KEY IDEAS

Section 1   Characteristics of Light

- Light is electromagnetic radiation that consists of oscillating electric and magnetic fields with different wavelengths.
- The frequency times the wavelength of electromagnetic radiation is equal to *c*, the speed of light.
- The brightness of light is inversely proportional to the square of the distance from the light source.

Section 2   Flat Mirrors

- Light obeys the law of reflection, which states that the incident and reflected angles of light are equal.
- Flat mirrors form virtual images that are the same distance from the mirror's surface as the object is.

Section 3   Curved Mirrors

- The mirror equation relates object distance, image distance, and focal length of a spherical mirror.
- The magnification equation relates image height or distance to object height or distance, respectively.

Section 4   Color and Polarization

- Light of different colors can be produced by adding light consisting of the primary additive colors (red, green, and blue).
- Pigments can be produced by combining subtractive colors (magenta, yellow, and cyan).
- Light can be linearly polarized by transmission, reflection, or scattering.

Variable Symbols

Quantities		Units	
p	object distance	m	meters
q	image distance	m	meters
R	radius of curvature	m	meters
f	focal length	m	meters
M	magnification		(unitless)

KEY TERMS

electromagnetic wave (p. 446)

reflection (p. 451)

angle of incidence (p. 452)

angle of reflection (p. 452)

virtual image (p. 453)

concave spherical mirror (p. 455)

real image (p. 456)

convex spherical mirror (p. 463)

linear polarization (p. 472)

PROBLEM SOLVING

See **Appendix D: Equations** for a summary of the equations introduced in this chapter. If you need more problem-solving practice, see **Appendix I: Additional Problems**.
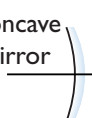
Diagram Symbols

Light rays (real)

Light rays (apparent)

Normal lines

Flat mirror

Concave mirror   Convex mirror