

- 1 Dialysis tubing is a partially permeable membrane. Some molecules such as glucose molecules can diffuse through pores in the membrane.

You are required to investigate the diffusion of glucose through the pores in dialysis tubing using two different concentrations of glucose.

You are provided with the materials shown in Table 1.1.

Table 1.1

labelled	contents	hazard	volume / cm ³
R	20.0% glucose solution	low	20
S	10.0% glucose solution	low	20
G	1.0% glucose solution	low	30
W	distilled water	low	100
Benedict's	Benedict's solution	harmful irritant	20
D1	length of dialysis tubing in distilled water	low	–
D2	length of dialysis tubing in distilled water	low	–

If any solution comes into contact with your skin, wash off immediately with cold water. It is recommended that you wear suitable eye protection.

You will need to:

- put two different concentrations of glucose solution into dialysis tubing surrounded by water
- take a sample of the water surrounding the dialysis tubing
- test the sample for the presence of glucose.

Carry out step 1 to step 10.

step 1 Draw a mark 8 cm from the top of a large test-tube, as shown in Fig. 1.1.

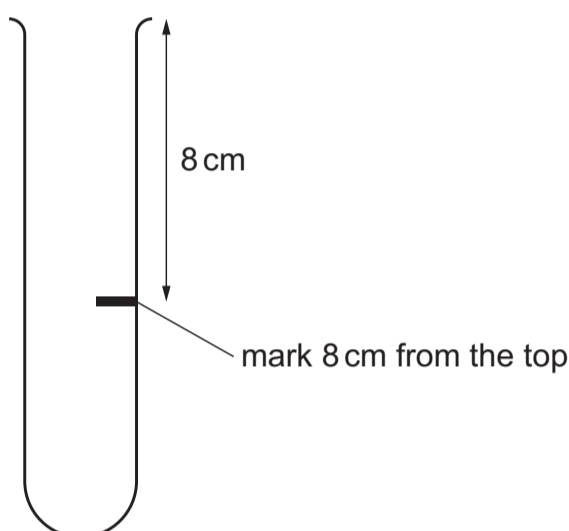


Fig. 1.1

step 2 Remove the dialysis tubing from beaker **D1**. Tie a knot in the dialysis tubing as close as possible to one end, so that the end is sealed.

step 3 The whole length of the dialysis tubing needs to be separated to allow the tubing to be filled with solution. To do this, rub the whole length of the dialysis tubing gently between your finger and thumb.

step 4 Put 10 cm³ of 20.0% glucose solution, **R**, into the open end of the dialysis tubing.

step 5 Rinse the outside of the dialysis tubing by dipping it in the water in beaker **D1**.

step 6 Put the dialysis tubing containing **R** into the large test-tube and keep it in position using an elastic band as shown in Fig. 1.2.

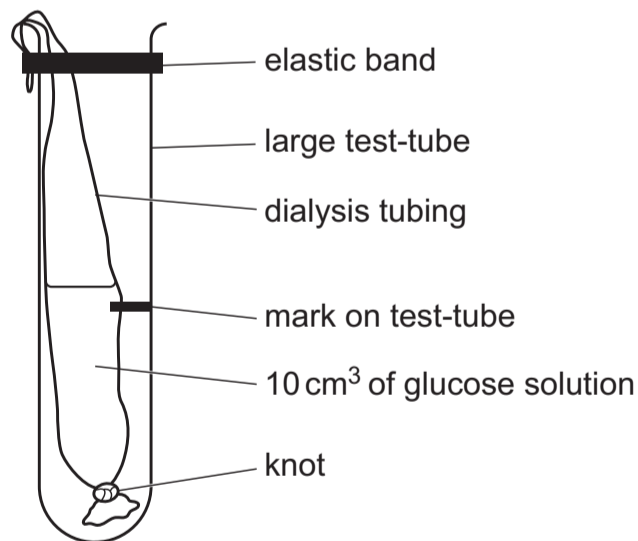


Fig. 1.2

step 7 Put distilled water into the large test-tube so that the top of the water is above the level of the glucose solution in the dialysis tubing.

step 8 Start timing and leave the dialysis tubing in the distilled water for 15 minutes.

step 9 Repeat step 1 to step 7 using the dialysis tubing in the container labelled **D2** and the 10.0% glucose solution, **S**, instead of **R**.

step 10 Start timing and leave the dialysis tubing in the distilled water for 15 minutes.

While you are waiting, continue with preparing the glucose standards.

Preparing glucose standards

You will need to carry out a **serial** dilution of the 1.0% glucose solution, **G**, to reduce the concentration by **half** between each successive dilution.

You will need to prepare **four** concentrations of glucose solution in addition to the 1.0% glucose solution, **G**.

After the serial dilution is completed, you will need to have 10 cm³ of each concentration available to use.

(a) (i) Complete Fig. 1.3 to show how you will prepare your serial dilution.

Each beaker should have:

- a labelled arrow to show the volume of glucose solution transferred
- a labelled arrow to show the volume of distilled water, **W**, added
- a label under the beaker to show the concentration of glucose solution.

0 cm³ of **W**