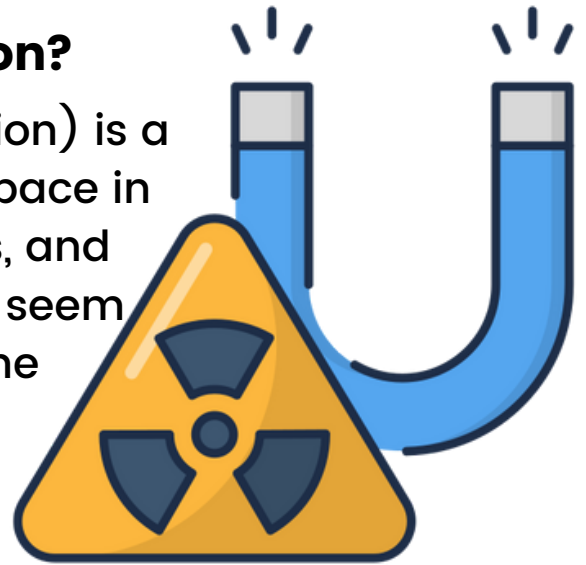


# Introduction to Electromagnetic Radiation

## What is Electromagnetic Radiation?

Electromagnetic radiation (EM radiation) is a form of energy that travels through space in waves. Examples include light, X-rays, and microwaves. Even though they might seem different, they are all types of the same phenomenon.

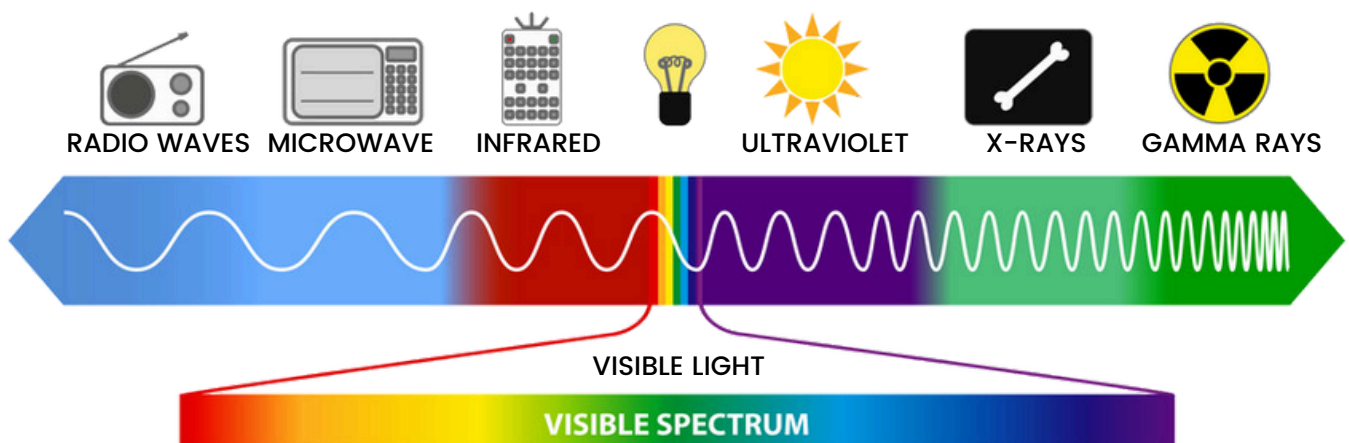


## Key Points:

- **Light** is a type of electromagnetic radiation.
- **Radiation** is the transfer of energy (e.g. sunlight transferring energy to Earth).
- **Visible light** is the portion of EM radiation that can be detected by our eyes.
- Radiation that lies beyond visible red is called **infrared**, and beyond violet is called **ultraviolet**.

## Electromagnetic Spectrum:

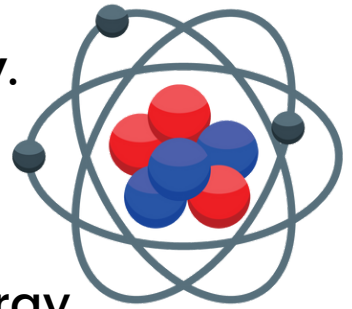
The electromagnetic spectrum consists of 7 types:



# EM Radiation Transfers Energy

## How Does Electromagnetic Radiation Transfer Energy?

- All types of EM radiation transfer **energy**.
- Example: The warmth from the sun is **infrared** radiation transferring heat energy.



### Key Concept: Photons

- EM radiation delivers energy in photons.
- A photon is a tiny packet or droplet of energy.
- When discussing energy transfer, it is useful to think of EM radiation as made of photons.

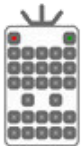


- EM radiation can also be viewed as waves (useful when thinking about reflection and diffraction).

# Energy Differences in EM Radiation

## Do All Photons Have the Same Energy?

- No. Photons carry different amounts of energy depending on the frequency of the radiation.
- The higher the frequency, the more energy each photon carries.
- The lower the frequency, the less energy each photon carries.



## Spectrum Summary (Increasing Frequency and Energy):

- Radio Waves → Microwaves → Infrared → Visible Light → Ultraviolet → X-Rays → Gamma Rays
- Radio Waves = Lowest frequency, least energy
- Gamma Rays = Highest frequency, most energy



# Summary and Analogy

## Quick Recap:

- EM radiation = transfer of energy as photons.
- Visible light is just one small part of the EM spectrum.
- Bees and other creatures can detect parts of the spectrum that humans cannot, like ultraviolet.



## Analogy:

- Think of the Royal Mail delivering packets. EM radiation is like a postman delivering energy in packets (photons) through space.

