



High School Science Virtual Learning

Biology

Photosynthesis

April 15th, 2020



High School Applied Biological Science

Lesson: April 15th, 2020

Objective/Learning Target:

Students will be able to identify the molecules used in photosynthesis and the factors that affect its rate.

Let's Get Started:

1. What is the difference between the reactants and products in a chemical reaction? Identify where each would be located if you were to write out a chemical reaction.
2. Do you think that photosynthesis is an energy-capturing or energy-releasing process? Why?

Let's Get Started: Answer Key

1. Question 1- The reactants are the elements of molecules that go into a chemical reaction. They are what you start with. There will always appear on the left side of the arrow when writing a chemical reaction. Products are what you have when the reaction is complete. They appear on the right side of a yields arrow when writing a chemical reaction.

Let's get Started: Answer Key

Question 2: Photosynthesis is an energy-capturing reaction. Plants and other photosynthetic organisms use pigments to capture light energy and convert it into high-energy sugars. Without the work of plants and other organisms there would be no energy available in the majority of the Earth's ecosystems.

Lesson Activity: Breaking down the Photosynthesis Reaction

Directions: Look at the Photosynthesis equation below.
Can you identify the names and locations of the reactants and products?



Photosynthesis Equation

REACTANTS

PRODUCTS



carbon dioxide + water + energy \rightarrow glucose + oxygen



Carbon
Dioxide

+



Water

+



Light
Energy



Sugar

+



Oxygen

Factors that affect the rate of photosynthesis

Now that we have identified the ingredients involved and their role let's take a look at some of the things that may affect the rate of photosynthesis. When we say affect the rate we mean things that either increase or decrease the rate at which the plants produce oxygen. Similar to how certain things either increase or decrease how fast you breathe.

Factors that affect the rate of photosynthesis

So what types of things affect the rate of photosynthesis? Think of the molecules of photosynthesis like the ingredients in a cake. The fewer ingredients you have the less cake you can make. In most cases if you are missing an ingredient than you will get no cake at all. Tough to make a cake without flour for example. The same is true for photosynthesis. Take away water and photosynthesis comes to a grinding halt.

Four Factors that affect the Rate of Photosynthesis

1. Water
2. Sunlight
3. Carbon Dioxide
4. Temperature

The first three are all found in the equation. The less of them you have, the slower the rate of photosynthesis.

Temperature is included because plants will also slow down if too hot or too cold.

Practice

Complete the following questions using the information you learned during the lesson activity.

Questions:

1. What are the reactants in the photosynthesis equation?
2. What are the products in the photosynthesis equation?
3. Identify four factors that could affect the rate of photosynthesis in plants.

Some more questions

4. If I submerge a plant in water under a light, the plant will produce bubbles? What are those bubbles made of and what happens if I remove the light?
5. If I increase the amount of Carbon Dioxide in a plants environment what would you expect to happen to the rate of photosynthesis?

Once you have completed the practice questions check with the **answer** key.

1. Carbon dioxide, water and light
2. Glucose and oxygen
3. Carbon dioxide, water, light and temperature
4. Oxygen, if I remove the light the bubbles will stop because light is necessary for photosynthesis
5. The rate of photosynthesis would also increase

More Practice:

Follow the links below to do more practice.

1. Complete the Photosynthesis Interactive from Nova here [\(LINK\)](#) Be sure to complete all 3 sections: The Cycle, Atomic Shuffler and Three Puzzles
2. Watch the Bozeman Science video on Photosynthesis here [\(LINK\)](#)