**Molecular Models of Photosynthesis and Respiration**

In these activities, you will model how photosynthesis and respiration work to transform energy to different forms needed by organisms.

**Part 1:** [**HS-LS1-5 From Molecules to Organisms: Structures and Processes**](http://www.nextgenscience.org/pe/hs-ls1-5-molecules-organisms-structures-and-processes)

Target: Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.

**Instructions (Read carefully and do these Step by Step!):**

Examine the equation for photosynthesis: 6 CO2 + 6 H2O 🡪 C6H12O6 + 6O2

1. Predict how a plant might make the products of photosynthesis (C6H12O6 + 6O2) from the reactants (CO2 + 6 H2O).
2. What else is missing from this equation that a plant needs in order to do photosynthesis?
3. Go to the Molecular Models for Photosynthesis and Respiration page on biomanbio.com. Here is the URL: <https://biomanbio.com/HTML5GamesandLabs/PhotoRespgames/molecular-models-page.html>

Task 1:

a. What did the light energy do to the water?

b. Once your oxygen (O2) is created, what atoms do you have left and how many of each?

c. Did you have any leftover atoms after creating the oxygen and the glucose? Explain why / why not

[**HS-LS1-6 From Molecules to Organisms: Structures and Processes**](http://www.nextgenscience.org/pe/hs-ls1-6-molecules-organisms-structures-and-processes)

Target: Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

Task 2:

d. What else is needed to make a Glycine (amino acid) from a molecule of Glucose? Where do you think that comes from?

[**HS-LS1-7 From Molecules to Organisms: Structures and Processes**](http://www.nextgenscience.org/pe/hs-ls1-7-molecules-organisms-structures-and-processes)

Target: Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Task 3:

e. Why must the bonds of the glucose and oxygen molecules be broken before anything else happens?

f. What do you notice about the products of cellular respiration compared to the reactants of photosynthesis? Explain...