Chapter 12 Review

Make Your Own Summary

Summarize the key concepts in this chapter using a graphic organizer. The Chapter Summary on the previous page will help you identify the key concepts. Refer to Study Toolkit 4 on pages 566–567 to help you decide which graphic organizer to use.

Reviewing Key Terms

Match each key term listed below to its definition. The terms may be used once, more than once, or not at all.

Definition	Terms
1. technology that is used to change the voltage of an alternating current	**a.** biomass energy
2. device that is used to protect a circuit by opening a switch when the current exceeds a safe maximum value	**b.** phantom load
3. the practical unit of electrical energy	**c.** electrical energy
4. something that helps you choose a new electric washing machine	**d.** electrical power
5. the clock on an electric coffee maker	**e.** EnerGuide label
6. a demand that is met using fossil-fuel-burning generators, which can be turned on and off quickly	**f.** fuse
7. a renewable source of energy that involves the indirect conversion of energy from the Sun	**g.** intermediate load
8. its practical unit is the kW	**h.** kW
	i. kW·h
	j. circuit breaker
	k. solar energy
	l. transformer

Knowledge and Understanding K/U

9. When there is alternating current in a circuit, electrons move back and forth. Explain how AC can transfer energy.

10. Why is AC, rather than DC, used to supply electrical energy in Canada?

11. What are the functions of the two vertical slots and the round hole in a wall outlet?

12. A freezer consumes 340 kW·h of electrical energy, and the average rate charged is 6.0 ¢/kW·h. What is the cost to operate this freezer for a year?

13. Energy conversions take place at a fossil-fuel generating station. Which of these energy conversions lower the efficiency of the station the most?

14. How is a surge protector the same as a power bar? How is it different?

15. Is the connection to a circuit breaker in series or in parallel? Explain.

16. What is the source of the energy that is available from oceans (tides and wave energy)?

17. What factors affect the energy that can be obtained from a solar panel?

18. Which source of energy that is used to generate electricity results in the greatest emission of gases to the atmosphere?

Thinking and Investigation T/I

19. Calculate the efficiency of a 23 W compact fluorescent bulb that generates 5.0 W of useful light energy.

20. An electric water heater is 90 percent efficient. If the output from the heater to the water is 6.5 kW, what is the power input to the heater?

21. Compare and contrast the methods used to generate electricity from different energy sources.

22. The following table compares the environmental costs of generating electricity from various sources. The cheapest source is wind energy (given a value of 1), and the other sources are compared with it.

Environmental Costs of Generating Electrical Energy from Various Sources

Source	Comparative Environmental Cost
Fossil fuels	114–609
Nuclear	120–1200
Solar	44
Wind	1

a. Wind and solar energy are renewable resources. Why do you think the environmental cost of a solar plant is so much greater than the environmental cost of a wind farm?

b. A considerable range is given for the environmental cost of nuclear energy. This cost includes the costs of construction, operation, waste disposal, and closing down the plant at the end of its life. Research these costs, and briefly summarize your findings. Explain why a wide range is quoted for the environmental cost of nuclear energy.

23. More electrical energy may be required in the future to charge electric vehicles. Which type of generating plant would you expect Ontario to build to meet this need? Why?

Communication C

24. A letter to the editor of your local newspaper states that in a northern climate such as Ontario's, incandescent bulbs provide necessary heat as well as light. How would you explain, in a follow-up letter, why although that is true, people should still replace incandescent with fluorescent lighting?

25. BIG IDEAS Electricity is a form of energy produced from a variety of non-renewable and renewable sources. To reduce environmental impact, we should generate electrical energy using clean, renewable sources, rather than non-renewable ones. Describe the promise and challenge of using wind turbines, solar panels, ocean energy, and geothermal energy to generate electricity.

26. BIG IDEAS The production and consumption of electrical energy has social, economic, and environmental implications. How is the slogan "every kilowatt counts" relevant to you as a consumer of electrical energy? How is the slogan relevant to the environment?

27. BIG IDEAS Static and current electricity have distinct properties that determine how they are used. Describe some of the uses of each type of electricity. Which of these types of electricity do you think has more practical applications (or more important practical applications)? Explain.

28. Men and women work in a variety of fields with the general heading of "electrician." Find out what these fields are, and what education and training are required. Using what you find out, create a brochure that could be placed on a careers bulletin board at your school.

Application A

29. Suppose that the capacity of an existing power plant is going to be doubled. Currently, electricity is carried from the plant by 350 kV transmission lines. Outline two ways that the increased energy could be distributed when the capacity of the plant is doubled.

30. Explain why a fire can result if a 15 A fuse is replaced with a fuse that has a higher rating.

31. What sources of electrical energy can best be developed in Ontario in the future? Explain.