

# Unit D Review Questions



1. The following list summarizes some of the important terms and concepts used in this unit. In a table, define each item (including relevant symbols and equations) in one column and state any related terms and applications (e.g., examples or diagrams) in a second column. If you prefer, a table has been set up in a Microsoft® Word file titled “Unit D Key Terms” on the Science 30 Textbook CD.

- energy
- energy efficiency
- fossil fuel (hydrocarbon)
- hydrocarbon combustion
- heat of combustion
- energy change for a reaction
- standard heat of formation
- first law of thermodynamics
- second law of thermodynamics
- radioactivity
- nucleon
- isotope
- ionizing radiation
- conservation of nucleons
- nuclear fission
- nuclear fusion
- mass-energy equivalence
- sustainable development
- biosphere

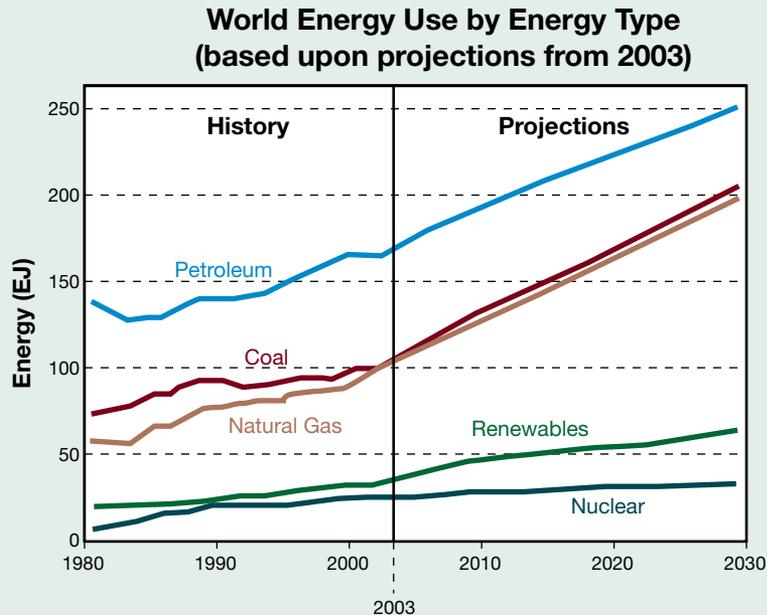
2. In this unit you studied a variety of energy technologies. Copy and complete the following table in your notebook. Remember to leave enough room for your answers.

| Technology                                 | Energy Conversions (original source to final use) | Renewable or Non-renewable | Negative Aspects | Positive Aspects |
|--|---|----------------------------|------------------|------------------|
| coal-fired power plant                     |   |                            |                  |                  |
| CANDU nuclear power plant                  |   |                            |                  |                  |
| hydroelectric power generating facility    |   |                            |                  |                  |
| tidal power generating facility            |   |                            |                  |                  |
| wind turbine                               |   |                            |                  |                  |
| solar collector                            |   |                            |                  |                  |
| earth energy system                        |   |                            |                  |                  |
| photovoltaic cell                          |   |                            |                  |                  |
| geothermal heating                         |   |                            |                  |                  |
| geothermal electricity generating facility |   |                            |                  |                  |
| ethanol fuel                               |   |                            |                  |                  |
| hydrogen fuel cell (automobile)            |   |                            |                  |                  |

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Use the following information to answer questions 3 to 8.

Projections concerning energy use in the future are important because they impact the research and development of alternative fuels. The following graph shows projections of the world's use of various energy types from 2003 to 2030.



- Suggest a possible reason for the small proportion of world energy coming from nuclear power.
- The world's supply of coal is much more plentiful than that of natural gas, yet natural gas use could surpass that of coal. Provide a possible reason for this.
- Calculate the percentage of the world's total use of energy that was supplied by renewable sources in 2003.
- Calculate the percentage of the world's total use of energy that will be supplied by renewable sources in 2030.
- Use your answers to questions 5 and 6 to determine whether the authors of this graph are anticipating a switch to the hydrogen economy.
- Buses that use hydrogen as a fuel emit only water and heat in their exhaust. Some buses in Edmonton are electric (powered by high-voltage cables suspended above the street). At first glance, neither bus appears to generate harmful emissions. Is this impression correct? Support your answer.
- List some factors affecting energy use in Canada. Describe practices that could be used to reduce the need for fossil fuels as an energy source. In your answer, identify technologies that could be used, and explain how they could be used in a way that demonstrates sustainable development.



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**Legend:** t = top, m = middle, b = bottom, l = left, r = right

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