

Cellular Respiration

Mitochondria liberate energy for the work that cells do, and chloroplasts capture sunlight energy for photosynthesis.

We already learned that plants make their food during photosynthesis.



Animal cells get the energy they need from the food the animal eats.

- The digestive system breaks down the food into molecules.
- The cells then convert those molecules into a form of energy they can use.



So how do plants and animals convert those food molecules into a form of energy they can use?

Through a chemical process called cellular respiration.

As you know, respiration is the process of breathing.

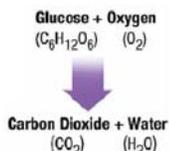
- Cellular respiration is not the same thing as breathing, but they are closely related.
- When you breathe in, you take in the oxygen your cells need for cellular respiration.
- When you breathe out, you get rid of the carbon dioxide that your cells produce during cellular respiration.

Try breathing onto a mirror or glass surface.

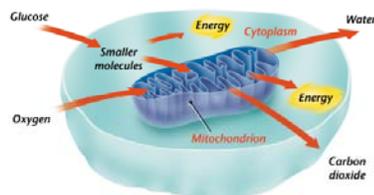
Can you see evidence of another product of cellular respiration?

This cellular respiration is carried out by every cell in both plants and animals and is essential for daily living.

- Cells use glucose and oxygen to produce carbon dioxide, water, and energy.



In cellular respiration, the carbohydrates from food are disassembled into glucose molecules.



- Then, this glucose is used to produce energy-rich ATP molecules.

In most eukaryotic organisms, cellular respiration takes place in the mitochondria of cells.

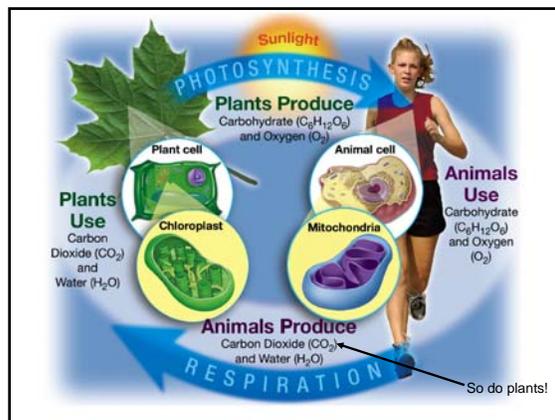


During cellular respiration, some energy is stored in ATP and some is released as heat.

- ATP is a molecule that stores and transfers chemical energy within cells.
- ATP is used to power cell functions such as muscle contractions, nerve impulses, and molecule-building.

The chemical equations of photosynthesis and respiration have an interesting relationship.

- The reactants in photosynthesis are the products in cellular respiration!
- The reactants in cellular respiration are the products in photosynthesis!



Fermentation is the breakdown of sugars to make ATP in the absence of oxygen.

- When no oxygen is present, muscles cells use fermentation to make ATP from sugar.
- Lactic acid is also produced and causes the muscles to "burn" when exercising.



A second type of fermentation occurs in yeast & in certain types of bacteria.

- First life forms used fermentation to gain energy.
- When the Earth was young, its atmosphere lacked oxygen.
- After organisms evolved the ability to photosynthesize, about 3 BYA, the oxygen they produced was added to the atmosphere.

