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S3 Biology

Cells and Molecules of Life

Vocabulary

Prefixes and suffixes

- Mono- : one
- Di- : Two
- Tri- : Three
- Poly- : Many
- saccharide: a sugar
- carbo- : containing carbon
- hydrates: chemical substances that contain water

A. Label the picture and identify which type of organic substances they **mainly contain**.



sugar _____



candy _____



butter _____



red meat _____



milk _____



oil _____

B. Match descriptions on the right to the words on the left

- | | |
|--------------------|--|
| 1. carbohydrates | A. All of them have reducing power, except sucrose. |
| 2. lipids | B. They are insoluble or very slightly soluble in water and do not give a sweet taste. |
| 3. proteins | C. Its molecule is composed of three fatty acid molecules joined with one glycerol molecule. |
| 4. disaccharides | D. They can also be called simple sugars. |
| 5. polysaccharides | E. They are only soluble in organic solvents, like alcohol and chloroform. |
| 6. triglyceride | F. The basic units are amino acids. |
| 7. monosaccharides | G. They can be classified into simple sugars, double sugars and polysaccharides. |

1.	2.	3.	4.	5.	6.	7.
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C. Complete the sentences concerning the definitions, compositions and functions of carbohydrates, proteins and lipids with the relative pronouns given in brackets. The first two examples have been done for you as examples.

Carbohydrates

DEFINITION

1. Carbohydrates are organic substances

These organic substances are composed of carbon, hydrogen and oxygen. (that)*

Carbohydrates are organic substances that are composed of carbon, hydrogen and oxygen.

* Note that 'that' can only be used to define and not join extra information. Which can be used for both.

JOINING EXTRA INFORMATION

2. Glucose is used in respiration in cells. (which)

Glucose is produced during photosynthesis.

Glucose, which is produced during photosynthesis, is used in respiration in cells.

3. Excess carbohydrates are used when necessary.

Excess carbohydrates are stored as glycogens in human. (which)

Excess carbohydrates, which are stored

Proteins

DEFINITION

4. Proteins are large organic substances.

These organic substances are composed of carbon, hydrogen and oxygen. (that)

Proteins are _____ substances that

JOINING EXTRA INFORMATION

5. Proteins are important components of the cell membrane and cytoplasm.

They are also required for body growth and repair of worn-out tissues. (which)

6. Proteins are used to make many important molecules in our body.

They include all enzymes, antibodies and certain hormones. (which)

Lipids

DEFINITION

7. Lipids are made up of triglycerides.

Triglycerides are formed by three fatty acid and one glycerol molecules. (which)

JOINING EXTRA INFORMATION

8. Fat acts as a heat-insulating layer to reduce heat loss.

The fat is stored under the skin. (which)

Comparing and contrasting

In Biology, we often need to compare and contrast biological facts. The following words can help us.

Addition

and also all both ... and

Examples:

- (1) Oils **and** fats are a main group of lipids.
- (2) **All** proteins, carbohydrates and lipids provide energy when they are broken down.
- (3) **Both** simple sugar **and** double sugars give a sweet taste.

Showing similarities and differences

also so do similar different

Examples:

- (1) Simple sugars give a sweet taste and double sugars **also** give a sweet taste.
- (2) Simple sugars give a sweet taste and **so do** double sugars.
- (3) The compositions of lipids and carbohydrates are **similar**.
- (4) The H:O ratio and C:O ratio in lipids and carbohydrates are **different**.

Contrast

while but However

Examples:

- (1) **While** the H:O ratio in carbohydrates is about 2:1, the H:O ratio in lipids is 18:1.
(Read this as: "While the hydrogen to oxygen ratio in carbohydrates is about two to one, the hydrogen to oxygen ratio in lipids is eighteen to one.")
- (2) Lipids are insoluble in water, **but** they are soluble in organic solvents.
- (3) All proteins, carbohydrates and lipids can provide energy. **However**, they have different energy values.

Use this table with information about monosaccharides, disaccharides and polysaccharides to answer the 7 questions that follow. Make sure you answer in full sentences. Look at the examples above to help you compare and contrast.

	Simple sugars – monosaccharides	Double sugars – disaccharides	Polysaccharides
Reducing power	<ul style="list-style-type: none"> All have reducing power and are known as reducing sugars 	<ul style="list-style-type: none"> All common double sugars, except sucrose, have reducing power 	<ul style="list-style-type: none"> Do not have reducing power
Taste Solubility	<ul style="list-style-type: none"> Sweet in taste Soluble in water 	<ul style="list-style-type: none"> Sweet in taste Readily soluble in water 	<ul style="list-style-type: none"> Do not have a sweet taste Insoluble or only very slightly soluble in water

1. Do all monosaccharides have reducing power?
2. What are two features that monosaccharides and disaccharides have in common?
3. How is sucrose different from other disaccharides?
4. Which saccharides are soluble in water?
5. How do the taste of different saccharides compare?
6. What are two features that mono- and disaccharides have in common that polysaccharides do not have?
7. Compare the composition of carbohydrates with the structure of saccharides.