

## Chapter 28 Color

**Exercises****28.1 The Color Spectrum (pages 555–556)**

- \_\_\_\_\_ was the first person to do a systematic study of color.
- Circle the letter of each statement that is true about Newton's study of color.
  - He studied sunlight.
  - He passed sunlight through triangular-shaped pieces of glass.
  - He observed that sunlight was broken into a rainbow-like pattern of colors.
  - He showed that sunlight is yellow light.
- A spread of colors is called a \_\_\_\_\_.
- List the colors of the visible spectrum in the correct order.  
\_\_\_\_\_
- Is the following sentence true or false? Sunlight is a combination of all colors. \_\_\_\_\_
- A white object appears \_\_\_\_\_ when illuminated by white light.
- Explain this statement: White and black are not actually colors.  
\_\_\_\_\_  
\_\_\_\_\_
- Is the following sentence true or false? Black objects that you can see absorb all light that falls on them. \_\_\_\_\_

**28.2 Color by Reflection (pages 556–558)**

- Circle the letter that best describes the color of an opaque object.
  - An opaque object is the color it absorbs.
  - An opaque object is the color of the light that shines on it.
  - An opaque object is the color it reflects.
  - An opaque object is the color of white light.
- Different materials have different \_\_\_\_\_ for absorbing and emitting radiation.
- Describe what happens when the frequency of the light shining on an object resonates with the object's natural frequency.  
\_\_\_\_\_
- Describe what happens when the frequency of the light shining on an object is higher or lower than the object's natural frequency.  
\_\_\_\_\_
- Is the following sentence true or false? When an object reemits the light that shines on it, absorption occurs. \_\_\_\_\_

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14. Circle the letter that best explains why cells containing chlorophyll are green.
- They absorb green light.
  - They produce food.
  - They reflect green light.
  - They are very small.
15. Is the following sentence true or false? Different sources of light produce light made up of different frequencies. \_\_\_\_\_

**28.3 Color by Transmission (page 558)**

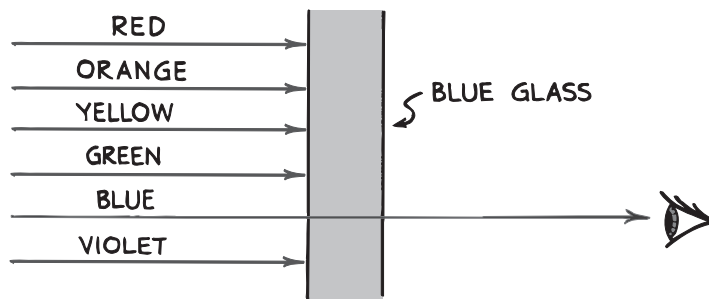
16. What determines the color of a transparent object?

\_\_\_\_\_

17. The illustration below shows what happens when sunlight shines on a piece of blue glass. Describe what happens to the sunlight as it passes through the glass.

\_\_\_\_\_

\_\_\_\_\_



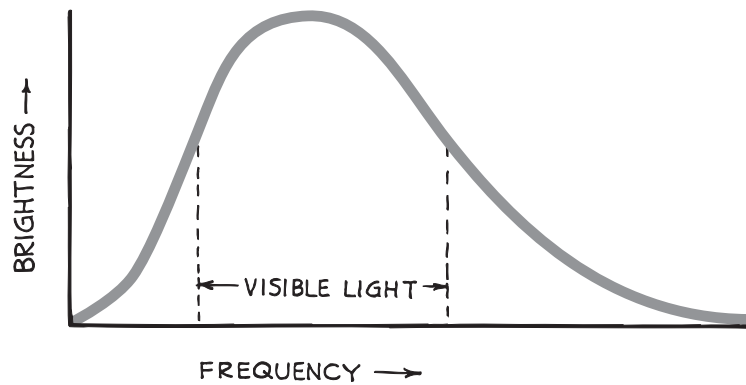
18. A \_\_\_\_\_ is a material in glass that selectively absorbs colored light.
19. Circle the letter that explains what the energy from the light absorbed by a piece of glass does to the glass.
- The energy hardens the glass.
  - The energy warms the glass.
  - The energy darkens the glass.
  - The energy has no effect on the glass.

**28.4 Sunlight (page 559)**

20. Is the following sentence true or false? Human vision is most sensitive to colors in the red-orange part of the visible spectrum. \_\_\_\_\_
21. The graphical distribution of brightness versus frequency in sunlight is called the \_\_\_\_\_.

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Use the graph of brightness versus frequency of sunlight to answer Questions 22 and 23.



22. Is the following sentence true or false? The brightness of sunlight is directly proportional to frequency. \_\_\_\_\_
23. What is the brightest portion of the spectrum of sunlight?
- \_\_\_\_\_

### 28.5 Mixing Colored Light (pages 560–561)

24. What color of light is produced when red, blue, and green light of equal brightness overlap? \_\_\_\_\_.

Match the name of each color of light to the mixture of colors that produces it.

Color of Light	Mixtures That Produce the Color
_____ 25. magenta	a. mixture of green and blue
_____ 26. yellow	b. mixture of red and blue
_____ 27. cyan	c. mixture of red and green

28. Is the following sentence true or false? By mixing red, blue, and green light and adjusting the brightness of each, virtually any color can be formed. \_\_\_\_\_
29. Red, blue, and green light are known as the \_\_\_\_\_ colors.
30. Explain how a color television produces a wide range of colors on its screen.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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**28.6 Complementary Colors (pages 562–563)**

31. Two colors of light that when added together produce white are known as \_\_\_\_\_.

*Match each color in the left column with its complementary color in the right column.*

Color	Complementary Color
_____ 32. magenta	a. red
_____ 33. yellow	b. green
_____ 34. cyan	c. blue

35. Circle the letter that best describes the light that results when a color is subtracted from white light.

- a. black
- b. magenta
- c. muddy brown
- d. the complementary color to the subtracted color

**28.7 Mixing Colored Pigments (pages 564–565)**

36. Is the following sentence true or false? The mixing of colored paints yields similar results as mixing the same colors of light. \_\_\_\_\_

37. Explain what happens when paints or dyes are mixed.

\_\_\_\_\_

\_\_\_\_\_

38. What color(s) are absorbed by blue paint?

\_\_\_\_\_

39. What color(s) are absorbed by yellow paint?

\_\_\_\_\_

40. If white light shines on a mixture of blue and yellow paint, what color is not absorbed? \_\_\_\_\_

41. The mixing of pigments, paints, or dyes is known as color mixing by \_\_\_\_\_.

42. Magenta, yellow, and cyan are the \_\_\_\_\_ colors used in printing illustrations in full color.

43. Describe the process used to print a color image in a book.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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**28.8 Why the Sky Is Blue (pages 566–567)**

44. Circle the letter of the process in which sound or light is absorbed and reemitted in all directions.
- a. reflection                                  b. resonance  
c. scattering                                  d. stimulated emission
45. Is the following sentence true or false? Atoms and molecules can behave like optical tuning forks, reemitting light waves that shine on them.  
\_\_\_\_\_
46. Describe the relationship between the size of a particle in the atmosphere and the frequency of the light it scatters.  
\_\_\_\_\_  
\_\_\_\_\_
47. Is the following sentence true or false? The sky appears blue because particles in the atmosphere scatter low-frequency light. \_\_\_\_\_
48. Although violet light is scattered more than blue light, our eyes see the sky as blue. Explain.  
\_\_\_\_\_  
\_\_\_\_\_
49. Circle the letter that describes what occurs when many particles larger than oxygen and nitrogen molecules are in the atmosphere.
- a. The sky appears darker blue.  
b. The sky appears black.  
c. The sky appears whitish.  
d. The sky appears green.
50. Is the following sentence true or false? The presence of water droplets in the atmosphere does not affect how much light is scattered or what frequencies of light are scattered. \_\_\_\_\_
51. Explain why many clouds appear white.  
\_\_\_\_\_  
\_\_\_\_\_
52. A cloud containing many large water droplets appears \_\_\_\_\_.

**28.9 Why Sunsets Are Red (pages 568–569)**

53. Circle the letter of the color of light that is scattered the least as it passes through the atmosphere.
- a. red    b. orange  
c. yellow    d. blue
54. Is the following sentence true or false? At sunset, light reaches Earth's surface through a shorter path than at noon. \_\_\_\_\_
55. As the path of sunlight through the atmosphere increases, what color of light is scattered more? \_\_\_\_\_