



1) The electromagnetic spectrum of light is often arranged in terms of frequency. Which one of the following has the highest frequency (*circle one*)?

- Visible light
- Microwaves
- Infrared light
- Gamma Rays
- Radio waves
- X-rays
- Ultraviolet light

2) The electromagnetic spectrum of light can also be arranged in terms of wavelengths. Which one of the following has the longest wavelength (*circle one*)?

- Visible light
- X-rays
- Ultraviolet light
- Infrared light
- Gamma rays
- Microwaves
- Radio waves

3) Which of the following types of light travels at the fastest speed (*circle your answer(s)*)? Explain your answer:

- Ultraviolet light
- X-rays
- Gamma Rays
- Visible light
- Microwaves
- Radio waves
- Infrared light

## Electromagnetic (EM) Spectrum of Light

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- 4) Another property of light is the energy. Which of the following has the greatest energy (*circle one*)?

Ultraviolet  
light

X-rays

Gamma  
Rays

Visible  
light

Microwaves

Radio  
waves

Infrared  
light

- 5) Consider the following discussion between two students about the different properties of light.

**Student 1:** *I think I get how light works. If you look at the chart of the electromagnetic spectrum, it shows that light with a higher frequency will also have a long wavelength. But it all has the same speed.*

**Student 2:** *I disagree. If one type of light has as a lot of energy and a high frequency, it will have a faster speed than light that has a lower energy and low frequency.*

Do you agree or disagree with either or both of the students? Explain your reasoning.

- 6) Complete the following sentence describing the relationship between the energy, wavelength, and frequency of light, using the words *highest*, *lowest*, *longest*, and/or *shortest*.

*The portion of the electromagnetic spectrum of light with the **greatest** energy has the \_\_\_\_\_ frequency and the \_\_\_\_\_ wavelengths.*

- 7) The visible light portion of the electromagnetic spectrum of light is often subdivided into the colors of red, orange, yellow, green, blue, indigo, and violet (*sometimes referred to as ROY G BIV*). Using the words *greatest*, *least*, *highest*, *lowest*, *fastest*, *slowest*, *longest*, and *shortest*, write a sentence or two that describes how light at the red end of the visible portion of the spectrum and light at the violet end of the visible light portion of the spectrum compare in terms of their energy, frequency, speed, and wavelength.

- 8) For each statement (a–d) provided below, circle the word choice that correctly describes how the two forms of light compare.
- a) Infrared light has greater / lower energy than ultraviolet light.
  - b) X-ray photons have longer / shorter wavelengths than gamma ray photons.
  - c) Visible electromagnetic radiation has a higher / lower frequency than radio wave electromagnetic radiation.
  - d) Infrared light has a faster / slower / same speed than microwave light.
- 9) Of all the types of light the Sun gives off, it emits the greatest amount of light at visible light wavelengths. If the Sun were to cool off dramatically and as a result start giving off mainly light at wavelengths longer than visible light, how would the frequency, energy, and speed of this light given off by the Sun also be different? Explain your reasoning.