**Unit D: Energy and the Environment**

**Chapter 1 and 2**

* Compare energy consumption of contemporary society with that of traditional cultures
* Compare Canada’s per-capita energy consumption with developed and developing nations and ID factors that affect consumption (i.e. economy, lifestyle, level of technology, geography and climate)
* Apply sustainable development to increasing efficient use of energy
* Explain the need to develop technologies that use renewable and non-renewable energy in the home and to meet increasing global demand
* Describe the environmental impact of developing and using various energy sources (i.e. conventional oil, oil sands, solar power, biomass, hydroelectricity, nuclear power and geothermal power, wind power)
* Explain how Hess’s Law leads to the theoretical prediction of heat of combustion. Use the formula to calculate the energy released in reactions
* Describe the conversion of solar energy into renewable forms (i.e. wind, hydro, chemical potential energy by photosynthesis) and non-renewable forms (i.e. coal, oil and gas) and further conversions into electrical and thermal energy
* Describe the functioning of renewable energy technologies and assess their advantages and disadvantages, including active and passive solar heating technologies, wind turbines, hydroelectric power, biomass energy hydrogen fuel cells
* Explain the difference between fission and fusion and balance simple nuclear reactions to show the conversions of nucleons
* Describe and demonstrate radioactive decay including alpha, beta and gamma radiation
* Describe mass energy changes in fission and fusion reactions and use E=mc2
* Describe the operation of a fission reactor (CANDU)
* Compare and contrast coal or hydroelectric power stations with nuclear power stations, in terms of purpose, process of energy conversions, design and function
* Explain the source of tides, in terms of gravitational attraction and the relative motions of the sun, moon and Earth
* Describe the energy transformations involved in converting tidal energy to electrical energy