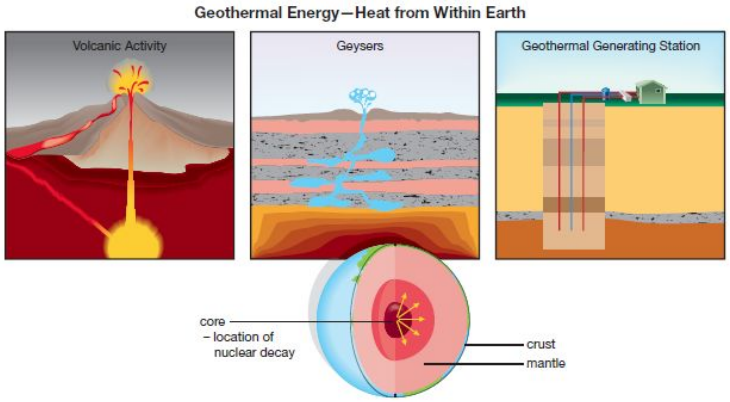
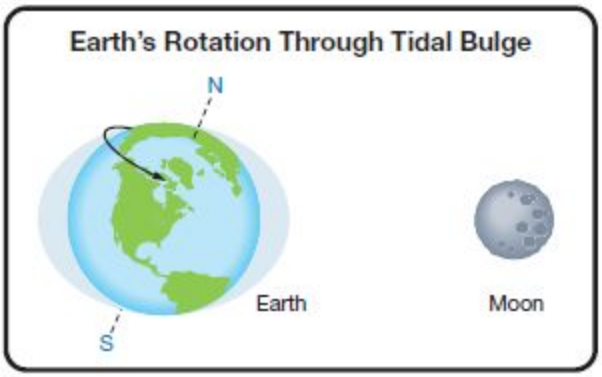
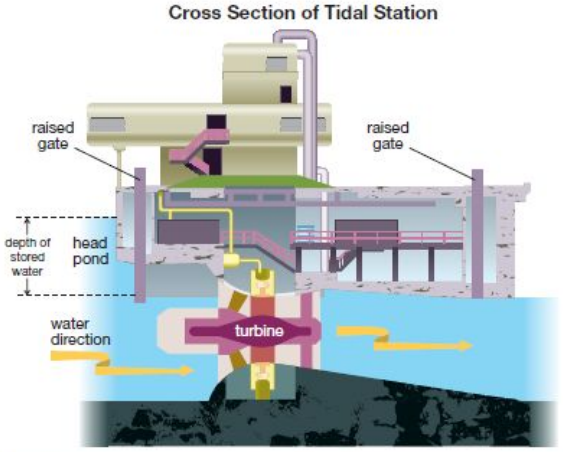
Science 30	Unit D: Energy and the Environment
Lesson 4 - Deeper into Types of Energy	84 mins

Geothermal

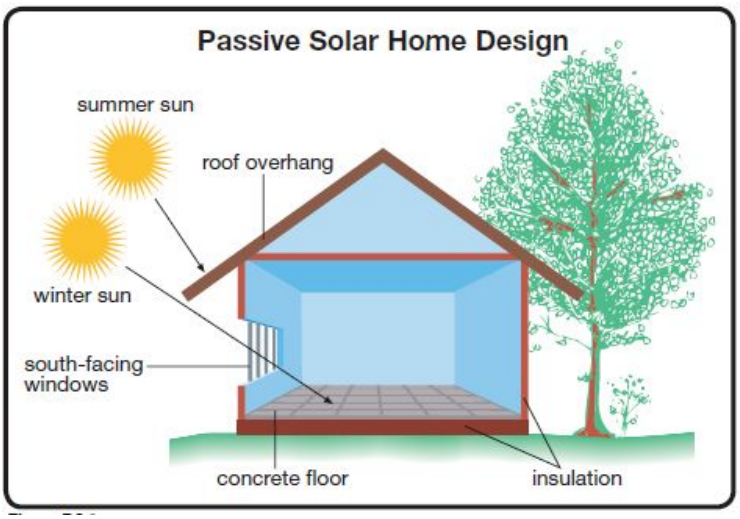
- heat that originates from radioactive decay in Earth's core (5000C at core)  	Uses: - Recreation - Hot Springs - Electricity - Stream Vents - Downsides - H_2S and CO_2 emissions from steam in earth's crust, think fracking… (a lot less then burning though…) - Localized resource… can't be used everywhere

Tidal Energy

- the deformation of land and water due to the gravitational fields of the Moon and Sun acting on every part of Earth   	Uses: - Electricity Downsides - Has to be in areas of large tidal differences, (such as the bay of fundy) - Not very effective in most conditions… Not consistent.

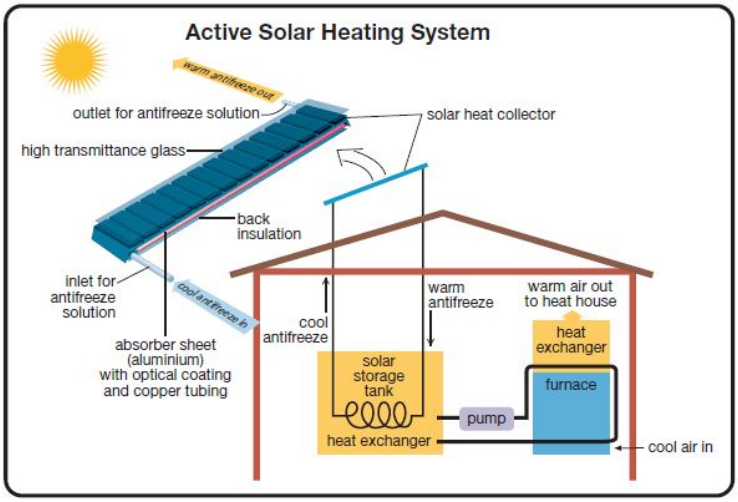
Solar Energy

passive solar energy: thermal energy derived from the Sun's radiant energy, absorbed by massive materials, and then transferred naturally to other areas by conduction, convection, and radiation

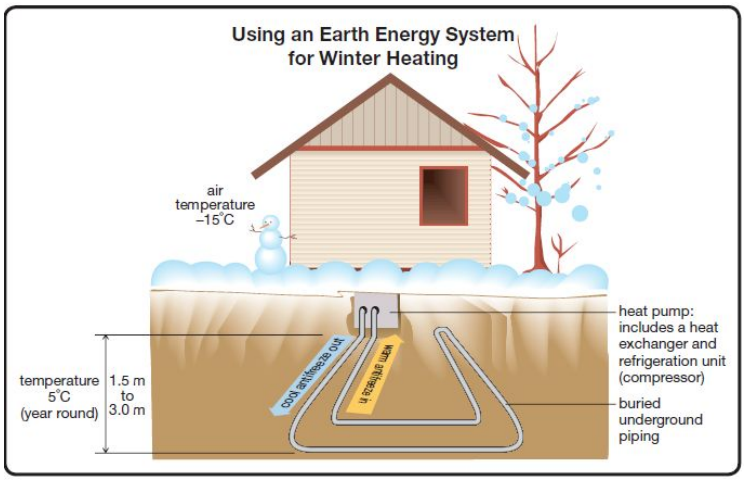


Active

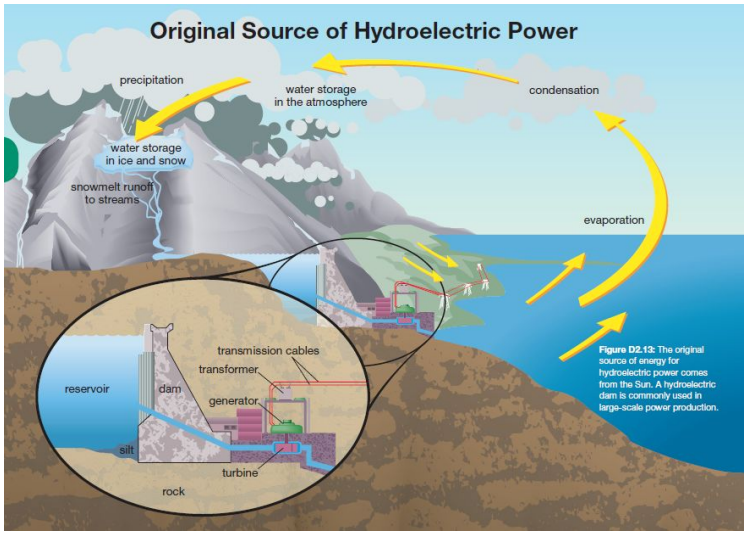
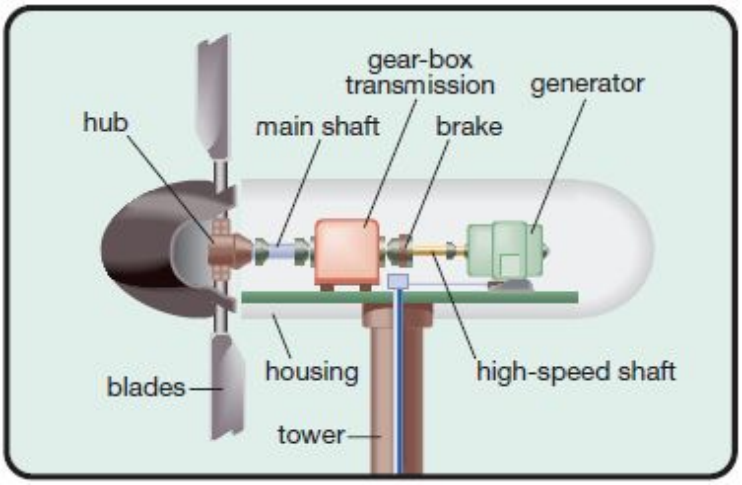
solar heat collector: a device that absorbs radiant solar energy and converts it into thermal energy that is carried by a fluid pumped through the collector



earth energy system: a heating system that uses a loop of piping through the ground to absorb thermal energy from the solar energy that the ground absorbs



photovoltaic cell: a device that converts electromagnetic radiation into electrical energy

Hydroelectric Power: uses the water cycle to generate electricity.	
Wind Energy: uses convection currents to produce electricity	
Biomass/Biofuels: plant matter or agricultural waste from recently living sources used as a fuel or as an energy source.	Wood burning, biofuels (ethanol/methanol). Since made from plants the net CO2 emissions are less than that of fossil fuels.
Landfill Gas (mathane): bacteria in dumps create methane as they decompose the garbage which can be turned into a fuel.	

Science 30 - Lesson 40 - Unit D - Deeper into Types of Energy

Name: _____

1) Describe the energy transformations that occur to produce electricity from each of the following sources. Begin with the original source of the energy and finish with the electricity produced.
    a. geothermal energy

    b. tidal energy

    c. photovoltaic cells

    d. hydroelectric power

2) Identify the main limitations and benefits of solar-energy technologies.

3) List actions that you and your family perform that are consistent with sustainable development. In each case, identify whether the action addresses ecological sustainability, environmental sustainability, societal sustainability, or any combination of these.

4) Last Class you evaluated one of these six energy sources—coal, nuclear fission, photovoltaic cells, hydroelectric power, wind energy, and biomass—for sustainability as sources of energy. You will need these six completed evaluations (check with your classmates) to answer questions a. and b.
    a. Summarize your findings by producing a table that compares the weighted scores for each category of sustainability as well as the overall score for each source of energy.

    b. Refer to your table to discuss the overall rankings, from highest to lowest, of the sources of energy. Support your findings by describing the overall reasons for your ranking.