Name_____

# PHOTOSYNTHESIS

**Directions:** Read the information below.

## The Process of Photosynthesis

If plants can't move, how do they get food to live and grow? This question is answered by the process of photosynthesis. This is how plants take resources from their environment and convert them into food, giving them energy. Photosynthesis happens in two main parts: light-dependent reactions and the Calvin cycle.

### Light-Dependent Reactions

In order to make photosynthesis happen, a plant needs three main ingredients: carbon dioxide, water, and sunlight. A plant's leaves will soak up carbon dioxide from the air around it. Below ground, it is absorbing water from the soil. That water flows from its roots, through its stem and into the leaves, where the carbon dioxide is also being soaked up. These two ingredients alone will do nothing. It takes light from the sun to get the process going.

As you know, all living things are made of cells. Inside the plant's cells is a chemical called chlorophyll. This green chemical is what converts sunlight into adenosine triphosphate, or ATP. This ATP chemical is energy in a form the plants can use.

So far, sunlight has been required in this process. Without sunlight, the carbon dioxide and water are not as useful to the plant.

### The Calvin Cycle

After the light-dependent reactions, plants begin the Calvin cycle. From this point on, the plant does not need sunlight to continue the process. The ATP that was created earlier will help break apart the water molecules. As you may know, water is oftentimes called $H_2O$. This is because it is made up of hydrogen and oxygen. The ATP breaks apart the hydrogen and oxygen. The oxygen leaves the plant and is released back into the environment.

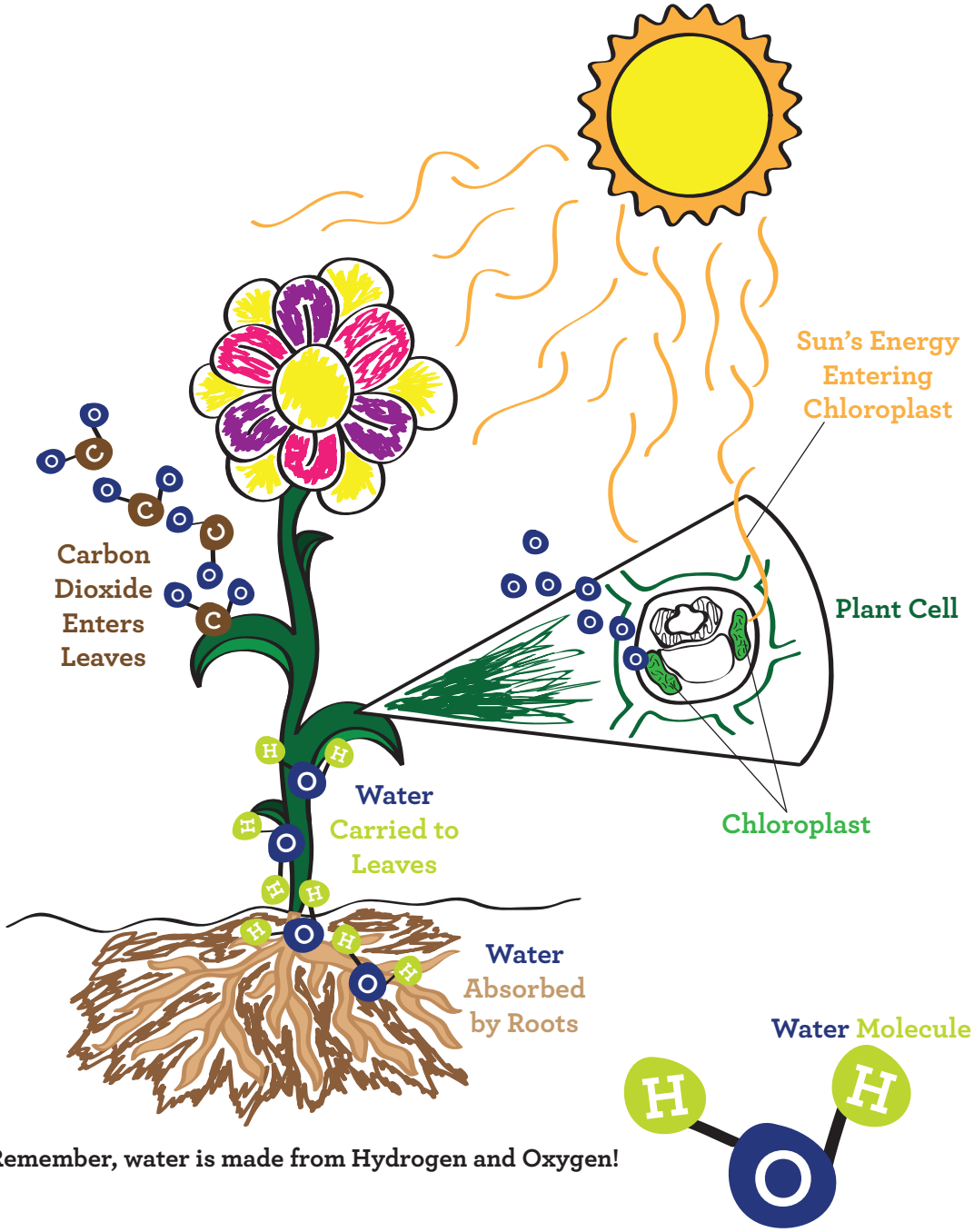
At this point we're left with carbon dioxide and hydrogen. These two components combine together to form glucose. The word glucose may not sound familiar, but you probably know it by its other name — sugar. This sugar acts like food for the plant.

### Importance of Photosynthesis

This process sounds complex, but it all happens in a matter of seconds. Imagine if your body could create its own sugar. Humans don't need photosynthesis because we can get our own food elsewhere. Without this process, plants cannot obtain the energy they need to survive.

We also benefit from photosynthesis. Remember when we mentioned that oxygen leaves the plant after it's no longer needed? People breathe in oxygen. We need this element for our own survival.

Finally, when humans consume plants (like vegetables), we take in the energy the plant has produced. It's a good thing our body does not produce its own sugar every time we drink water and get exposed to the sun. However, we do need glucose to give us energy. The energy we get by consuming plants helps us continue to live and grow as well.




**Directions:** Answer the questions below.

1. Contrast how humans get energy with how plants get energy.

2. What are the two main parts of the photosynthesis process?

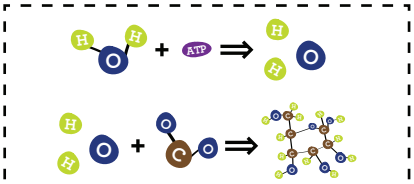
3. Describe two ways in which humans benefit from photosynthesis.

**Directions:** Cut and paste the images below in the order they belong in the photosynthesis process.

**Step 1 - Light Dependent Reactions** *(the three steps that belong here may be in any order)*

**Step 2 - Light Dependent Reaction**

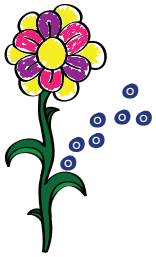
**Step 3 - Calvin Cycle**



ATP breaks apart the water molecule and combines it with Carbon Dioxide to form glucose.

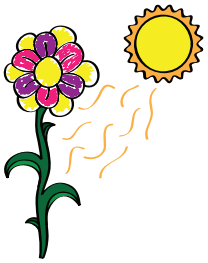
Sunlight is converted into ATP through the chlorophyll in the plant's cells.

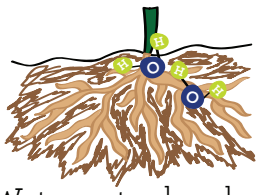
The leaves absorb Carbon Dioxide from the air.



Oxygen is released from the plant.

Energy from the sun enters the plant's leaves.





Water gets absorbed from the roots.