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Curriculum Units by Fellows of the National Initiative
2020 Volume IV: Solving Environmental Problems through Engineering

The Chemistry of Energy

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Energy production and consumption are a hot topic in our society, as the economy and development of many countries depend fundamentally on the capacity of energy production. However, the production of energy despite being vital in modern society also has a negative side effect. One of the most important ones is the release of by-products that affect the environment like the release of carbon dioxide, provoking the increase of global temperature. The depletion of non-renewable sources for the production of energy is another issue of global concern. This Energy Chemistry Unit is part of the Thermochemistry chapter in the Chemistry curriculum for high school students from grades 10 to 12. The students will study concepts and laws such as Hess's Law, exothermic and endothermic process, energy conservation, and different types of energy and enthalpy.

This unit is mainly for students at High School, particularly those taking advanced chemistry classes such as AP (Advanced Placement), IBSL (International Baccalaureate Standard Level), and IBHL (International Baccalaureate High Level). The main objective of this Unit is to study the different ways of producing energy where chemical reactions are present, such as the combustion of fossil fuels, nuclear reactions, hydrogen, and oxygen reaction and conversion of solar energy into electrical energy. The study of this unit will address not only the production of energy, but also the advantages and disadvantages associated with production and consumption. The 12 principles of Green Chemistry will be used.

(Developed for Thermochemistry, grades 10-12; recommended for Thermochemistry, grades 11-12)

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