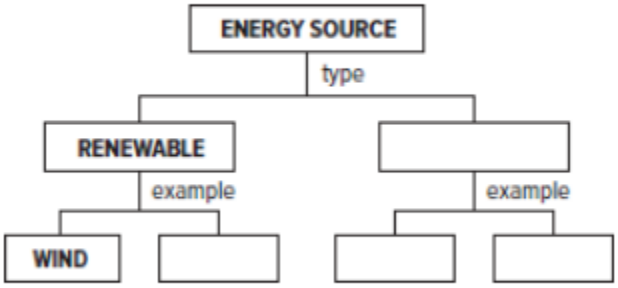
Hemingway Name:

Electricity Review

1. Copy and complete the concept map.



3. Below are four sets of terms from this unit. For each set, write one or two sentences that use all the terms correctly.

a. law of electric charge, negative charges, positive charges

b. voltage, current, Ohm's law, resistance

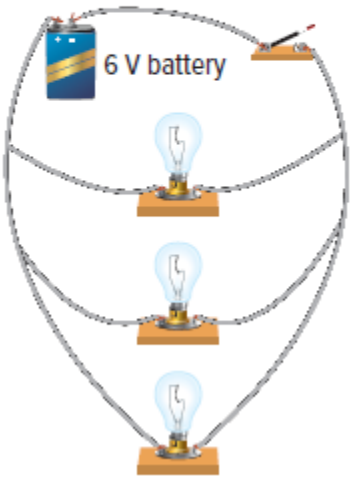
c. current, closed circuit, load

d. electrical energy, EnerGuide label, smart meter

4. Examine the diagram.

a. Identify the load(s), source, switch, and direction of current flow.

b. Identify the type of circuit.



6. a. Describe the relationship among mechanical energy, potential energy, and kinetic energy.

   b. Explain how a geothermal generating station transforms thermal energy into electrical energy.

7. A generating system is sometimes referred to as simply a generator. Why is this technically incorrect?

8. 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?

9. Describe the law of electric charge.

10. Use the analogy of a worker to explain how chemical energy does work to create an electrical potential difference in a cell.

11. Which "batteries" that you use in your daily life are not actually batteries? Explain.

12. A series circuit has a battery, a switch, and a load. Explain why the load goes off when you open the switch. Base your answer on the necessary conditions for circuits.

13. Use the terms "electrically charged" and "electrically neutral" to explain what has caused the phenomenon on the right.

14. Write out Ohm's law in your own words.

15. a. How does a short circuit form?

    b. Explain how a short circuit might be dangerous.

16. Describe one way that a series circuit is the same as a parallel circuit and one way that it is different.

17. Explain what happens to the current from a source when it encounters two branches of a parallel circuit.

18. Describe the danger associated with running too many appliances on the same parallel circuit in a building.

19. Explain why a radio might still use electrical energy when it is switched off.

20. In Canada, electrical energy is generated mainly by hydroelectric dams, nuclear reactors, and fossil fuel–burning generating stations. Which of these use renewable energy sources?

21. Identify three different ways that renewable energy sources are currently used to generate electrical energy in B.C.

22. **a.** How is the slogan "every kilowatt counts" relevant to you as a consumer of electrical energy?

b. How is the slogan relevant to the environment?

23. Explain the ideas behind First Peoples Ecosystem Based Management in your own words.

27. You want to build a circuit with a source, a switch, a motor, and a lamp. You want the lamp to indicate if the motor stops working. Draw the circuit.

28. There are three light bulbs, A, B, and C, in a circuit. The circuit has only one switch which turns on all of the light bulbs. When A burns out, B and C remain on. When B burns out, A remains on but C goes out. When C burns out, A remains on but B goes out. Draw a circuit diagram with these three light bulbs that would give these results. Explain why each light bulb responds as described.

29. A solid metal ball is sitting on a rubber mat. If it is given a negative charge, will the charge remain on the surface or spread through the ball? Use your understanding of conductors and the properties of charges to explain your answer.

30. Objects A and B are suspended from insulating threads. A positively charged balloon attracts Object A and repels Object B. Can you determine the charge of each object? Explain your reasoning.

32. A battery has an electrical potential difference of 6 V. A bulb with a resistance of 50 Ω is connected to the battery in series. The bulb burns out. What is the current through the bulb? Explain.

34. A forensics team is investigating a fire. They find a burnt-out wall outlet with the remains of two extension cords plugged into it. Several appliances are plugged into each extension cord. Explain a possible cause of the fire.

35. A washing machine has a power rating that is many times greater than a television. However, a washing machine uses less electrical energy in a year in an average home than a television. Suggest why this is true.

36. Whenever a new hydroelectric dam is built, unavoidable flooding of plants and other organic materials results in the release of mercury compounds as they decompose. This leads to harmful mercury build-up in food chains and, in particular, in valuable fish stocks. Over a period of 10 to 30 years, decomposition rates slow and mercury in the environment decreases.

a. How should we value the electrical energy generated by a hydroelectric dam versus the damage caused by mercury pollution?

b. Many First Peoples depend on fish in B.C. rivers. If you depend on fish in a region where a dam is built and have to stop eating them, should you be compensated for your loss? Explain your reasoning.

c. In light of the environmental harm a dam can cause, can it be part of a sustainable energy system? Explain your reasoning.

40. Your family is trying to decide whether to install photovoltaic cells on your roof.

a. Identify one benefit of installing photovoltaic cells.

b. Identify one problem related to installing them.

c. Describe what other factors you would take into account when choosing whether to install this technology.

d. Many provinces offer subsidies that help homeowners pay for renewable energy technology they install in their homes. Others buy back excess electrical energy produced by the consumer. Do you think these programs will increase the number of people using this technology? Would it influence your decision? Explain.

41. People living in different countries have very different rates of electrical energy consumption. In general, developed countries use the most electrical energy while developing countries use the least. How do you think this information should influence how much responsibility different countries have in moving to a sustainable energy system?

42. As shown below, Abbotsford Middle School has installed a wind turbine to generate electrical energy. The school also has solar panels and a bicycle generating system all linked up to the computer lab.

How is the school moving toward a sustainable energy system or following the principles of First Peoples Ecosystem Based Management?