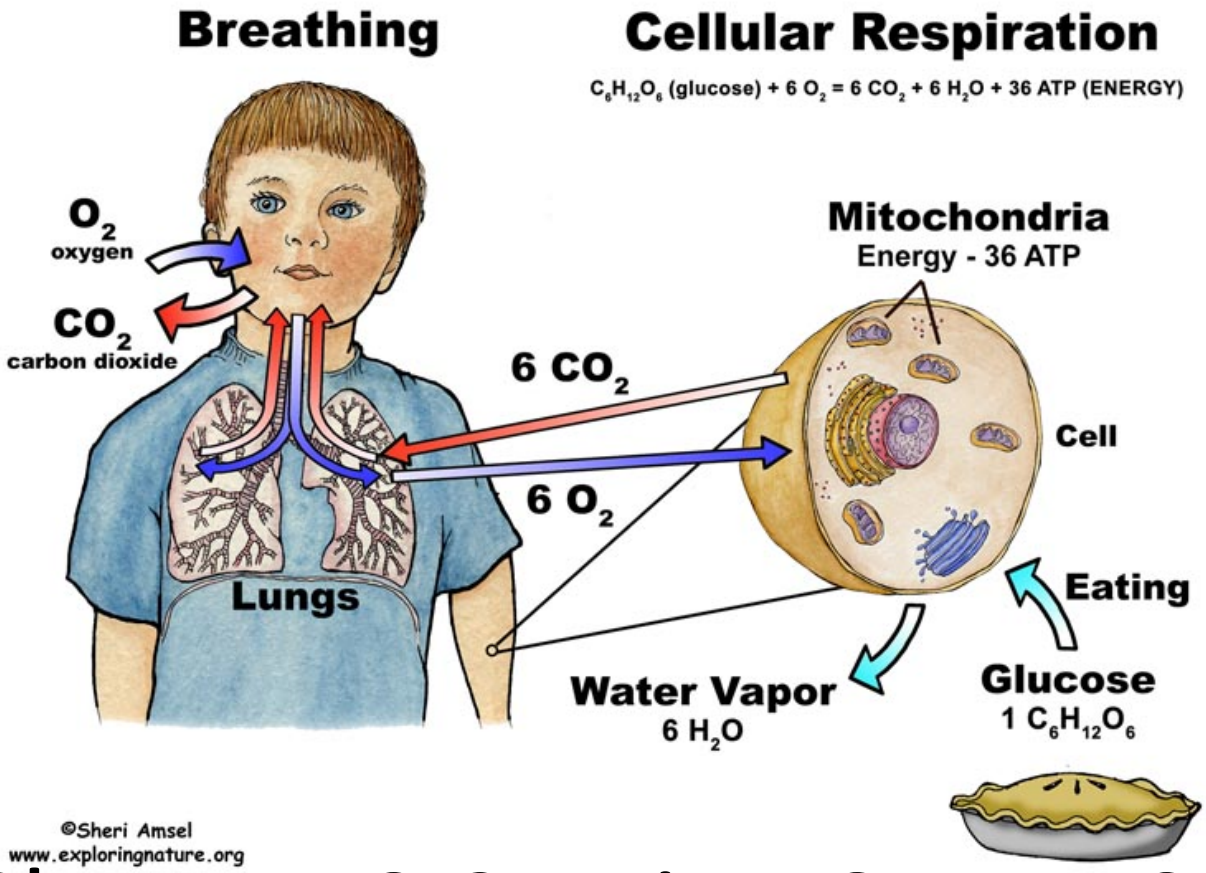


Chapter 3 Section 3 Part 2

SPI 0707.3.1 Compare the chemical compounds that make up the reactants and products of photosynthesis and respiration

Essential Questions

- What is cellular respiration?
- Why do we need oxygen?
- How are the reactants/products different in photosynthesis and cellular respiration.

What does mastery look like?

During photosynthesis, carbon dioxide (CO_2) and water (H_2O) react in the presence of sunlight to produce

F oxygen (O_2) and carbon (C).

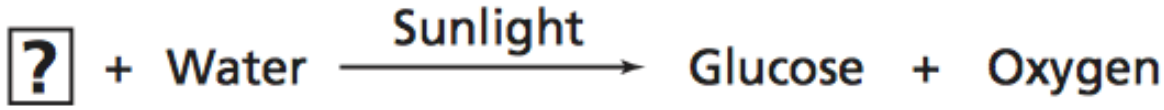
G glucose ($C_6H_{12}O_6$) and carbon monoxide (CO).

H glucose ($C_6H_{12}O_6$) and oxygen (O_2).

J hydrogen (H_2) and oxygen (O_2).

What does mastery look like?

Part of the equation for photosynthesis is shown below. A substance released during cellular respiration is missing.



What substance belongs in place of the question mark?

A Carbon

B Hydrogen

C Nitrogen dioxide

D Carbon dioxide

Check out the wording of the question. It's tricky!

Oxygen

- Why do we need oxygen to survive?
  - Brainstorm with your group.

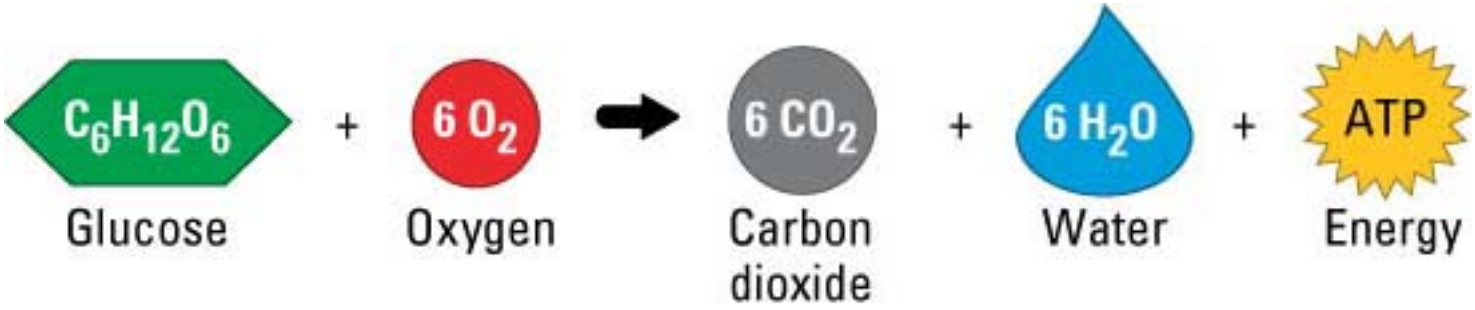
  - We use oxygen to process glucose.
  - Glucose provides the energy cells need to function.

process (verb) – perform a series of mechanical or chemical operations on (something) in order to change or preserve it.

Cellular Respiration

- This is what living cells do with oxygen.

- https://www.brainpop.com/science/cellularlifeandgenetics/cellularrespiration/



Cellular Respiration

- Imagine that you get up late for school.
- You dress quickly, then you run three blocks to school.
- When you get to school, you feel hot and are breathing fast.
- Why? Discuss with your group.
- Your muscle cells use a lot of energy when you run. To get this energy, muscle cells break down food.
- Some of the energy is used when you move and some of it becomes thermal energy, which is why you feel warm or hot.
- Most cells also need oxygen to break down food. You were breathing fast because your body was working to get oxygen to your muscles.
- Your muscles were using the oxygen for the process of cellular respiration.

Cellular Respiration

- During cellular respiration, chemical reactions occur that break down food molecules into simpler substances and release their stored energy.
- Just like photosynthesis, enzymes are needed for the chemical reaction of cellular respiration.

Breaking Down Carbohydrates

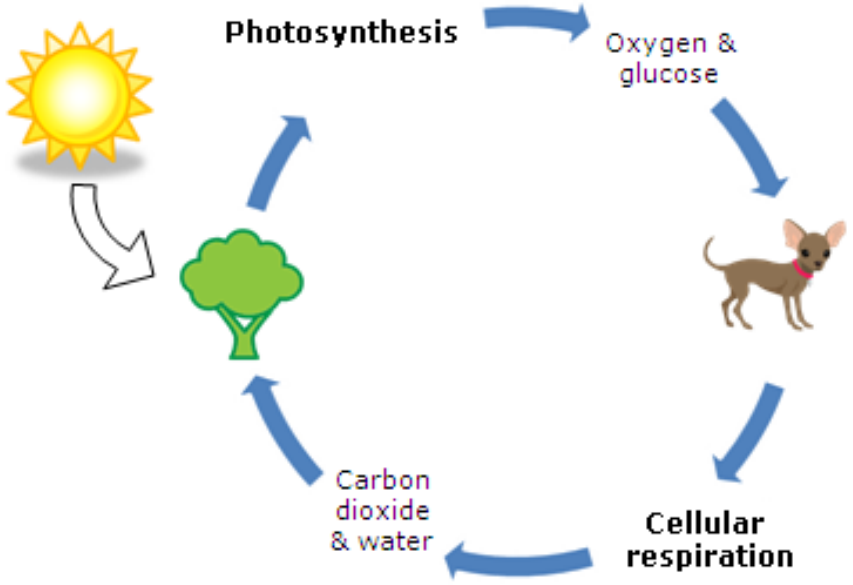
- The food molecules most easily broken down by cells are carbohydrates.
- Cellular respiration of carbohydrates begins in the cytoplasm of the cell.
- The carbohydrates are broken down into glucose molecules.
- Each glucose molecule is broken down further into two simpler molecules.
- As the glucose molecules are broken down, energy is released.

Breaking Down Carbohydrates

- The two simpler molecules are broken down again. This breakdown occurs in the mitochondria of the cells of plants, animals, fungi, and many other organisms.
- This process uses oxygen, releases much more energy, and produces carbon dioxide and water as wastes.

Breaking Down Carbohydrates

- Cellular respiration occurs in the cells of many living things.
- Producers and consumers carry on cellular respiration that releases energy from food.



Fermentation

- When cells do not have enough oxygen for cellular respiration, they use a process called fermentation to release some of the energy stored in glucose molecules.
- Like cellular respiration, fermentation begins in the cytoplasm.
- As glucose molecules are broken down, energy is released.
- But, the simple molecules from the breakdown of glucose do not move into the mitochondria. Instead, more chemical reactions occur in the cytoplasm.
- These reactions release some energy and produce wastes.
- Depending on the type of cell, the wastes may be lactic acid or alcohol and carbon dioxide. (Examine Figure 15.)

Fermentation

- http://on.aol.com/video/how-lactic-acid-affects-your-body-517241039

Exit Ticket

- What must happen to food molecules for respiration to take place?
- Where in the cell does fermentation take place?