LINKING ACTIVITY 1 "MOLECULES IN MOTION"

Once students are familiar with the photosynthesis equation, you should carry out the Molecules in Motion curriculum linking activity. During this class period, students engage in a kinesthetic activity where they play the role of atoms to form molecules. It is valuable for reinforcing the arrangement of atoms and molecules in the process of photosynthesis.

In this activity, each student is given the role of an atom and is given a card that designates what atom they are. The photosynthesis equation requires 36 atoms. If you do not have that many students, some students may need to assume the role of a molecule (oxygen, hydrogen) and hold two oxygen or two hydrogen cards.

YOU WILL NEED

- A set of Molecules in Motion cards. These include cards to represent:
- 6 carbon atoms
- 12 hydrogen atoms
- 18 oxygen atoms

A Note for the Teacher

Each student will carry one of the Molecules in Motion card representing an atom comprising the photosynthesis equation. This means that as many as 36 students can do this activity if each student carries just one atom. The activity can also be successfully completed with as few as 21 students by allowing students to represent a molecule of either hydrogen or oxygen. Up to 6 students can hold 2 hydrogen cards and up to 9 students can hold 2 oxygen cards.

Procedure

1. Put the photosynthesis equation up on a poster, white board, or Smartboard facing the students, and tell them that they will create the photosynthesis reactants.

2. Hand out cards so that each student has at least one atom that they will represent. Remember, if you have less than 36 students in your class, you will have to ask some students to represent a molecule by holding 2 hydrogen or 2 oxygen cards as stated in the above Note for the Teacher.

Carbon Dioxide

3. Begin by asking one student with a carbon card, and two students with oxygen cards to come to the front of the class and create one carbon dioxide molecule. Students should hold their atom card(s) in front of them so they're visible to the class.

4. Then, ask any remaining carbon and oxygen students to create five more carbon dioxide molecules, so that there is a total of six carbon dioxide molecules in the front of the class.

5. Have students return to their seats.

Water

6. Ask student volunteers to come to the front of the class and create one water molecule. Each student should hold his atom card(s) in front of himself.

7. Once again, ask any remaining hydrogen and oxygen students to create five more water molecules, so that there is a total of six water molecules in the front of the class.

8. Then have these students return to their seats.

Reactants

9. Ask one group of carbon dioxide and one group of water molecule students to position themselves as the reactants of the photosynthesis equation. Remind them that there should be six molecules of each, but that there are not enough students to have this happen.

10. Assign yourself to the role of the Sun.

11. Tell the remaining students that they will position themselves so that they represent the products of the photosynthesis equation. Ask student volunteers to come to the front of the class and create one glucose molecule. The students from the reactant molecules will have to join these students in order to create the glucose molecule. The idea is that the same carbon atoms that make up the carbon dioxide molecule make up the backbone for the glucose molecule.

12. Once students are in the correct positions, ask them what other product they must create, and have volunteers create the final six oxygen molecules.

Sense-Making Discussion: Photosynthesis

Conduct a discussion help students summarize what they've learned. Set up chart paper or write on a white board or Smartboard that will remain posted throughout the unit. *Be sure to get several student responses and post them on the chart paper/white board or Smartboard.* Use the following questions to guide the conversation.

- What kind of, and how many, molecules were represented in the activity?
- Explain how you arranged the molecules in the activity.
- What were the reactants (inputs)?
- What were the products (outputs)?