

Answers to Workbook exercises

Chapter 4

Exercise 4.1 Carbohydrates

- a Look for a single ruled table with fully headed rows and columns.

	Result of test with iodine	Result of test with Benedict's	Conclusion
Food A	brown	orange-red	contains reducing sugar but not starch
Food B	black	blue	contains starch but not reducing sugar

Students might decide to have two separate columns for the conclusions, one for starch and one for reducing sugar, which would be fine.

b

Type of carbohydrate	Example	Role in living organisms
monosaccharide	glucose	provides energy; released by respiration; also the form in which carbohydrates are transported in mammalian blood
	sucrose	the form in which carbohydrates are transported in plants
polysaccharide	starch	the form in which plants store energy
	cellulose	forms cell walls of plant cells
	glycogen	the form in which animals store energy

Exercise 4.2 Proteins

The facts that students give will very much depend on what they find, and what they think of as being important. Give credit for being very brief and packing information into a few words; very long answers do not meet the criteria set by the question. The following are some suitable answers.

- a Haemoglobin: a red pigment found in red blood cells of mammals that contains iron. It combines reversibly with oxygen, and so is used for the transport of oxygen from lungs to respiring tissues.
- b Keratin: a protein found in hair, nails and the upper layers of skin. It is insoluble and forms long fibres. It is a structural protein.
- c Collagen: a protein found in skin, bone and other tissues. It forms long, stretchy fibres and so helps to provide strength and elasticity. Vitamin C is required to make it.
- d Antibodies: proteins secreted by white blood cells (lymphocytes) in response to antigens. Specific antibodies attach to specific antigens, and help to destroy them.

Exercise 4.3 Testing a hypothesis

- a Add dilute sodium hydroxide (or potassium hydroxide) and very dilute copper sulfate solution to the milk. A purple colour indicates the presence of protein. (Alternatively, biuret reagent could be added.)
- b
 - i The variable to be changed is the type of milk – cow's milk and goat's milk.
 - ii The most important variables to be controlled are: the volume of milk, the age of the milk, the temperature of the milk, the volume and concentration of reagents added to it, the time left before the intensity of the colour is assessed.

- iii The quantity to be measured is the intensity of the colour produced after the biuret test has been carried out on the milk.
- iv This could be measured by comparing the colours visually.
- v If the hypothesis is correct, the purple colour formed in the cow's milk will be more intense than the colour in the goat's milk.

Exercise 4.4 DNA

- a bases
- b Upper strand: A, G. Lower strand: C
- c chromosomes, nucleus

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