CARBOHYDRATES

Organic molecules that contain carbon, hydrogen, and oxygen

All living things need carbohydrates to produce energy and to build the organism.

Those organisms that cannot make or consume carbohydrates will cease to function.

CARBOHYDRATES

Objective: At the end of this unit of study, you will be able to:

1) List the elements that make up carbohydrates
2) List and explain the 3 functions of carbohydrates
3) Be able to define/describe and understand the correct usage of the following words:

<table>
<thead>
<tr>
<th>Carbohydrate</th>
<th>glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>dietary fiber</td>
<td>sucrose</td>
</tr>
<tr>
<td>energy source</td>
<td>cellulose</td>
</tr>
<tr>
<td>growth and repair</td>
<td>starch</td>
</tr>
<tr>
<td>monosaccharide</td>
<td></td>
</tr>
</tbody>
</table>
REMEMBER THIS !!!

Carbohydrates are always made from carbon, hydrogen, and oxygen with. The ratio of hydrogen to oxygen is always 2:1.

Carbohydrates

All living organisms need energy for life functions like growth and reproduction. The molecules for quick energy and growth come mostly from the organic molecules called carbohydrates. Living organisms must make the carbohydrates or consume them in order to survive.

Carbohydrates are very common. In your diet, they would include such things as bread, pasta, candy, and cake. Although the word carbohydrate is a long word, it is easy to remember because carbohydrates are a special type of organic molecule that is always made from carbon, hydrogen, and oxygen. For example, glucose, a common sugar formed during photosynthesis, has the formula C6 H12 O6.

Question 1. How would you determine if an organic molecule was a carbohydrate?

Question 2. List several carbohydrates that you eat.
Why are carbohydrates important?

There are 2 main functions for carbohydrates in your body and in the body of all living things. The following is a list that you will have to know and remember.

The 2 main functions for carbohydrates:

1. Quick energy source
2. Forms cell walls in plants and dietary fiber

Let’s take a look at each of these functions so that you may understand them correctly.

1. Function of Carbohydrates: ENERGY SOURCE

All living things need to use energy to move, to grow, and to make repairs. Carbohydrates are designed to be used by a living organism for a quick source of energy. That is why some athletes will eat a high carbohydrate meal before a big game. In plants, carbohydrates that are used for energy are stored as starch. Both starch and glycogen must ultimately be broken down into Glucose for the cells to use as energy.

**REMEMBER THIS !!!**

Carbohydrates are a quick source of energy. They must be broken down to their simplest form, glucose, for cells to use.

**Interesting Scientific Fact:** Table sugar is a good source of quick energy. It is also known as sucrose. Monosaccharides, the building blocks of carbohydrates, are the simplest type of carbohydrate and therefore are the quickest to break down to release energy. “Mono” means “one” and Saccharide means sugar, so monosaccharide literally means “one sugar”. Glucose is a monosaccharide. A complex carbohydrate is a long chain of monosaccharides. Sucrose and Starch are all examples of complex carbohydrates.

**Interesting Scientific Fact:** Glucose is an important carbohydrate because it is the simplest monosaccharide.
**Interesting Scientific Fact:** Sucrose is a more complex carbohydrate. It is made of two glucose molecules. You know it as table sugar. Starch is a very long complex carbohydrate composed of many glucose molecules.

**Sucrose**

**Starch**

**Question 3.** Why do long distance runners often eat a breakfast of pancakes before running?

**Question 4.** What do starch and sucrose have to be broken down into for cells to use as energy?

**Question 5.** What is a monosaccharide and give an example?
2. Function of Carbohydrates: FORM CELLS WALLS & DIETARY FIBER

**Cellulose** is a common carbohydrate found in the **cell wall of plants** that allows plants to stand upright. Although it is present in a lot of foods that humans eat, we cannot digest it. However, it still serves a useful purpose as roughage, which is also known as **dietary fiber**. Dietary fiber helps strengthen the smooth muscles in the digestive tract and helps prevent cancer because it cleanses the digestive areas.

Recent scientific studies have shown that humans can decrease their chance of getting certain types of cancer by increasing the amount of fiber in their diet. That is why some diets have you eat a lot of oat bran and vegetables. The fiber helps move food through your digestive system.

The correct amount of fiber in your diet allows the food to move through your digestive system at the right speed for proper digestion. Carbohydrates are a good source of dietary fiber. Make sure you eat them on a regular basis.

REMEMBER THIS !!!

**Carbohydrates (Cellulose) are a good source of dietary fiber.**

Question 6. What part of the plant cell in made from cellulose and what purpose does cellulose serve for plants?

Question 7. Even though humans cannot digest cellulose, it is still an important component of a normal diet. What purpose does cellulose serve for humans?
Carbohydrates

Self Test

Matching

_____ 1. glucose  a. a carbohydrate that is used for stored energy in animals

_____ 2. carbohydrate  b. a carbohydrate that gives us dietary fiber

_____ 3. monosaccharide  c. a carbohydrate that is used for stored energy in plants
d. an organic molecule containing carbon, hydrogen, oxygen.

_____ 4. cellulose

_____ 5. starch  e. the simplest monosaccharide

_____ 6. glycogen  f. the simplest type of carbohydrate

True or False

_____ 1. Carbohydrates are a group of molecules that contain carbon, nitrogen, hydrogen and oxygen.

_____ 2. A carbohydrate is composed of organic molecules.

_____ 3. A monosaccharide is the simplest carbohydrate.

_____ 4. Glucose is the simplest monosaccharide.

_____ 5. Cellulose is found in plants and makes good dietary fiber in humans.

_____ 6. Starch is an example of a carbohydrate.

_____ 7. Glycogen is an example of a carbohydrate.
8. Starch and cellulose are both made by plants.

9. The right amount of fiber in your diet can help prevent cancer.

Fill in the Blank

1. _______________________ are molecules that provide energy for organisms.

2. _______________________ is often given to patients in a hospital.

3. _______________________ is an example of a monosaccharide.

4. _______________________ and _______________________ are types of carbohydrates used for stored energy.

5. _______________________ is used for structure in plants.

6. _________________________ are the simplest types of carbohydrates.

Answer the following.

1. How could you tell if a molecule is a carbohydrate?

2. How do you know that all carbohydrates are organic molecules?

3. List and explain the 2 functions for carbohydrates?

4. How are starch and glycogen alike?
Question 1. How would you determine if an organic molecule was a carbohydrate?

Question 2. List several carbohydrates that you eat.

Question 3. Why do long distance runners often eat a breakfast of pancakes before running?

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