Applications of Electrical Energy

Key Concepts

- **I can list many applications of electrical energy.**
- **I can explain how many different types of energy can be transformed into electrical energy.**

Electrical Energy

- the energy of charged particles

Applications of Electrical Energy

- electrical energy plays an important role in living organisms and in our everyday life
- electrical signals in our nerve cells allow messages to be sent to and from the brain
- electrical signals in our muscles contract muscles allowing for us to move our eyes to read and legs for movement
- touch screens use the pressure from a touch command to complete an electrical pathway
- neon signs involve electrical energy being passed through a gas
  - energy carried by electrons collide with neon atoms, transferring energy to them
  - the atoms give off energy as visible light that looks orange-red
- Maglev trains levitate (hover) above electrified coils that run along tracks
  - the coils create magnetic fields that repel large magnets under the train, causing it to levitate
  - fastest one can travel at 600km/h

Transforming Energy

- energy is neither created nor destroyed
- energy is transformed from one kind of energy into another kind of energy
- several kinds can be transformed into electrical energy

1. Mechanical Energy
   - the energy of motion
2. Chemical Energy
   - stored in chemical bonds
   - fossil fuels store chemical energy
3. Solar Energy
   - carried by the electromagnetic radiation given off by the sun
   - fossil fuels are the result of energy from the sun being captured by plants
4. Nuclear Energy
   - generated by forming new atoms
   - nuclear fusion – new atoms are made as smaller atoms collide and fuse
   - nuclear fission – larger atoms are split into smaller atoms
   - fission reactions are carried out in reactors on earth

5. Thermal Energy
    - the energy due to the rapid motion of particles
    - we detect it as heat

Assignment

Answer the following questions on a separate sheet of paper.

1. Describe 3 ways that you have depended on electrical energy since you woke up this morning
2. Describe the difference between kinetic energy and potential energy.
3. Describe the relationship between solar energy and fossil fuels.
4. Identify the type of energy associated with each source below.
    a. the sun
    b. river flow
    c. a battery
    d. wind
    e. uranium
    f. hot springs
    g. garbage
5. How does each of the following use electrical energy to perform a function?
    a. A maglev train to travel.
    b. A tablet to carry out a command from your finger.
    c. A neon sign to glow a specific colour.
6. Describe the relationship among mechanical energy, potential energy, and kinetic energy.
7. Consider the terms nuclear fission and nuclear fusion.
    a. How do these two nuclear reactions differ?
    b. Which is currently used to generate electrical energy in Canada?