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Curriculum Units by Fellows of the National Initiative
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The Backwards and Forwards of Photosynthesis

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The curriculum unit I plan to write will allow my middle school students to discover where the energy in fossil fuels actually comes from. Students will engage in a series of problem-based learning experiences in order to connect several large concepts including: the chemistry of photosynthesis, the role photosynthesis played in the evolution of Earth's atmosphere, fossil fuel combustion, and atmospheric chemistry. By focusing on the chemistry behind photosynthesis, middle school students will use the chemical equation for photosynthesis to learn about reactants and products in a chemical equation, balancing chemical equations, and subscripts and coefficients. Students will also able to discover where the energy in fossil fuels actually comes from by examining the photosynthesis and its reverse reaction, combustion. This chemical equation will also be used to analyze the role photosynthesis played in the evolution of the Earth's atmosphere. Several hands-on activities will provide middle school students the opportunity to interact with photosynthesis firsthand by modeling molecular equations using toothpicks and gumdrops, watching photosynthesis occurring in spinach leaves, and testing how the color of light affects plant growth using a 5E lesson. This unit could be adapted to meet the needs of upper elementary, middle school, or even high school students.

(Developed for General Science, grade 7; recommended for General Science, grades 6-8)