Discovery EDUCATION

Word Box for Blanks: Some words will be used more than once.

ENERGY, SUFFOCATES, CELLULAR RESPIRATION, ATP, CELLS, BACTERIA, BURN, GLUCOSE, BACTERIA, CHEMICAL REACTIONS, OXYGEN

Getting to Know: Cellular Respiration

.1 .2 .3 .4

Many people know that eating a healthy meal will give them energy. All organisms require the input of energy to complete their life cycles. The daily tasks of animals like walking, growing, reproducing, and eating require (1). To complete these tasks, animals take in food and water to gain energy. Likewise, plants also grow and reproduce, both of which require energy. Plants do not eat, so they use the process of (2) to convert the sun's energy into a food source.

Once the intake of energy is complete, the energy must be exchanged with the cells inside the body. All life is made of (3) and each individual cell in the organism needs this food energy. It is not enough for animals to eat foods and for plants to make foods. The energy must be in a usable form for the organism. Animals and plants both convert food energy into usable forms during *cellular respiration*.

What happens during cellular respiration?

.5 .6 .7 .8

Energy is stored in all chemical bonds, including those of foods. All sugars contain energy, but cellular respiration uses *glucose*. Glucose is the fuel for the cells of organisms. The body converts foods into (4) to use it in (5). The cell cannot use glucose directly. Cellular respiration is a multistep process requiring oxygen.

Cellular respiration converts glucose, a type of sugar, into a usable form of energy for cells.

First, glucose and oxygen pass into the cell. Once inside the cell, processes in the *cytoplasm* extract the energy from the atomic bonds in glucose. Enzymes break up the (6) molecule, releasing the energy. This energy is later transferred into another kind of molecule called ATP, which supplies direct energy to (7).

What other parts of the cell are involved in cellular respiration?

In *eukaryotes*, another stage of respiration takes place inside the *mitochondria*, the power house of cells. In a chain of chemical reactions, glucose and oxygen react to form carbon dioxide, water, and (8).

Misconception 1: *Is cellular respiration another word for breathing?*

Breathing is an exchange of gases from an *external* source. Cellular respiration occurs when cells use oxygen to metabolize nutrients. It is an *internal* exchange of gases in the cells.

9 _____ *Prokaryotic* organisms such as bacteria do not have organelles. Although more energy is produced in the mitochondria, the energy from the cytoplasm is enough for prokaryotes. Because (9) is not necessary for (10) to use energy, they perform *anaerobic*

10 _____ respiration. That enables bacteria to live in places where there is little or no (11)

11 _____ **Misconception 2:** ***Only animals perform cellular respiration. Plants get their energy from photosynthesis.***

12 _____ Plants also use cellular respiration. Plants use photosynthesis to create glucose from carbon dioxide and water. Plants store energy as glucose and then use cellular respiration to release that energy for growth and reproduction. That's why animals depend on plants. Animals can't make sugars, so they rely on plants to do that.

13 _____

14 _____

Why is oxygen an important reactant?

15 _____ Oxygen is very reactive. One way it combines with substances is through *oxidation*. Oxidation is the addition of oxygen to a substance through (12) Oxidation can be slow such as when iron rusts. Oxidation can also happen quickly such as when things (13) During

16 _____ cellular respiration, cells need oxygen to produce large amounts of (14) Therefore, cellular respiration is an aerobic reaction. It requires oxygen.

What can go wrong with cellular respiration?

17 _____ Cells starved of oxygen in cellular respiration can die. A lack of oxygen causes a decrease in essential energy for cell processes. In essence, the cell (15) without (16)

Mitochondria may also cause problems. Severe diseases result if the mitochondria malfunction. Leigh's disease is caused by mutations in the mitochondria. The cells of patients with Leigh's disease cannot produce enough energy. Several other diseases are linked to (17)

In this lesson, you will learn more about how cellular respiration supports all of the other functions happening in your body. It will help you understand why feeding your cells is so important.

Mitochondria are colored blue in this image. These organelles are where most energy is produced during cellular respiration.

Answer These Q's:

What's The difference between breathing and cellular respiration?

Do Plants Perform cellular respiration?