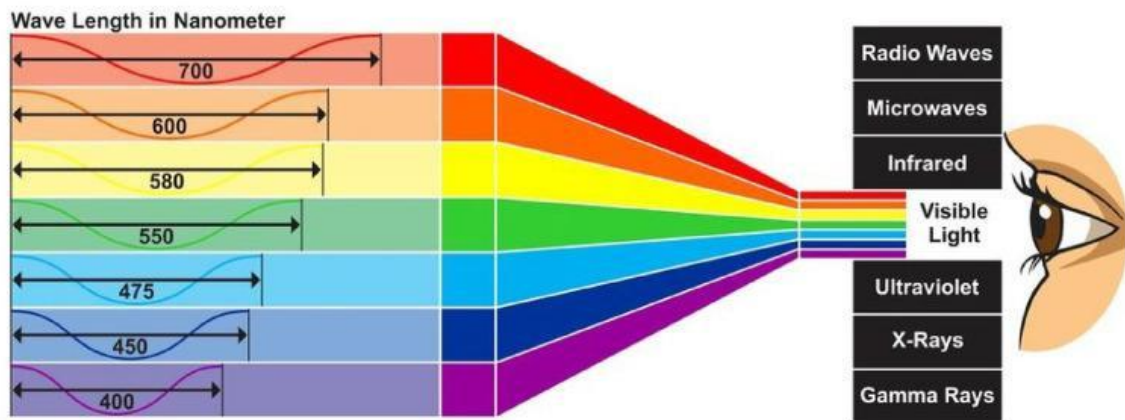


Learning Target: I can construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy.

Part 2: Visible Light and Energy

Chart: Colors of Visible Light



Activity: Using the chart, answer the following:

1. Which color of light has the shortest wavelength? _____
What does that say about the energy of this color? _____
2. Which color of light has the longest wavelength? _____
What does that say about the energy of this color? _____
3. Which color of light has the lowest energy? _____
What does that say about the wavelength of this color? _____
Which color of light has the highest energy? _____
What does that say about the wavelength of this color? _____
4. If a light wave has a wavelength of 500 nm, what color is it likely to be? _____
700 nm _____ 400 nm _____ 600 nm _____

Critical Thinking:

Why do objects appear a specific color under white light? _____

Learning Target: I can construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy.

Part 3: Applications of Electromagnetic Waves

Scenario-Based Questions:

1. **Medical Imaging:** X-rays are commonly used to look inside the human body. Explain how the energy of X-rays makes them suitable for this purpose. _____
2. **Communication:** Cell phones use microwaves to transmit signals. Why are microwaves chosen over higher types of waves? _____
3. **Infrared Technology:** Night vision goggles detect infrared waves. What property of infrared waves allows this technology to work? _____

Part 4: Experiment Simulation

Data Table: Energy and Wavelength

| Type of Wave | Wavelength (m) | Energy (J) |
|---------------|----------------|------------|
| Radio Waves | 10^3 | 10^{-12} |
| Microwaves | 10^{-2} | 10^{-8} |
| Infrared | 10^{-5} | 10^{-5} |
| Visible Light | 10^{-7} | 10^{-3} |
| Ultraviolet | 10^{-8} | 10^{-2} |
| X-rays | 10^{-10} | 10^2 |
| Gamma Rays | 10^{-12} | 10^4 |

Analysis Questions:

1. What is the trend between wavelength and energy as you move from radio waves to gamma rays? _____
2. Calculate the difference of energy between X-rays and radio waves using the data in the table. _____
3. Calculate the difference of energy between microwaves and visible light using the data in the table. _____
4. Calculate the difference of energy between infrared and ultraviolet using the data in the table. _____