Science Review — Light and Electromagnetic Radiation (EMR)

Answer Sheet

1. Energy Transfer Through Light and EMR

Q: What is electromagnetic radiation (EMR)?
A: EMR is energy that travels in waves through space.

Q: How does light transfer energy from one place to another?
A: Light transfers energy through electromagnetic waves.

Q: Does light need a medium (like air or water) to travel? Explain.
A: No. Light can travel through empty space.

Q: Give one example of energy being transferred by light in everyday life.
A: Example: sunlight warming your skin or the ground.

Q: Why is the Sun important as a source of energy on Earth?
A: The Sun provides most of the energy used by living things on Earth.

2. Models of Light (Ray, Wave, and Particle)

Q: What does the ray model of light show us?
A: The ray model shows light traveling in straight lines.

Q: When would you use the ray model to explain light?
A: To explain reflection, shadows, or how mirrors work.

Q: What does the wave model of light explain?
A: The wave model explains how light behaves as a wave.

Q: What are two properties of waves that apply to light?
A: Wavelength and frequency.

Q: What does the particle model of light suggest?
A: It suggests light behaves like tiny packets of energy called particles or photons.

Q: Why do scientists use different models to explain light instead of just one?
A: Different models explain different behaviours of light.

3. Properties and Behaviours of EMR

Q: What does EMR stand for?
A: Electromagnetic Radiation.

Q: List two types of electromagnetic radiation.
A: Examples: radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, gamma rays.

Q: What is wavelength?
A: The distance between two waves.

Q: What is frequency?
A: The number of waves passing a point each second.

Q: How are wavelength and frequency related?
A: As wavelength increases, frequency decreases.

Q: Which type of EMR has the shortest wavelength?
A: Gamma rays.

Q: Give one effect of EMR on living things.
A: Examples: sunburn, heating, or helping plants grow.

4. Interaction of Light with Materials

Q: What does it mean for a material to be transparent?
A: Light passes through clearly.

Q: What does it mean for a material to be translucent?
A: Some light passes through, but images are blurry.

Q: What does it mean for a material to be opaque?
A: Light cannot pass through.

Q: What happens to light when it is reflected?
A: It bounces off a surface.

Q: What happens to light when it is absorbed?
A: The material takes in the light energy.

Q: How does the way light interacts with materials affect what we see?
A: It affects visibility, colour, brightness, and whether objects can be seen clearly.

5. EMR in Everyday Life and Technology

Q: Give one example of EMR used in everyday technology.
A: Examples: radios, microwaves, cell phones, Wi-Fi, TVs.

Q: What type of EMR is used in microwaves?
A: Microwaves.

Q: What type of EMR do we see with our eyes?
A: Visible light.

Q: How is infrared radiation used in everyday life?
A: Examples: heaters, remote controls, thermal cameras.

Q: Give one example of how EMR can be harmful.
A: Examples: sunburn, skin damage, radiation exposure.

Q: Why is EMR important for communication technology?
A: It carries signals for phones, radio, television, and wireless communication.