UNIT OF STUDY

Title: Energy	Subject/Course: Environmental Science	Length: 6 weeks
Topic: Sources of Energy	Grade: 11-12	Designer: D Wright

UNIT GOALS AND EXPECTATIONS

IMPORTANT CONCEPTS/UNDERSTANDINGS:

1. All energy use has environmental and social costs.
2. Energy type and energy use should be matched to improve the efficiency of energy consumption.
3. Fossil fuels are nonrenewable resources.
4. Conservation is the energy source with the greatest potential for creating new energy supplies.
5. Nuclear power plants produce energy by creating steam from water and using the steam to turn a turbogenerator.
6. Nuclear power uses fission—the splitting of a uranium-235 atom into two smaller atoms—to produce electricity. Fusion is the fusing of hydrogen into helium and occurs on the sun.
7. Radioactive emissions, alpha and beta particles and gamma rays, can adversely impact biological systems.
8. Concerns about nuclear power come from the possibility of accidents and the lack of secure disposal options. There is less concern about the possibility of an accident with newer designs.
9. Solar energy is, for all practical purposes, an inexhaustible energy source.
10. Renewable energy can be found in many forms.

ESSENTIAL QUESTIONS:

1. How can energy use have environmental and social costs?
2. How can energy type and energy use be matched to improve the efficiency of energy consumption?
3. What is the energy source with the greatest potential for creating new energy supplies?
4. Nuclear power is plentiful, but how can we use it safely?
5. What source of energy is for our purposes inexhaustible?
6. Is it possible to supply our needs for energy completely from renewable sources?

STUDENT LEARNING EXPECTATIONS:

PD.1.ES.16- Explain heat transfer in the atmosphere and its relationship to meteorological processes.
SP.3.ES.1- Explain the reciprocal relationships between Earth's processes (natural disasters) and human activities.
NS.4.ES.3- Utilize technology to communicate research findings.
NS.5.ES.1- Compare and contrast environmental concepts in pure science and applied science.
NS.5.ES.2- Explain why scientists should work within ethical parameters.
NS.5.ES.3- Evaluate long-range plans concerning resource use and by-product disposal for environmental, economical and political impact.
NS.5.ES.4- Explain how the cyclical relationship between science and technology results in reciprocal advancements in science and technology.

SPECIFIC DECLARATIVE KNOWLEDGE – What I know

Identify the criteria used to identify or classify energy and energy sources.
Describe the production and use of energy.
Identify and describe abiotic factors.
Understand the role of energy use in ecosystems.
Name and describe the three major changes in human energy used that have affected the environment.

SPECIFIC PROCEDURAL KNOWLEDGE – What I need to do

Make clear and unbiased observations.
Make predictions according to a pattern.
Identify correctly information found on graphs, tables and charts.
Research skills will be used to gather information.

UNIT ASSESSMENTS (Include tasks related to Dimensions 3 and 4 and Bloom's Taxonomy)	
Discuss (in writing) the idea of a sustainable approach to the Earth's environment. Chapter Content Brainstorming	
Traditional Assessments: Unit test. Written quizzes. Chapter outline Activity analysis	Other Evidence of Learning: Daily notebook entries. LPS 4-step Vocabulary strategy

ACTIVITIES AND LEARNING EXPERIENCES	Resources
Identify and define key words and vocabulary: (using LHS vocabulary format) Secondary energy source, primary energy source, electric generator, turbogenerator, conversion loss, thermal pollution, estimated reserves, oil fields, proven reserves, production, primary recovery, synthetic fuels, oil shale, oil sands, cogeneration, Fission, fusion isotopes, mass number, fission products, fuel rods or elements, control rods, meltdown, radioisotopes, radioactive emissions, radioactive wastes, radioactive decay, half-life, reprocessing, corrosion, earth-sheltered housing, photovoltaic cell, wind turbine, wind farms, electrolysis, fuel cells, geothermal energy, production tax credits, research and development, building codes, tax incentives, fuel economy (CAFE) standards, hybrid electric and fuel cell vehicles, carbon tax Weather Mapping Topographic Mapping Quadrant biodiversity Lab	Environmental Science: Toward A Sustainable Future Media Center Internet Smartboard Power point Newspaper/Magazines Lab exercises TI-83 calculator w/ probes

Career Connections
Politician Economist Sociologist Ecologist