EMS and Light (6.P.1.2)

Name: _____ **Date:** _____

1. Compared to the wavelength of red light, the wavelength of yellow light is

   A. shorter B. longer C. the same

2. Compared to a photon of red light, a photon of blue light has a

   A. greater energy B. longer wavelength

   C. smaller momentum D. lower frequency

3. What happens to the frequency and the speed of an electromagnetic wave as it passes from air into glass?

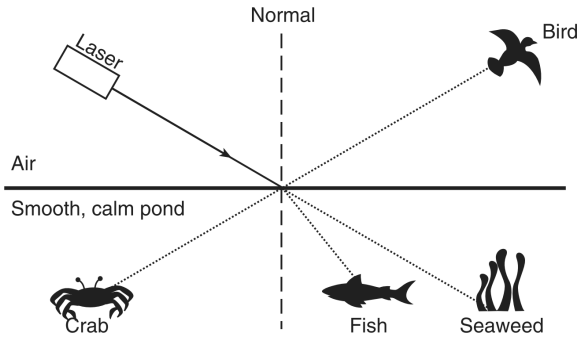
   A. The frequency decreases and the speed increases.

   B. The frequency increases and the speed decreases.

   C. The frequency remains the same and the speed increases.

   D. The frequency remains the same and the speed decreases.

4. A laser beam is directed at the surface of a smooth, calm pond as represented in the diagram below.



   Which organisms could be illuminated by the laser light?

   A. the bird and the fish B. the bird and the seaweed

   C. the crab and the seaweed D. the crab and the fish

5. Which pair of terms best describes light waves traveling from the Sun to Earth?

   A. electromagnetic and transverse

   B. electromagnetic and longitudinal

   C. mechanical and transverse

   D. mechanical and longitudinal

6. Which wave characteristic is the same for all types of electromagnetic radiation traveling in a vacuum?

   A. speed B. wavelength

   C. period D. frequency

7. What happens to the speed and frequency of a light ray when it passes from air into water?

   A. The speed decreases and the frequency increases.

   B. The speed decreases and the frequency remains the same.

   C. The speed increases and the frequency increases.

   D. The speed increases and the frequency remains the same.

8. When a light wave enters a new medium and is refracted, there must be a change in the light wave's

   A. color B. frequency C. period D. speed

9. A television remote control is used to direct pulses of electromagnetic radiation to a receiver on a television. This communication from the remote control to the television illustrates that electromagnetic radiation

   A. is a longitudinal wave

   B. possesses energy inversely proportional to its frequency

   C. diffracts and accelerates in air

   D. transfers energy without transferring mass

10. What is characteristic of both sound waves and electromagnetic waves?

A. They require a medium.

B. They transfer energy.

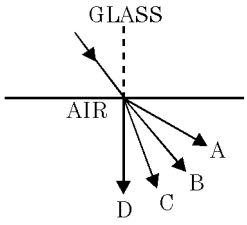
C. They are mechanical waves.

D. They are longitudinal waves.

11. A ray of light emerges from a glass block into air as shown in the diagram. Which path would the light ray take?

A. *A* B. *B*

C. *C* D. *D*



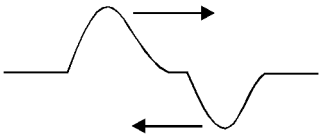
12. Two pulses are travelling along a string toward each other as represented in the diagram below. Which phenomenon will occur as the pulses meet?

A. reflection

B. polarization

C. interference

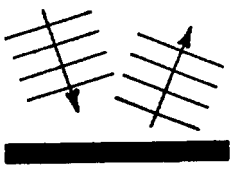
D. refraction



13. Which diagram best illustrates wave refraction?

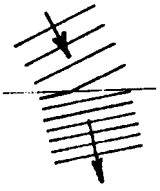
A.

B.



C.

D.



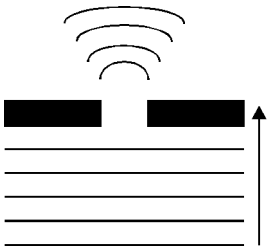
14. Which wave phenomenon is represented in the diagram here?

A. refraction

B. diffraction

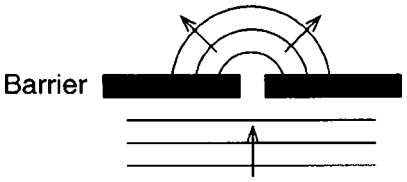
C. reflection

D. interference

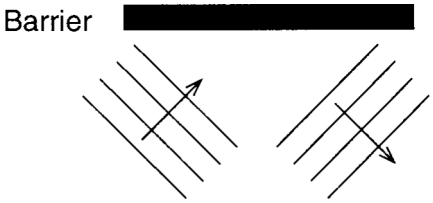


15. Which diagram best illustrates wave diffraction?

A.



B.



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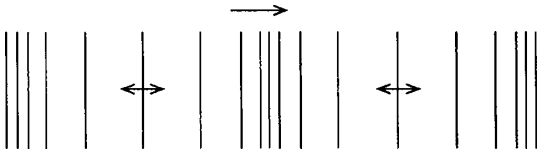

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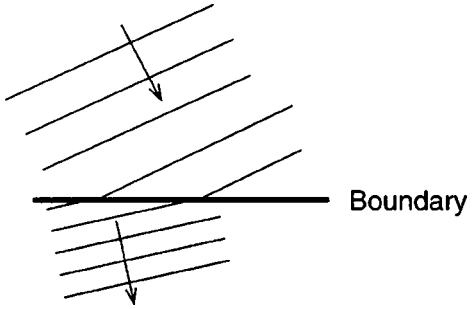
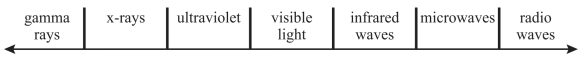


16. A diagram of the electromagnetic spectrum is shown below.

Electromagnetic Spectrum



Sunscreen is a lotion used to protect skin from exposure to the Sun. This sunscreen protects a person's skin from wavelengths that are

A. longer than radio waves but shorter than x-rays.

B. longer than x-rays but shorter than infrared waves.

C. longer than microwaves but shorter than infrared waves.

D. longer than visible light waves but shorter than radio waves.

17. The setting sun often appears red. What is the best explanation for this?

A. The surface temperature of the sun is lower at sunset than at other times of the day.

B. The Earth's atmosphere scatters blue light, so that at the Earth's surface mostly red light is visible at sunset.

C. The path of light through the Earth's atmosphere is shorter at sunset than at noon.

D. The surface of the Earth changes infrared radiation into red light.

18. Which of the following explains why an apple looks red?

A. The apple is reflecting red light and absorbing all other colors of light.

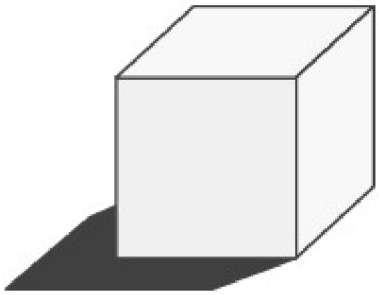
B. The apple is absorbing red light and reflecting all other colors of light.

C. The apple is absorbing all colors of light, but it absorbs the red light better.

D. The apple is reflecting all the light.

19. Which of these cubes reflects the *most* light?

A.



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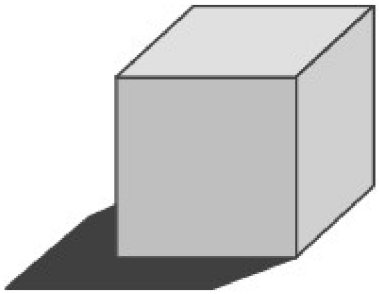

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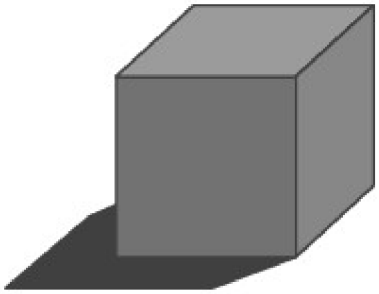

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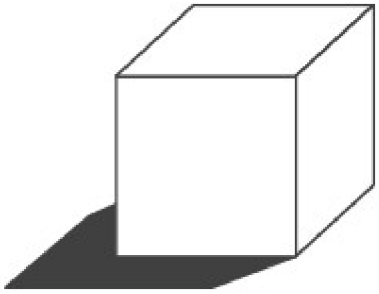
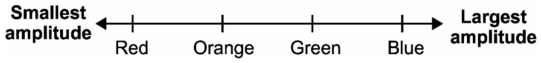
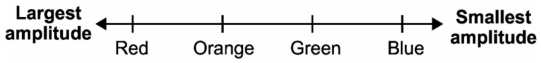
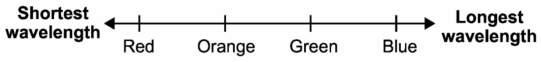
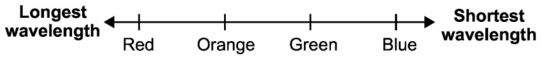


20. Which diagram correctly orders different colors of light according to the value of a property?

A. 

B. 

C. 

D. 

21. Denise was driving east over a hill in the afternoon, shortly after a rain shower. Suddenly the sun broke through the clouds, and she saw a rainbow ahead of her. Which of the following made the rainbow possible?

A. Sunlight can be separated into all the colors of the rainbow.

B. Water reflects sunlight like a mirror to make it look colored.

C. Overhead black clouds reflect in puddles to cause a mirage.

D. Air pollution causes the sky to look colored under these conditions.

22. What happens to green light and red light when they shine on a green leaf?

A. Both are absorbed.

B. Both are reflected.

C. Green light is absorbed, and red light is reflected.

D. Green light is reflected, and red light is absorbed.

23. A student places a sheet of black construction paper on her desk. What happens to *most* of the light that strikes the black construction paper?

A. The light is bent by the paper.

B. The light reflects off the paper.

C. The light is absorbed by the paper.

D. The light passes through the paper.

24. What property of electromagnetic waves makes it possible to use these waves to transmit information between a space shuttle and NASA mission control centers on the ground?

A. Electromagnetic waves are transverse waves.

B. Electromagnetic waves have very low velocity.

C. Electromagnetic waves are all visible to human eyes.

D. Electromagnetic waves can travel through a vacuum.

25. The chart below shows a portion of the electromagnetic spectrum.

Gamma	X-rays	Ultraviolet	Visible	Infrared	Microwave	Radio

A plastic filter is fitted over a light. The light emits white light, but the filter only lets the longest wavelengths of visible light pass through. Which color would a person looking at the filtered light see?

A. green B. red C. violet D. yellow