

Sound (pages 298 to 300)

3. A singer's vocal cords vibrate 1320 times in 4 seconds as he sings a note. What is the frequency in hertz of the note?

$$f = \frac{\text{Number of cycles}}{\text{Total time}}$$

$$f = \frac{1320 \text{ cycles}}{4 \text{ seconds}}$$

$$f = 330 \text{ cycles/sec or Hz}$$

4. What is the threshold of audibility and what is its value in decibels? *The threshold of audibility is the lowest sound intensity that the human ear can perceive. It is 0 dB.*

The Electromagnetic Spectrum (pages 300 to 303)

5. Connect the types of electromagnetic waves in the list below with descriptions a) to g). The same answer can be used more than once.

Radio waves

Microwaves

Infrared rays

Visible light

Ultraviolet rays

X-rays

Gamma rays

- a) The electromagnetic waves that carry the greatest quantity of energy and are most dangerous to humans as a result *Gamma rays*
- b) The electromagnetic waves with the shortest wavelengths *Gamma rays*
- c) The electromagnetic waves with the lowest frequencies *Radio waves*
- d) The electromagnetic waves with wavelengths that correspond to particular colours *Visible light*
- e) The electromagnetic waves that are used in radiography *X-rays*

f) The electromagnetic waves emitted by objects that are hotter than their surroundings *Infrared rays*

g) The electromagnetic waves that make skin tan *Ultraviolet rays*

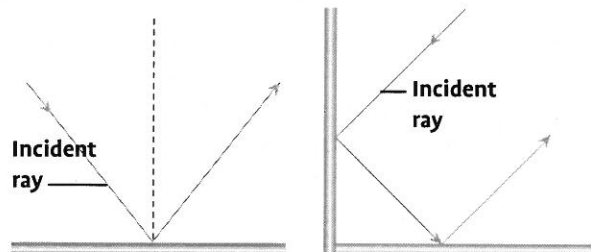
The Deviation of Light Waves (pages 303 to 310)

6. What are the following phenomena called?
- a) Phenomenon in which light rays bounce off an obstacle *Reflection*
- b) Phenomenon in which rays deviate when they pass through one translucent material into another that does not have the same density *Refraction*

7. What are the two laws of reflection?

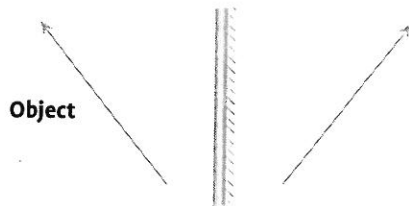
1. *The incident ray, the normal ray and the reflected ray are all on the same plane.*
2. *The angle of reflection is always equal to the angle of incidence.*

8. Trace the two following diagrams in your notebook. Draw the trajectory of the light rays.

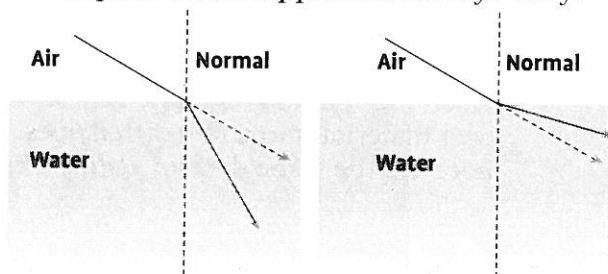


9. Describe the characteristics of the virtual image produced by a plane mirror (the size, distance from the mirror and left-right orientation of the image). *The virtual image created in a plane mirror is the same size, has the same shape and appears to be the same distance behind the mirror as the real object in front of it. However, the left-right orientation is inverted in relation to the original object.*

10. Trace the following diagram in your notebook and draw the reflected image of the object as it appears in the plane mirror.



11. Which of the following two diagrams depicts what happens in reality? Why?



The diagram on the left depicts what happens in reality because when light passes from a less dense material to a more dense material, it always deviates toward the normal.

12. a) What happens to a light ray's angle of refraction when the angle of incidence is increased? *The angle of refraction increases as well.*
 b) What can happen when the angle of incidence of a light ray hitting a reflective surface is increased? *Beyond a certain angle of incidence, the light rays are reflected instead of refracted.*

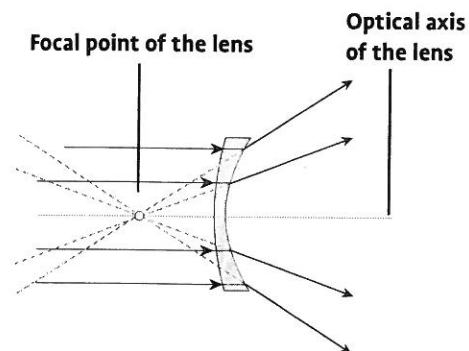
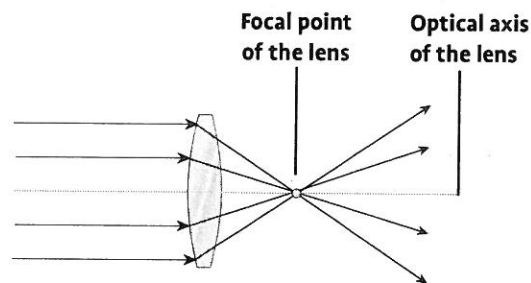
Lenses (pages 310 to 312)

13. What is a lens? *A lens is a curved object made from translucent material, such as glass or plastic, that causes the light rays that pass through it to deviate from its trajectory.*
14. a) What is the name of the lens that makes the light rays that pass through it move apart?
Divergent lens

- b) What is the characteristic shape of this type of lens? *It has at least one concave side.*

15. a) What is the name of the lens that makes the light rays that pass through it move closer together?
Convergent lens
 b) What is the characteristic shape of this type of lens? *It has at least one convex side.*

16. Trace the two lenses below and draw the deviated light rays in each of them.



17. a) What happens to the location of the focal point and the deviated light waves when a convex lens is made increasingly more convex? *The focal point is closer to the lens and the rays converge closer.*
 b) What happens to the location of the focal point and the deviated light waves when the curve of a divergent lens is reduced? *The focal point is farther from the lens and the rays diverge farther.*