

Required Practical Review



SCIENCE
WELLSWAY
MULTI ACADEMY TRUST

Biology Practical - Osmosis

Free Science Lessons video link: <https://www.youtube.com/watch?v=ef2Ts2AKhg8>

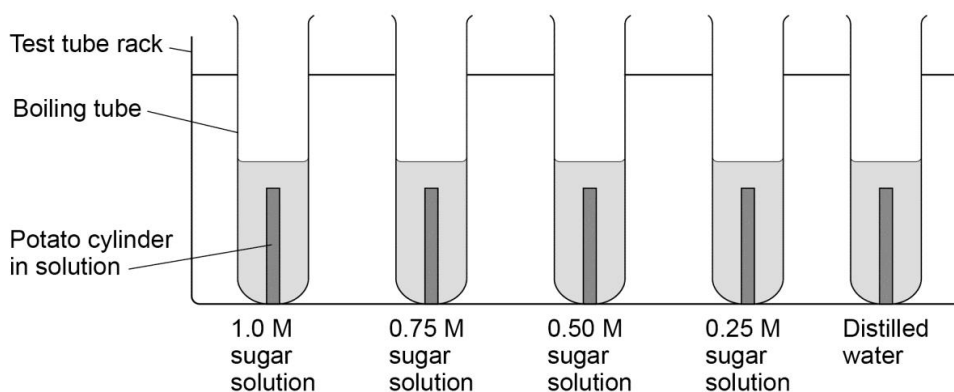
GCSEpod link: <https://members.gcsepod.com/shared/podcasts/title/11567>

Know it

Investigate the effect of a range of concentrations of salt or sugar solutions on the mass of plant tissue. This will tell us if osmosis has taken place and in what direction (into the plant tissue or out of the plant tissue).

Method

1. Use a cork borer to cut five potato cylinders of the same diameter.
2. Use the knife to trim off any potato skin on each potato cylinder. Then trim each potato cylinder so that they are all the same length.
3. Blot them dry with paper towels.
3. Accurately measure the mass of each potato cylinder.
4. Accurately measure the length of each cylinder.
5. Record your measurements in a table.
6. Measure 10 cm³ of each concentration of sugar or salt solution and put into boiling tubes. Label each boiling tube clearly.
7. Measure 10 cm³ of the distilled water and put into the fifth boiling tube. Label the boiling tube clearly.
8. Add one potato cylinder to each boiling tube.
9. Leave the potato cylinders in the boiling tubes for a chosen amount of time.
10. Remove the potato cylinders from the boiling tubes and carefully blot them dry with the paper towels.
11. Measure the new mass and length of each potato cylinder again. Record your measurements for each concentration in your table.



Review it

Complete the tasks below into your book.

Up to grade 4

- Draw a table to show how you would record your results.
- State the independent, dependent and control variables.
- Why do we measure the mass before putting the potato cylinder into solution?

Grade 5-7

- If you have identified an anomaly in your data set, what might have caused this?
- Why do we calculate the change in mass rather than just the end mass?
- Why was it important to dry the potato before weighing it?

Grade 7+

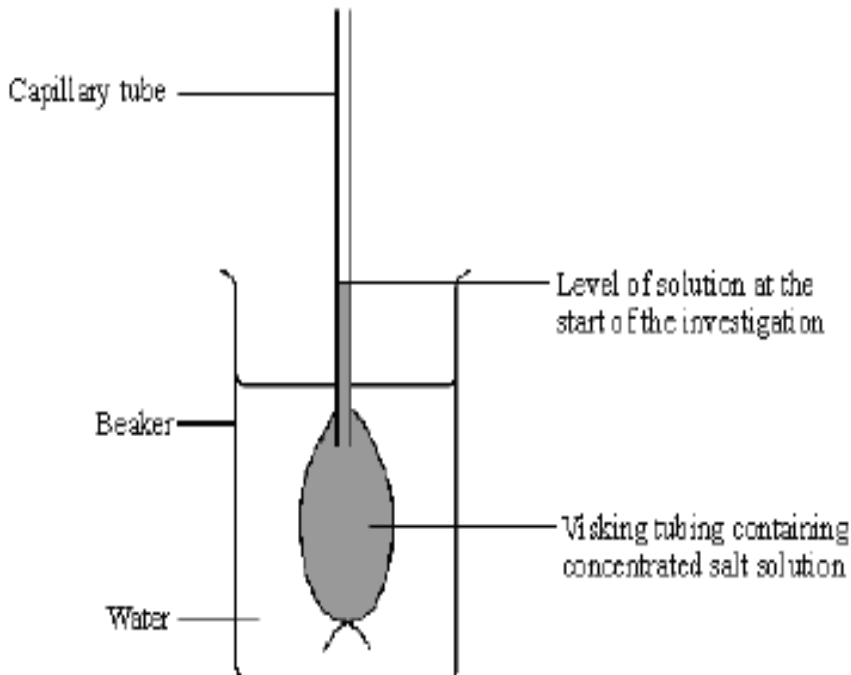
- Describe which concentrations caused a gain in mass and which caused a loss. Explain these results in relation to osmosis.
- Name one problem (limitation) that meant your results were not as accurate as they could have been and describe the effect this would have had on your results (would it make the result higher or lower?)
- How could you improve the method to reduce this impact?

Test it

Answer the exam questions below into your book.

Q1 – Easier

Some students set up the equipment below to investigate osmosis.



(a) What is osmosis?

.....

.....

.....

(3)

(b) (i) What will happen to the water level in the capillary tube during the investigation because of osmosis?

.....

(1)

(ii) Use your knowledge of osmosis to explain why this happens.

.....

(2)

(Total 6 marks)

Q2 - Harder

Q2. In fish and chip shops, potatoes are cut into chips several hours before the chips are cooked.

The amount of water in the chips must be kept constant during this time.

To keep the water in the chips constant, the chips are kept in salt solution.

A student investigated the effect of different concentrations of salt solution on the mass of five chips.

- He weighed each one of the five chips.
- He placed each chip into a different concentration of salt solution.
- After one hour he removed the chips from the salt solutions and then reweighed the chips.

	Concentration of salt solution				
	0 M	0.5 M	1 M	2 M	3 M
Mass of chip at start, in grams	2.6	2.8	2.8	2.5	2.6
Mass of chip after one hour, in grams	2.7	2.8	2.7	2.3	2.1

(a) (i) In which concentration of salt solution did the chip gain mass?

(1)

(ii) Explain why the chip gained mass in this solution.

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.....

.....

(2)

(b) In which concentration of salt solution should the chips be kept in the shop?

Give the reason for your answer.

.....

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.....

.....

(2)
(Total 5 marks)

Mark it

M1. (a) movement of water [1]

from high concentration (of water) to low concentration (of water)

or

from (an area of) dilute solution to an area of concentrated solution [1]

through a differentially or partially or selectively or semi permeable membrane [1]

3

(b) (i) it will rise

1

(ii) water enters visking tubing [1]

because the concentration of water outside is greater than the concentration inside

or

because the concentration of salt or solute is greater inside the tubing than outside [1]

or

to equalise concentration water has to enter visking tubing [2]

2

[6]

M2. (a) (i) 0 M

1

(ii) water entered cells by osmosis

1

because the concentration of water outside cells was higher than inside the cells

1

(b) 0.5 M

1

because the chip did not change mass in this solution

1

[5]