

and a self-test.

Reviewing Content

1. c 2. a 3. b
4. c 5. d 6. b
7. d 8. b 9. a
10. d

Understanding Concepts

11. The electric and magnetic fields regenerate each other.
12. Constructive and destructive interference
13. Infrared cameras are used to find victims because the human body is usually warmer than its surroundings.
14. Excessive exposure to ultraviolet rays can cause sunburn, wrinkles, skin cancer, and damage to eyes. In moderation, ultraviolet rays help the skin to produce vitamin D; they are also used to kill microorganisms in ventilation systems and to help plants grow in nurseries.

electromagnetic modulation, p. thermograms,

18.3 Behav

Key Concepts

- Materials can be transparent or opaque.
- When light strikes a surface, it is reflected, absorbed,

Vocabulary

transparent, p. 547; image, p. 547; diffuse reflection, p. 548; scattering,

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Chapter 18

Print

- Chapter and Unit Test A and Test B
- Test Prep Resources

15. X-rays have high energy and can penetrate matter, such as muscle, that light cannot. But X-rays are absorbed by teeth and bones, so these areas appear as white on an X-ray photograph.

16. The glass is transparent.

17. Polarized sunglasses block glare with vertically polarized filters, which block the horizontally polarized light reflected from horizontal surfaces.

18. A prism spreads out the colors in white light, separating the colors into a spectrum.

19. Each secondary color of light is produced by the combination of two primary colors.

20. Complementary colors of pigments are two colors that combine to make black pigment, such as blue and yellow, green and magenta, or red and cyan.

21. A secondary color is a combination of two primary colors; when added to its complementary color (the third primary color), white light results.

22. Fluorescent lights do not get as hot as incandescent lights. They are more efficient because they emit most of their energy as visible light.

23. Laser light is coherent light, which means all of the waves have the same wavelength and the crests and troughs are lined up. Laser light can form a beam that can be focused on a small area.

24. The halogen gas reduces wear on the filament, so the bulb lasts longer than an incandescent bulb.

Critical Thinking

25. Similarities: Microwaves and infrared photons have less energy than invisible light photons. They both travel in a vacuum at the speed of light. Both have applications in communications. Differences: Microwaves are used for cooking and reheating food. Infrared photons have more energy than microwaves.

26. The frequency of the reflected radio waves is reduced because the car is moving away from a stationary radar source.

27. The sunset would be yellow because there would be no scattering if there is no atmosphere.

28. Light: The primary colors red, green, and blue mix to form white light.

Pigment: The primary colors cyan, yellow, and magenta mix to form black pigment.

29. In all three cases, two primary colors of pigments combine to form a secondary color of pigment.

30. Only one color, magenta, is needed to produce black.

31. Students might predict that black will result because all three primary colors are being mixed. But the colors are not mixed in equal amounts. Two parts yellow plus two parts magenta plus one part cyan should result in black plus yellow and magenta, which is the same as black plus red. The result should be a dark red.

32. Laser light is very high intensity light that does not spread out, so it can damage tissue in the eye.

Math Skills