Adam-Carr, C., Gabber, M., Hayhoe, C., Hayhoe, D., Hayhoe, K., LeDrew, B., Sanader, M., 2010. **Science Perspectives 10,** Nelson Education Ltd., Toronto, pp. 469, 476

1. In terms of heat transfer, how is *radiation* different from *conduction* and *convection*? K/U
2. What two major properties did Maxwell predict that electromagnetic waves would possess? K/U
3. What two discoveries confirmed the existence of electromagnetic waves? K/U
4. Write these electromagnetic waves in order from lowest energy to highest energy: infrared light, X-rays, red light, gamma rays, and microwaves. K/U
5. Sunscreen, if used properly, can protect you from getting a sunburn. From which electromagnetic waves must sunscreen protect the skin? K/U
6. List the seven colours that Newton identified in the visible spectrum of white light. K/U
7. Why is it useful to examine the universe using parts of the electromagnetic spectrum other than visible light? K/U A
8. List some devices that you have used or plan to use today that involve electromagnetic waves. K/U A
9. Match each electromagnetic wave from column A with the term from column B that is most closely related. K/U A

Column A	Column B
(a) X–rays	vitamin D
(b) ultraviolet light	telecommunications
(c) radio waves	cancer treatment
(d) infrared light	radar
(e) microwaves	theatre/concert effects
(f) amma rays	baggage screening
(g) visible light	DVD player remote control

CHECK YOUR LEARNING

1. In Grade 9 science, you studied the differences among stars, planets, and moons. Which are luminous, and which are non-luminous? Explain why this second group is classified as non-luminous. K/U
2. Why is an incandescent bulb a very inefficient light source? K/U
3. Name the process of producing light by passing an electric current through a gas. K/U
4. What is the main difference between phosphorescence and fluorescence? K/U
5. (a) Do fluorescent brighteners in detergents really make clothes cleaner?
   (b) There is concern that extra additives in detergents can have negative health and environmental impacts. Is it wise to use detergents containing these additives? Explain. K/U T/I A
6. Predict whether or not a fluorescent material would glow if it was illuminated by infrared light. T/I
7. Why is chemiluminescence also called "cold light"? K/U
8. Predict whether or not a light stick would be a good light source in a potentially explosive environment. Explain your prediction. T/I C
9. State several reasons why living organisms might use bioluminescence. K/U C
10. What are two differences between LEDs and incandescent bulbs? K/U C
11. LEDs are considered an even better alternative to CFLs to replace incandescent bulbs. Compare CFLs with LEDs. Are LEDs a better alternative? Be sure to consider environmental, health, and economic factors. Write a brief report to communicate your opinion. K/U T/I A