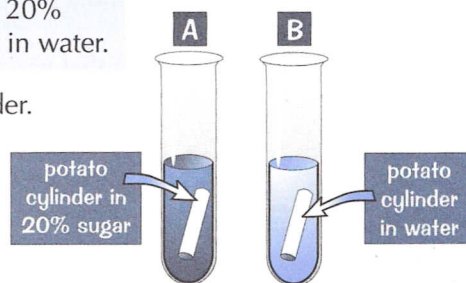


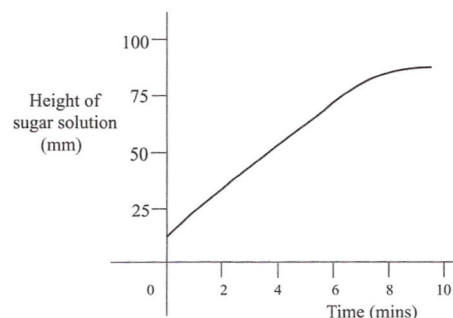
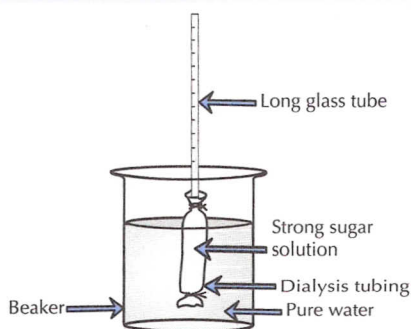
## Transport Across Cell Membranes

**Q1** Two identical cylinders of potato were obtained by pushing a cork-borer into a cut potato. One cylinder is placed in a 20% sugar solution (a strong solution), and the other is placed in water.

- a) **Explain** what happens to the **length** of each potato cylinder.
- b) In another experiment a range of solutions of different concentrations were made, ranging from pure water to 20% sugar. It was noticed that the cylinder in one of the middle test tubes **did not change** length. Explain this result.

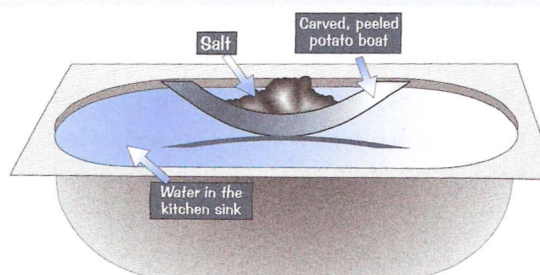


**Q2** An experiment was set up as shown below. The level of the solution in the glass tube was then measured every minute. The results are shown in the graph.



- a) **Why** did the solution rise in the glass tube?
- b) What was the **level** of the solution at 5 minutes?
- c) **How much longer** did it take for the solution to reach its maximum height in the glass tube (88 mm)?
- d) Would the solution take longer to reach a given height in the glass tube if the sugar solution inside the dialysis tubing was weaker? **Explain** your answer.
- Q3** Livadia is a Mediterranean village by the sea. In spring there is flooding and the sea water rises and covers some of the nearby farmland owned by farmer Antonis. Antonis has noticed that when this happens, his crops begin to shrivel and die. Explain **why** this happens.
- Q4** Luke carved a boat out of a potato, and played with it in the kitchen sink. He placed salt inside the boat as his cargo and then left it sitting on the water for an hour while he had lunch. When he returned to his boat, he found that it had water inside. The water was not there before lunch and nobody interfered with his boat.

**Explain** how the water got into the boat.



## Diffusion of "Food" Molecules

Q1 **Match** each nutrient to the molecules it forms when digested:

starch is digested to form ...

... smaller molecules called fatty acids and glycerol

protein is digested to form ...

... smaller molecules called sugars

fat is digested to form ...

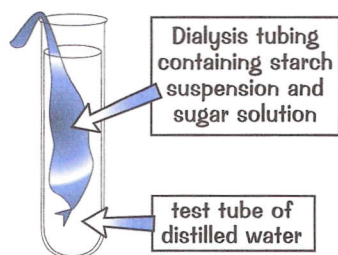
... smaller molecules called amino acids

Q2 The products of digestion are absorbed into the bloodstream.

- In **which** part of the digestive system does this happen?
- Explain how the **structure** of the organ you gave for part a) allows for the efficient movement of the products of digestion through its wall.
- By what process are molecules absorbed into the bloodstream if there is already a **high concentration** of nutrients in the blood?

Q3 A student did an experiment to show the movement of nutrients through the wall of a model intestine.

She made a watertight bag using dialysis tubing, which is partially permeable. She put a mixture of starch suspension and sugar solution into the bag, and put the bag into a test tube containing distilled water (see diagram). At the beginning of the experiment she tested the contents of the bag, and the water for starch and sugar. She did this again after 30 minutes. Her **results** are shown in the table.



time (minutes)	contents of bag		water	
	starch	sugar	starch	sugar
0	✓	✓	✗	✗
30	✓	✓	✗	✓

- How** did sugar get into the test tube of water during the experiment?
- Why** was there no starch in the water at the end of the experiment?
- Suggest **three** ways that the student could speed up the process described in your answer to part a).



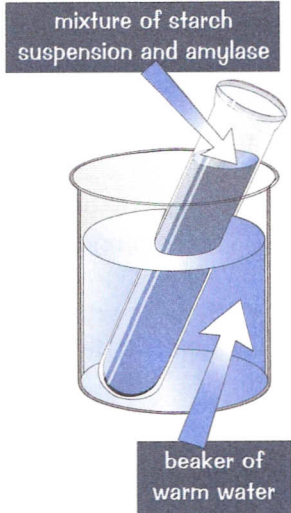
## Food Tests

**Q1** Iodine occurs as a shiny black solid at room temperature, which can easily turn into a purple vapor. When dissolved in water with a little potassium iodide, iodine forms a brown solution.

- a) What **type** of nutrient can be detected using iodine solution?
- b) What **color change** happens when iodine solution is added to this type of nutrient?

**Q2** Isaac wanted to see if the amylase in his saliva could digest starch to sugar. His teacher didn't want the class spitting, even in the name of science, and supplied some ready-made amylase instead. He set up the experiment shown on the right.

- a) What should Isaac see when he tests a sample of the starting mixture with iodine solution? **Explain** why he should get this result.
- b) After 20 minutes, Isaac tested the mixture with Benedict's solution. It turned orange. What does this result **mean**?
- c) Isaac's teacher wasn't sure that the experiment proved that starch had been digested to sugar. Two important tests had been missed. What were these **missing** tests? What results would you expect to see if the starch **had been digested** to sugar?
- d) Isaac repeated the experiment, and included the two missing tests. Unfortunately, his teacher was not convinced that the experiment proved that amylase was needed to digest starch. What **control experiment** should have been set up?



**Q3** John has lost his instructions for the Buret food test. He can remember parts of it, but isn't sure of the details. He has written down as much as he can remember, but there are gaps. **Copy** John's instructions (below), **replacing** the ink blots with the correct words.

John rules OK	<u>The Buret Test</u>	☆ hello
✚	The Buret test is used to detect <span style="background-color: black; color: black;">████████</span> in food.	
☺	1. Put some food in a test tube and add some <span style="background-color: black; color: black;">████████</span> .	
☺	2. Give it a shake and add some <span style="background-color: black; color: black;">████████</span> (this is blue).	
☺	3. If it turns <span style="background-color: black; color: black;">████████</span> there is <span style="background-color: black; color: black;">████████</span> present.	

**Remember** — you're looking for a color change

For each of the three food tests you need to know what's required for the test, how you carry it out, and what results you're looking for. Simple.