

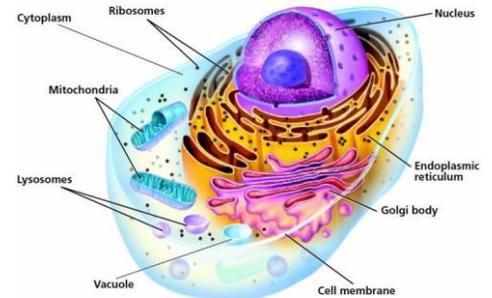
GET THE GRUB

HOW FOOD HELPS ORGANISMS SURVIVE

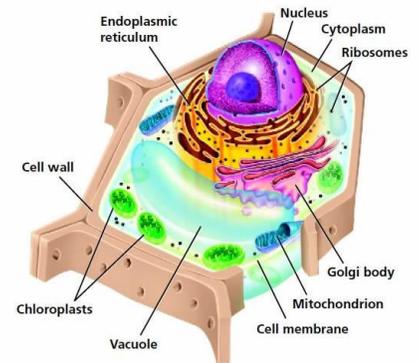
8L.5.1 – Summarize how food provides the energy and the molecules required for building materials, growth and survival of all organisms

Food provides molecules that serve as fuel and building material for all organisms. Plants utilize *photosynthesis*, a process in which cells use the energy in sunlight to make sugars out of carbon dioxide and water, to generate food. This food can be used immediately for fuel or materials or it may be stored for later use. Organisms that eat plants break down the plant structures to produce the materials and energy they need to survive. Then those materials are consumed by other organisms.

Cells carry on the many functions needed to sustain life. They grow and divide (*mitosis* or *meiosis*), thereby producing more cells. This requires that they take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or an organism needs. The way in which all cells function is similar in all living organisms. Within cells many of the basic functions of organisms, such as releasing energy from food and getting rid of waste, are carried out by different cell elements. Eukaryotic cells have many specialized structures in the *cytoplasm* called *organelles*. Think of a big bowl of jello with candy spread around the inside. The jello represents the cytoplasm and the candy represents the organelles. The cytoplasm holds the organelles in place to protect them from being slammed around in the cell.

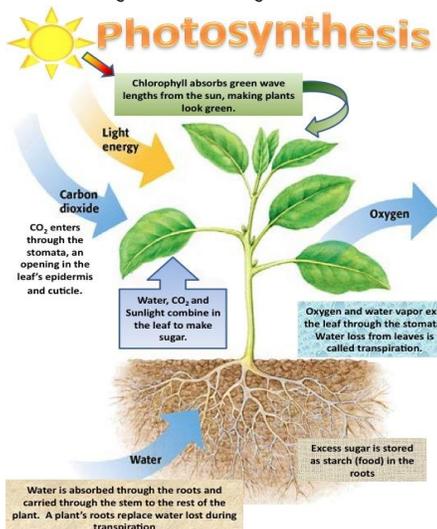


Cells break down the molecules in foods in different ways. Also, different foods are better for certain cell function. For example, because of its composition, fruit provides the most energy for the body in the shortest amount of time compared to potatoes, meat, and milk. However eating foods high in protein, such a meat or nuts, are important for a healthy diet because protein is needed to repair body tissue. Foods high in saturated fat are not easily broken down by cells and can result in an unsafe amount of fat lining body organs, inhibiting them from properly functioning. All of these factors greatly contribute to a healthy functioning body.



Matter/energy is transferred among organisms in an ecosystem when organisms eat, or are eaten by others for food. Matter is transferred from organisms to the physical environment when molecules from food react with oxygen to produce carbon dioxide and water in a process called *cellular respiration*. For animal cells, it is important to note that food **MUST** be broken down into a useable form of energy before the cell can use it. Through the process of cellular respiration, cells convert energy from sugar (glucose) to a usable form of energy (ATP). The energy stored in ATP provides the means by which cells are able to carry out their functions such as growth, development, and repair of organisms, locomotion and transportation of molecules across cell membranes. This process is the opposite of photosynthesis.

In plants and animals, molecules from food react with *oxygen* to provide energy that is needed to carry out life functions. Matter moves within individual organisms through a series of chemical reactions in which food is broken down and rearranged to form new molecules.



Plants use the energy from light to make sugars (food) from carbon dioxide and water. This process transforms light energy from the sun into stored chemical energy. Minerals and other nutrients from the soil are not food (they don't provide energy), but they are needed for plants to make complex molecules from the sugar they make. Chemical energy is transferred from one organism in an ecosystem to another as the organisms interact with each other for food. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. Over a long time, matter is transferred from one organism to another repeatedly and between organisms and their physical environment. As in all material systems, the total amount of matter remains constant, even though its form and location change. Energy can change from one form to another in living things. Animals get energy from oxidizing their food, releasing some of its energy as heat. Almost all food energy comes originally from sunlight.

ASSIGNMENT

IN NEAT & COMPLETE SENTENCES, answer the following on your own sheet of loose-leaf paper

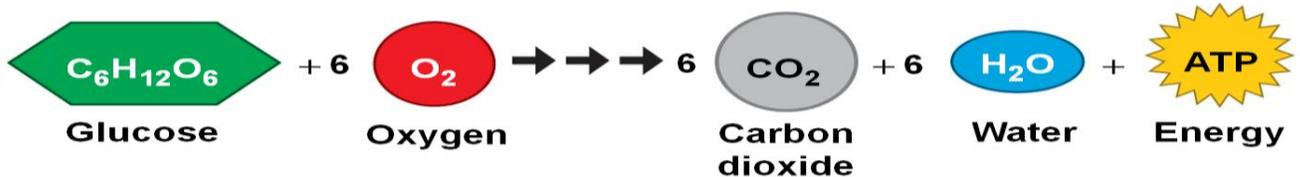
RECALL

1. What is the basic fuel source for all organisms?
2. What process do plants use to create food?
3. What is the process called that cells use to grow and divide?
4. What is the purpose of cytoplasm?
5. How is matter/energy transferred from one organism to the next?
6. The process of food molecules reacting with oxygen is known as what process (hint: think of your vocabulary words)?
7. What is a scientific word for sugar?
8. Where does almost ALL energy for food come from?

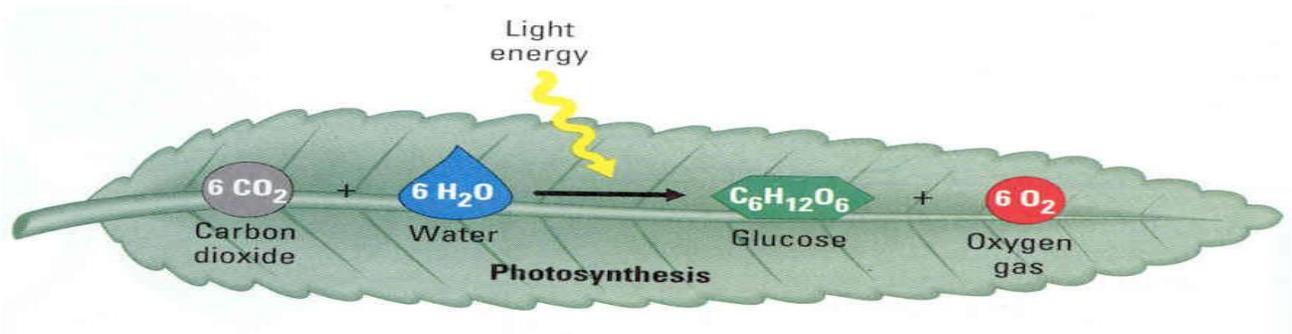
ANALYZE

9. Look at the two equations below:

Equation 1



Equation 2:



What is the relationship between these two equations? Explain similarities. Which equation do you think takes place in a plant cell? Which equation do you think takes place in an animal cell?

10. If you eat a cheeseburger, are the molecules useable in this original form? Explain.

PREDICT

11. Knowing how food choices impact the function and productivity of cells, why do you think it is important to maintain a healthy diet? What can happen if someone continually eats junk food? Be sure to mention AT LEAST 4 foods that promote a healthy diet.