

## **Photosynthesis Play**

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## PHOTOSYNTHESIS PLAY

Plants are very special. Animals must search for their food, but plants can make their own. Each leaf is a small food factory, using sunlight and carbon dioxide and special cells containing chlorophyll to make their food. Today our play is about this process of food making. It is called photosynthesis. That's a big word which comes from two Greek words, photo meaning light and synthesis meaning building. So photosynthesis describes the building of food using light. Our play is personification, which means we will be using people to show what happens, even though there aren't really people in a leaf. Let's take a look at our leaf and see what is going on in the Food Factory.

Along the edge of the leaf you will see lips. These are the mouths of the leaf called the stomates.

1. Each leaf has many of them. Entering through the stomates are particles of carbon dioxide.
2. Each group has one carbon atom and two oxygen atoms.
3. As they enter through the stomates, they are met by some chlorophyll workers (see how green the chlorophyll is!) and loaded into a cart.
4. Look! As the carbon dioxide particles are being loaded into the cart, another chlorophyll worker takes one of the oxygen atoms and puts it into another cart.

**(AFTER THE THIRD GROUP OF CARBON DIOXIDE ENTERS THEN SAY :)**

Let's see what is happening in another part of the leaf. Inside the stem are two elevators. Water is being carried up from the roots in the up elevator which is called the xylem. Water is made of two hydrogen atoms and one oxygen atom ( $H_2O$ ) and they must always be together if they want to form water. As the water is entering from the xylem (the up elevator) it is being met by a chlorophyll worker and loaded into a cart (like the carbon dioxide!). Again, another chlorophyll worker is taking away the oxygen atom and loading it into a separate cart.

**(WAIT UNTIL THE PARTICLES OF WATER HAVE BEEN PROCESSED, THEN SAY :)**

Actually the water and the carbon dioxide are always entering at the same time. Let's watch them being greeted and loaded into the carts.

**(WAIT UNTIL ALL THE GROUPS ARE LOADED INTO THEIR CARTS – THEN ...) (A SCENE CHANGE IS GOING TO TAKE PLACE FOLLOWING THIS ACT.)**

Now let's follow the carts. The cart containing the oxygen atom from the carbon dioxide, and the cart containing the oxygen from the water travel to meet at another stomate (remember, that means mouth). When they meet at the stomate, the oxygen atoms are gently pushed out through the stomates – they are very important to us; they are pure oxygen and we breathe them every day. This is one of the gifts that we get from plants; while they are making their own food, they also make pure oxygen for us. The people on the picnic are enjoying the fresh, pure oxygen they are breathing in.

**(SCENE CHANGE WITH PICNICKERS)**

**(WAIT UNTIL THE OXYGEN PAIRS HAVE DANCED AROUND THE PICNICKERS TWICE AND HAVE BEEN SEATED – THEN ...)**

Meanwhile, the car which met the carbon dioxide is now full of carbon monoxide, which is a poison! It's traveling to meet the cart which met the water. When the two carts meet, the carbon and oxygen atoms mix with the hydrogen atoms from the water. As they are mixing, a very special thing is happening! They are mixing so well that they are forming a new substance. This is called a chemical reaction, and when there is a chemical reaction there is always heat – so they are mixing in a cooking pot. Now that they are completely mixed together they are ready to continue their journey through the food factory. Since they formed a new substance, they must leave the cooking pot six by six. A chlorophyll worker will bring them to their next stop. This new substance is called glucose - it is pure sugar and this process of mixing the hydrogen, carbon and oxygen atoms is a very important one; it is the first change from inorganic to organic material. The leaf took material that was not food, and this mixing up of carbon, hydrogen and oxygen atoms made it food. But it's not the food that the plant needs SO – on to the oven.

**(WAIT UNTIL THE WATER HAS ESCAPED, THEN ...)**

Now the atoms have cooked to perfection and they leave the oven – they are now starch, THE PERFECT PLANT FOOD! This starch, six carbons, ten hydrogen atoms, and five oxygen atoms, is loaded into a chlorophyll worker's cart and is carried back in the stem. The starch is loaded into the DOWN elevator called the phloem, and carried to all parts of the plant that need food. Any extra food is stored in the roots. The food factory works all day long, as long as it is sunny. When the sun sets, the food factory begins to close down - the flames die down in the oven, the chlorophyll workers stop moving their carts and the stomates and elevators close. During the night when the moon rises, there is no work going on in the food factory because, remember, the factory needs sunlight to work. There is no night shift in the food factory. The factory will open again when the sun rises. I hope you have enjoyed our play.