

# Electromagnetic Spectrum Worksheet Answer Key PDF

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## Part 1: Building a Foundation

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**Which of the following correctly describes the electromagnetic spectrum?**

undefined. A) A range of visible light colors

**undefined. B) A range of all types of electromagnetic radiation ✓**

undefined. C) A range of sound frequencies

undefined. D) A range of mechanical waves

The electromagnetic spectrum includes all types of electromagnetic radiation.

**Which of the following are types of electromagnetic waves? (Select all that apply)**

**undefined. A) Radio Waves ✓**

undefined. B) Sound Waves

**undefined. C) X-Rays ✓**

undefined. D) Water Waves

Radio waves and X-rays are types of electromagnetic waves.

**Describe the relationship between wavelength and frequency in electromagnetic waves.**

**Wavelength and frequency are inversely related; as one increases, the other decreases.**

**What is the speed of light in a vacuum? Provide your answer in km/s and m/s.**

1. Speed in km/s

**299,792**

2. Speed in m/s

**299,792,458**

The speed of light in a vacuum is approximately 299,792 km/s and 299,792,458 m/s.

## Part 2: Comprehension and Application

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**What happens to the energy of electromagnetic waves as the wavelength decreases?**

undefined. A) Energy decreases

undefined. B) Energy remains constant

**undefined. C) Energy increases ✓**

undefined. D) Energy is not affected by wavelength

As the wavelength decreases, the energy of electromagnetic waves increases.

**Which colors are part of the visible spectrum? (Select all that apply)**

**undefined. A) Red ✓**

undefined. B) Ultraviolet

**undefined. C) Green ✓**

undefined. D) Infrared

Red and green are part of the visible spectrum.

**Explain how infrared radiation is used in everyday household items.**

**Infrared radiation is used in devices like remote controls and heat lamps.**

**Which type of electromagnetic wave is primarily used for broadcasting radio signals?**

undefined. A) Gamma Rays

undefined. B) X-Rays

**undefined. C) Radio Waves ✓**

undefined. D) Ultraviolet Rays

Radio waves are primarily used for broadcasting radio signals.

**Which electromagnetic waves are used in medical imaging? (Select all that apply)**

undefined. A) Microwaves

**undefined. B) X-Rays ✓**

**undefined. C) Gamma Rays ✓**

undefined. D) Radio Waves

X-rays and gamma rays are used in medical imaging.

**A doctor uses X-rays to examine a broken bone. Explain why X-rays are suitable for this purpose.**

**X-rays can penetrate soft tissue but are absorbed by denser materials like bone, making them suitable for imaging.**

### Part 3: Analysis, Evaluation, and Creation

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**If the frequency of a wave doubles, what happens to its wavelength?**

undefined. A) It doubles

**undefined. B) It halves ✓**

undefined. C) It remains the same

undefined. D) It quadruples

If the frequency doubles, the wavelength halves.

**Which safety measures are important when working with X-rays? (Select all that apply)**

**undefined. A) Wearing lead aprons ✓**

undefined. B) Using sunscreen

**undefined. C) Limiting exposure time ✓**

undefined. D) Wearing sunglasses

Wearing lead aprons, limiting exposure time, and following safety protocols are important.

**Compare and contrast the uses of microwaves and infrared radiation in technology.**

**Microwaves are used for cooking and communication, while infrared radiation is used for heating and remote controls.**

**Which of the following electromagnetic waves poses the greatest risk to human health with prolonged exposure?**

undefined. A) Radio Waves

undefined. B) Microwaves

undefined. C) Ultraviolet Rays

**undefined. D) Gamma Rays ✓**

Gamma rays pose the greatest risk to human health with prolonged exposure.

**Imagine you are designing a new type of sunglasses. Which features would you include to protect against UV radiation? (Select all that apply)**

**undefined. A) UV-blocking lenses ✓**

**undefined. B) Polarized lenses ✓**

undefined. C) Lead-lined frames

undefined. D) Adjustable nose pads

UV-blocking lenses and polarized lenses are important features for UV protection.

**Propose a new application for gamma rays in a field of your choice, explaining its potential benefits and challenges.**

**Gamma rays could be used in cancer treatment, but challenges include safety and precision.**