4 Complete column 5 by calculating the percentage change in mass for each potato strip using the formula shown.

5 Compare the results for percentage change in mass from all groups in the class for each solution. Identify any results that seem very different from the others (outliers). Try to find a reason why they are so different.

6 Using all results except outliers, calculate a mean value for percentage change in mass for each solution.

7 Draw a suitable chart or graph to show the mean percentage change in the mass of each potato strip on the *y*-axis against the solution description on the *x*-axis.

Considering your results/conclusions

8 Describe the pattern shown in your chart or graph.

9 Explain the pattern shown in your chart or graph, using the word ‘osmosis’ in your answer.

10 Explain why you calculated percentage change in mass.

11 Explain why calculating a mean value from several repeats of the same experiment is more likely to give a value that can be reproduced by others.

Evaluation

12 Describe any problems that you had with the experiment. Suggest how these could be reduced or avoided to produce better results.