

3.1 Assessment

Match each term on the left with the best descriptor on the right. Each descriptor may be used only once.

Term	Descriptor
1. ___ X-rays	A. used to send radio broadcasts
2. ___ microwaves	B. used in night vision cameras
3. ___ gamma rays	C. used to send text messages
4. ___ radio waves	D. used to kill cancer cells
5. ___ infrared radiation	E. used by the dentist to take pictures of your teeth

Circle the letter of the best answer for questions 6 to 12.

6. Which of the following types of radiation is responsible for causing skin cancer?
- A. visible light C. ultraviolet radiation
 B. infrared radiation D. gamma rays
7. Which of the following is a benefit of ultraviolet radiation?
- A. improves eyesight
 B. helps make vitamin D
 C. helps make vitamin E
 D. reduces effects of aging
8. Which of the following types of electromagnetic radiation can be given off by objects in outer space?
- | | |
|-----|-------------|
| I | X-rays |
| II | microwaves |
| III | radio waves |
- A. I and II only
 B. I and III only
 C. II and III only
 D. I, II, and III

9. Which of the following types of electromagnetic radiation could help an investigator determine whether a painting is fake?

I	X-rays
II	infrared radiation
III	ultraviolet radiation

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II, and III
10. Which two kinds of electromagnetic radiation are given off by a campfire?
- A. visible light and microwaves
- B. visible light and infrared radiation
- C. infrared radiation and microwaves
- D. ultraviolet radiation and infrared radiation
11. Which two types of electromagnetic radiation do satellites use to monitor weather conditions?
- A. X-rays and gamma rays
- B. visible light and infrared radiation
- C. ultraviolet radiation and visible light
- D. radio waves and ultraviolet radiation
12. Which of the following generates X-rays?
- A. a cell phone
- B. an X-ray tube
- C. a halogen bulb
- D. all of the above

3.2 Assessment

Match each term on the left with the best descriptor on the right. Each descriptor may be used only once.

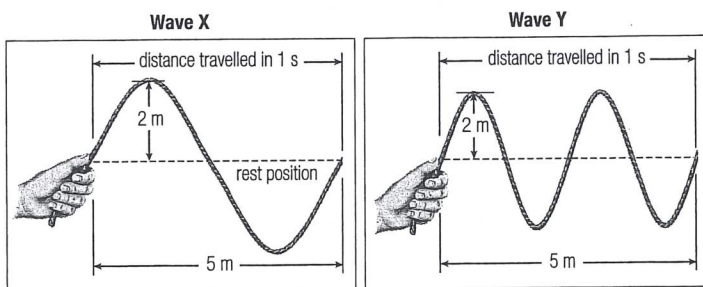
Term	Descriptor
1. ___ crest	A. a particle of light or other type of electromagnetic radiation
2. ___ trough	B. the lowest point of a wave
3. ___ photon	C. the highest point of a wave
4. ___ amplitude	D. distance from trough to trough
5. ___ frequency	E. height of crest from the centre line of the wave
6. ___ wavelength	F. number of complete wavelengths that pass a point in one second

Circle the letter of the best answer for questions 7 to 17.

7. Which statement(s) about electromagnetic radiation is (are) true?
- A. All types of electromagnetic radiation can travel through empty space.
 - B. All types of electromagnetic radiation are invisible as they travel through empty space.
 - C. All types of electromagnetic radiation travel at the same speed through empty space.
 - D. all of the above
8. Why is visible light used to model all types of electromagnetic radiation?
- A. It is fairly easy and safe to study.
 - B. It becomes visible when it interacts with matter.
 - C. It has many properties in common with other types of electromagnetic radiation.
 - D. all of the above
9. The ray model of light depends on the fact that
- A. light is made up of photons according to the particle model of light.
 - B. light is made up of waves according to the wave model of light.
 - C. light follows a straight-line path as it travels from a source.
 - D. light gets dimmer as it moves farther from a source.

10. A ray diagram
- is a diagram that involves light rays.
 - can be used to predict the location, size, and shape of shadows.
 - pictures a light ray as a straight line with an arrow on one end.
 - all of the above
11. Which of the following is a way to measure a wavelength?
- the distance from crest to crest
 - the distance from trough to centre line
 - the distance from the top of a crest to the bottom of a trough
 - the distance covered by one wave in 1 s

Use the following diagrams to answer questions 12 and 13.



12. Wave X has a longer wavelength than Wave Y.
- The statement is supported by the diagrams.
 - The statement is not supported by the diagrams.
 - You cannot tell by looking at the diagrams.
13. Which statement is correct?
- Both Wave X and Wave Y have the same amplitude.
 - Both Wave X and Wave Y have the same wavelength.
 - Both Wave X and Wave Y have the same frequency and wavelength.
 - Neither amplitude nor wavelength is the same for both Wave X and Wave Y.
14. Which colour of visible light has the shortest wavelength?
- red
 - violet
 - yellow
 - orange

3.3 Assessment

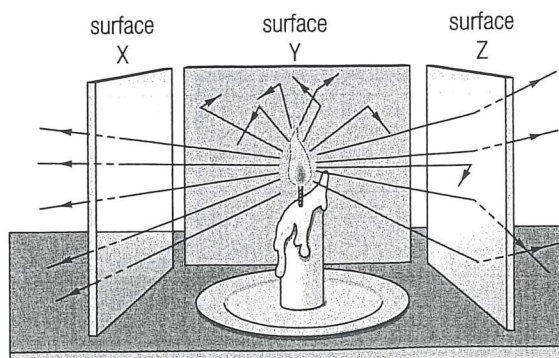
Match each term on the left with the best descriptor on the right. Each descriptor may be used only once.

Term	Descriptor
1. ___ reflection	A. This occurs as light passes through an object.
2. ___ refraction	B. The process in which light changes direction as it travels from one medium into another.
3. ___ scattering	C. This occurs when light bounces off a surface and travels in another direction.
4. ___ absorption	D. Responsible for dark surfaces getting hot on sunny days.
5. ___ transmission	E. Reason why objects seen through translucent materials are blurry.

Circle the letter of the best answer for questions 6 to 14.

6. Which of the following objects will transmit the most light?
- A. a clear glass window C. a piece of wood
B. a chunk of gold D. a white piece of paper
7. Which of the following objects will absorb the most light?
- A. sunglasses C. a white stone
B. a black hockey puck D. a clear plastic bag
8. Which of the following objects is the least opaque?
- A. a tent C. a plastic sandwich bag
B. a granite counter top D. a fabric shower curtain
9. A pencil in a glass half full of water appears broken at the water line due to which process?
- A. reflection C. absorption
B. refraction D. transmission

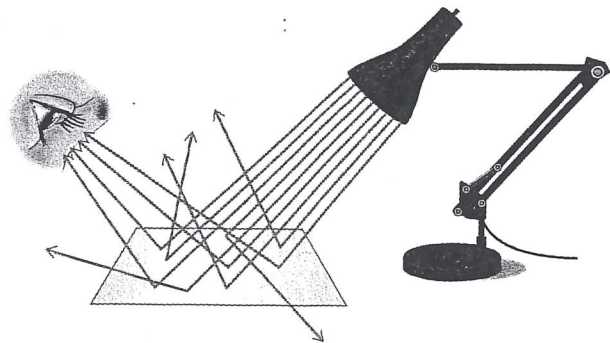
Use the following diagram to answer questions 10 to 13.



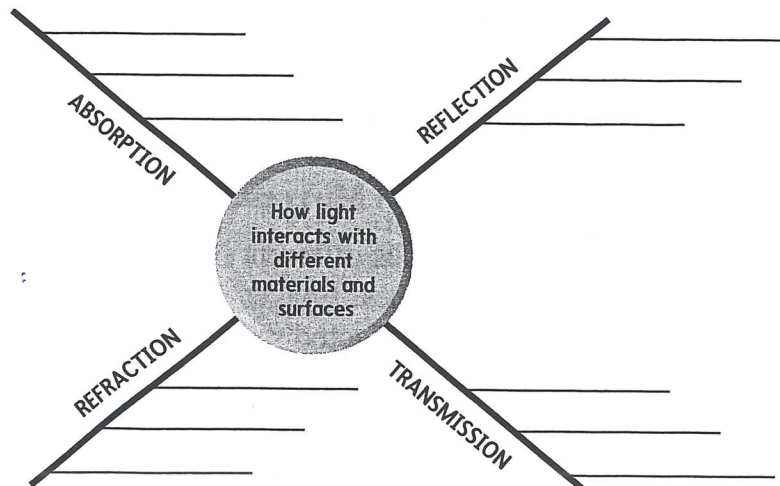
10. Which of the surfaces is transparent?
 - A. Surface X
 - B. Surface Y
 - C. Surface Z
 - D. Surface Y and Surface Z
11. Which of the surfaces transmits the fewest light rays?
 - A. Surface X
 - B. Surface Y
 - C. Surface Z
 - D. Surface X and Surface Z
12. Which of the surfaces is most likely made of frosted plastic or glass?
 - A. Surface X
 - B. Surface Y
 - C. Surface Z
 - D. Surface X and Surface Y
13. Which statement correctly describes Surface Y?
 - A. It transmits all light.
 - B. It scatters all light.
 - C. It absorbs all light.
 - D. It allows no light to pass through it.

14. Which of the following processes is shown in the diagram on the right?

- A. refraction
- B. reflection
- C. absorption
- D. transmission



15. Complete a spider chart/map for the different ways that light interacts with different materials and surfaces. The graphic organizer has been partially completed to help guide you.



3.4 Assessment

Match each term on the left with the best descriptor on the right. Each descriptor may be used only once.

Term	Descriptor
1. ____ normal	A. extremely smooth, flat reflective surface
2. ____ incident ray	B. light ray going toward a mirror
3. ____ reflected ray	C. light ray that bounces off a mirror
4. ____ focal point	D. angle between the incident ray and the normal
5. ____ plane mirror	E. angle between the reflected ray and the normal
6. ____ angle of reflection	F. line perpendicular to a surface, such as a mirror
7. ____ angle of incidence	G. point where light rays come together when they reflect off a concave mirror

Circle the letter of the best answer for questions 8 to 17.

8. Which of the following mirrors can be used to make an image that is the same size as the object?
- A. plane mirror
 - B. convex mirror
 - C. concave mirror
 - D. both concave and convex mirrors
9. What do all three types of mirrors have in common?
- A. They all produce upside-down images.
 - B. They all reflect light rays to form an image.
 - C. They all reflect light rays so that the rays diverge and do not meet.
 - D. They all reflect light rays so that the rays converge on a focal point.
10. What shape of mirror would you use if you wanted the image to be larger than the object?
- A. plane mirror
 - B. convex mirror
 - C. concave mirror
 - D. no mirror produces an image that is larger than the object

11. Which of the following statements about a plane mirror is incorrect?
- A. It produces an upright image.
 - B. It produces an image in front of the mirror.
 - C. It produces an image that is the same size as the object.
 - D. It produces an image that appears to be the same distance from the mirror as the object.

12. Which of the following lie on the same plane?

I	normal
II	incident ray
III	reflected ray

- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II, and III
13. If the angle of incidence of a light ray striking a smooth, flat mirror is 50° , what is the angle of reflection?
- A. 5°
 - B. 25°
 - C. 50°
 - D. 100°

14. Which of the following describes the difference between a virtual image and a real image?

	Virtual Image	Real Image
A.	Appears to be behind the mirror	Located in front of the mirror
B.	Located in front of the mirror	Appears to be behind the mirror
C.	Forms when reflected rays meet	Forms when extended rays meet
D.	Forms when incident rays meet	Forms when refracted rays meet

15. An object that is 10 cm high is placed 20 cm from a plane mirror. Which of the following describes the image formed in the plane mirror?
- A. The image is 20 cm high and 10 cm from the mirror. The image is upright.
 - B. The image is 10 cm high and 20 cm from the mirror. The image is upright.
 - C. The image is 20 cm high and 10 cm from the mirror. The image is upside-down.
 - D. The image is 10 cm high and 20 cm from the mirror. The image is upside-down.

16. Which of the following identifies the types of mirrors associated with the bowl (the inner surface) and the back of a spoon?

	Bowl of a Spoon	Back of a Spoon
A.	Plane mirror	Convex mirror
B.	Convex mirror	Concave mirror
C.	Concave mirror	Convex mirror
D.	Concave mirror	Plane mirror

17. Which of the following are characteristics of reflections in convex mirrors?

I	Image is upside down
II	Image is a virtual image
III	Image is smaller than the object

- A. I and II only
 B. I and III only
 C. II and III only
 D. I, II, and III

18. Complete the Venn diagram to compare and contrast a concave mirror, a convex mirror, and a plane mirror.

