

Name _____

SOL 5.3 Light

Things you need to know (you'll find answers here also)

- The white light that we see is really a combination of several different wavelengths of light traveling together.
- These wavelengths are represented by the colors red, orange, yellow, green, blue, indigo, and violet.
Think- Roy G Biv
- In the visible spectrum, red has the longest wavelength, and violet has the shortest.

- 1) White light is actually a combination of several different _____ of light traveling together.
 - a. speeds
 - b. types
 - c. wavelengths
- 2) Which has the longest wavelength?
 - a. red
 - b. blue
 - c. violet
- 3) Which has the shortest wavelength?
 - a. blue
 - b. indigo
 - c. violet
- 4) All the colors in the visible spectrum put together will form:
 - a. refraction
 - b. luminous light
 - c. white light
 - d. black light
- 5) In the visible spectrum, number the wavelengths from longest to shortest (use Roy G. Biv)
___indigo ___red ___orange

___blue ___green ___violet ___yellow

More you need to know:

- Light travels in waves.
 - Compared to sound, light travels extremely fast. It takes light from the sun less than eight and a half minutes to travel 150 million kilometers to reach the Earth.
 - Unlike sound, light waves travel in straight paths called rays and do not need a medium through which to move. A medium is the matter or substance that light or sound move through, like air or water.
 - Light moves best through less dense substances (gases). The molecules get in the way. Sound is opposite. Sound needs molecules to vibrate.
- 6) Compared to sound, light travels:
 - a. slow
 - b. very fast
 - c. about the same
 - 7) How long does it take for sunlight to travel 150 million kilometers to Earth?
 - a. 1 hour
 - b. less than 8 ½ minutes
 - c. 2 days
 - 8) Light travels in straight paths called:
 - a. cubes
 - b. rays
 - c. wavelengths
 - 9) Does sound travel in rays?
 - a. yes
 - b. no
 - 10) Which needs a medium (substance) to travel through?
 - a. light
 - b. sound

- 11) Which can travel through empty outer space?
- light
 - sound

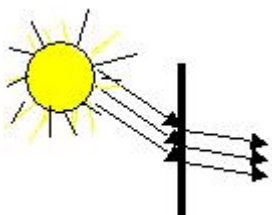
- 12) Why does sound need a medium (substance to travel through) when light can travel through empty space?
- Sound is vibration or the compression of molecules. Without a medium, there are no molecules.
 - Light travels in rays and can travel fastest when there is nothing to get in the way.
 - a & b are both correct

- 13) Which would light travel through fastest?
- outer space
 - air
 - water
 - a wall

- 14) Which would light travel through fastest?
- a vacuum (nothing exists)
 - a gas (like air – molecules spread apart)
 - a liquid (like water – molecules closer)
 - a solid (molecules tightly packed)

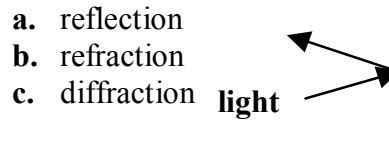
More you need to know

- Light travels in straight paths until it hits an object, then either bounces off (reflects); bends (refracts); passes through the object (is transmitted); or is absorbed as heat.



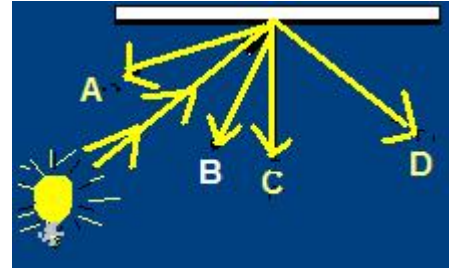
- 15) Label the picture:
- reflection
 - refraction
 - diffraction
 - absorption

- 16) Label the following picture:



- 17) The light from the bulb will reflect off the mirror in which direction?

- A
- B
- C
- D



- 18) Light rays bend when they ____.
- refract
 - vibrate
 - split
 - resonate

More you need to know:

- The terms transparent, translucent, and opaque indicate the amount of light that passes through an object.
- Opaque objects reflect or absorb light. They do not let light pass through.
- Translucent objects let some light pass through, but also reflect and absorb some of the light. You can see a fuzzy image through a translucent object.
- Transparent objects do not absorb or reflect light. They let light pass through. They transmit light.

- 19) The terms transparent, translucent and opaque indicate:
- the thickness of the object
 - the amount of light that passes through an object
 - the speed of the light ray

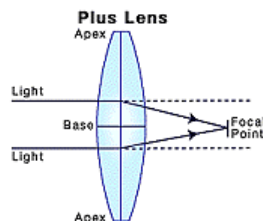
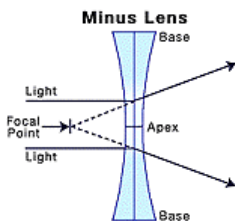
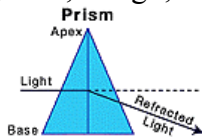
20) Which set of the following materials are:

translucent ___
transparent ___
opaque ___

- a. frosted glass, tissue paper, notebook paper
- b. window glass, clean water, air
- c. table top, brick wall, chalk board
- d. book, plastic wrap, tin foil

More things you need to know

- Inventors and scientists have used the properties of lenses and mirrors to create important optical tools. These tools, including the refracting telescope, the microscope, and the reflecting telescope, have led to important scientific discoveries.
- Lenses and mirrors are used in many optical tools to enlarge or clarify an image.
- A prism can be used to refract white light. When the different wavelengths of light in white light pass through a prism, they are bent at different angles. The colors of light we see are red, orange, yellow, green, blue, indigo, and violet.



- Convex lenses are used to make small things look larger. Magnifying glasses, telescopes and microscopes use convex lenses
- Glasses – nearsighted- use concave, farsighted, use convex
- Cameras – usually convex

- microscopes – at least 2 convex
- telescopes – at least 2 convex
- movie projector – concave

21) A concave lens will _____ light waves.

- a. absorb
- b. focus
- c. reduce
- d. spread

22) Which type of lens can cause a beam of light to focus or come together?

- a. convex lens
- b. concave lens.

23) Which lens is thinner in the middle?

- a. concave
- b. convex

24) Which lens is thicker in the middle?

- a. concave
- b. convex

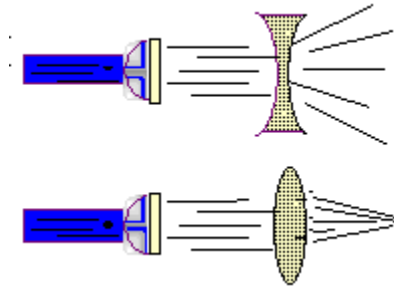
25) Label the following mirrors:

- a. convex
- b. plane
- c. concave
- d. closed



- a. convex
- b. plane
- c. concave
- d. closed

28. Circle the diagram that shows a beam of light focusing as it passes through a convex lens.



- 26) Until it strikes an object, light travels:
- in straight paths
 - with many curves and turns
- 27) When light hits an object it may:
- be reflected
 - be refracted
 - be transmitted
 - be absorbed as heat
 - all of the above
- 28) Light that bounces off an object is
- refracted
 - transmitted
 - reflected
 - amplified
- 29) What type of material will not transmit light?
- opaque
 - transparent
 - translucent
- 30) A clear glass window will _____ light.
- refract
 - transmit
 - reflect
 - scatter

- 31) What name allows us to remember the visible colors of the rainbow?
- Ron B. Liv
 - Zen T. Miv
 - Roy G. Biv

- 32) Reflection occurs when light bounces off an object.
- true
 - false

- 33) What kind of light is used frequently surgery?
- neon
 - laser
 - phosphorus

- 34) What is the distance from the crest of one wave to the crest of another?
- peak
 - wavelength

- 35) What is the top of the wave called?
- peak or crest
 - top
 - trough

- 36) The bottom?
- peak or crest
 - top
 - trough

- 37) What kind of radio wave might be used to detect the position of far away objects?
- microwaves
 - radar
 - airwave

- 38) What kind of surface reflects light?
- smooth
 - rough

- 39) A nearsighted person can not clearly see objects that are -
- close by
 - far away

- 40) What color in the visible spectrum follows red?
 m. violet
 n. yellow
 a. orange

**Choose from one of these words:
 opaque, visible, transparent,
 translucent-**

- 41) The _____ spectrum is light energy that can be seen and can be broken into the colors of light in the rainbow.
- 42) A(n) _____ object scatters light, allowing only some to pass through causing objects to look fuzzy.
- 43) You can see through a _____ object because it allows light to pass through.
- 44) Light can't pass through a(n) _____ object. You also can't see through such an object.
- 45) The color of an object is really the color of light it reflects.
 TRUE FALSE
- 46) Images formed by curved mirrors will look identical to images formed by flat mirrors.
 TRUE FALSE
- 47) Light bends when it travels from air into water.
 TRUE FALSE
- 48) When light changes speed, it also changes direction. The change in speed causes it to bend.
 TRUE FALSE
- 49) A _____ lens is thinner in the middle than at the edges and spreads the light passing through it.

- 50) A _____ lens is thicker in the middle than at the edges and focuses the light passing through it.

51) True or False
 When light or sound waves hit an object, they can be transmitted, reflected, or absorbed.

- 52) A vibrating object makes _____.
- 53) Sound waves travel _____ than light waves.
 a. faster
 b. slower
- 54) You see lightning before you hear the thunder because light travels to you faster than sound.
 TRUE FALSE
- 55) An echo is the reflection of sound waves. TRUE FALSE
- 56) Roy G. Biv is the name of the scientist who invented the prism.
 TRUE or FALSE
- 57) Roy G. Biv is a way of remembering the colors of the visible spectrum.
 TRUE FALSE

- 58) Label the parts of the wave below:
 peak (or crest) _____
 trough _____
 wavelength _____

