

Light Quiz

1. Like all light, the light that travels from the Sun to Earth is a kind of (force/energy/heat/electricity). Light from a point source illuminates increasingly distant objects more (directly/indirectly/strongly/weakly) in accordance with the inverse-square law. Properties such as (speed/interference/refraction/propagation) show that light interacts with matter.

2. If a prism can disperse light that is visible to humans, then it is reasonable to propose that prisms disperse _____.

- types of radiation other than light
- only visible light, not invisible light
- all light, visible or not
- some visible and some invisible light

3. Arrange the items below to outline a report on the evolving understanding of light. Drag each term or phrase into its correct position at left to organize the items in the proper sequence.

Mechanical Concepts

Electromagnetic Theory

Quantum Theory

Particles and Waves

4. Which note card best summarizes the important points in the article?

- a.
 - Radiant energy consists of waves that have wavelength and frequency.
 - Wavelength is the distance from one wave crest to the next.
 - Frequency is the rate at which waves pass through a given point.
- b.
 - Radiant energy, or electromagnetic waves, can travel through empty space.
 - Different kinds of electromagnetic radiation have different wavelengths.
 - Visible light covers a narrow portion of the

- c.
 - The most familiar kind of electromagnetic radiation consists of visible light.
 - Ultraviolet radiation causes sunburn and fades the color of paints and fabrics.
 - The ability of microwaves to heat certain materials led to microwave cooking.

Which is right? Note Card 1

Note Card 2

Note Card 3

5. The speed of light—about 186,000 miles (300,000 kilometers) per second—applies only to light that passes through _____.

- the air
- diamond
- a vacuum
- glass

6. The most general characteristic of luminescent light sources is that they often emit light _____.

- in high-tech devices
- during chemical reactions
- at low temperatures
- over narrow color ranges

7. In vision, light stimulates the cells that make up the eye's _____.

- sclera
- choroid coat
- retina
- optic nerve

8. Which statement best summarizes the main ideas in the article?

- Geometrical optics considers rays, or beams, of light, and physical optics deals with the wave nature of light.
- Diffraction occurs when light encounters obstacles, and interference occurs when waves meet.
- Optical instruments such as lenses and mirrors exploit the reflection and refraction of light.
- When materials absorb light, its energy changes into other forms. These include heat, chemical energy, and electricity.

9. A color wheel using the principle of _____ would show how spotlights of primary colors could be used to bathe a performer in light of any color.

- subtraction
- addition
- division
- multiplication

10. Fiber-optic communications has several advantages over conventional electrical communications, but these do NOT include

- higher bandwidth
- less interference
- faster signal speed
- extended range

11. Which source would help a student prepare a report on the basics of lasers?

- a book titled *The Rocker's Guide to the Most Awesomely Destructive Laser Shows*
- a summary of laser-surgery techniques presented on a government Web site
- an article titled "Fifty Years of Lasers" published in a popular science magazine
- a directory of diode lasers published by a distributor of electronics components

12. Which note card best summarizes the important points in the article?

- a. A spectroscope is a device that separates light into its component wavelengths. It may be used to study which wavelengths of light are absorbed or emitted by different substances. It can even produce a spectral "fingerprint" for a particular substance. Applications range from medicine to astrophysics.
- b. The wavelengths of light absorbed or emitted by substances correspond to various phenomena at the atomic and molecular levels. For example, some wavelengths correspond to the stretching and bending of chemical bonds, and some correspond to molecular rotations.
- c. It is not necessary to understand all the theory behind spectroscopy to use a spectroscope. These devices have many common applications. For example, they may be used to detect the presence of a particular contaminant in a water sample. Or they may be used to determine the contaminant's concentration.

- Which is right?**
- Note Card 1
 - Note Card 2
 - Note Card 3

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