**Chemistry Unit 1**

P3i

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| **Sub-atomic particle** | **Mass** | **Charge** |
| **Proton** |  |  |
| **Neutron** |  |  |
| **Electron** |  |  |

P3ii. Describe what an isotope is.

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**Physics P1:**

1. Comment on the validity of the results:

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1. Comment on the reliability of the results:

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Physics P3. Describe what the EM spectrum is.

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| **Name of part of electromagnetic spectrum** | **Wavelength** | **Frequency** | **Sources** |
| Radio waves |  |  |  |
| Microwaves |  |  |  |
| Infra red |  |  |  |
| Visible light |  |  |  |
| Ultraviolet |  |  |  |
| X rays |  |  |  |
| Gamma rays |  |  |  |

**Physics Unit 2 P4:**

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| **Type of radiation** | **What it is** | **How it can be detected** | **What it is stopped by** |
| **Alpha** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Beta** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Gamma** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Microwave** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Infra-red** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Radio wave** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

Biology Unit 3 P1:

How is cell function related to the proteins that different genes make?

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**Physics Unit 2 P4:**

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| **Type of radiation** | **What it is** | **How it can be detected** | **What it is stopped by** |
| **Alpha** | A particle identical to a helium nucleus. They are highly ionizing. | Geiger-Muller tube. | Skin or paper. |
| **Beta** | High energy, high speed electrons. A form of ionizing radiation. | Geiger-Muller tube. | Sheet of aluminium. |
| **Gamma** | High frequency, high energy, electromagnetic radiation. Gamma rays cannot be seen or felt, they pass through skin and soft tissue. | By observing the effects they have on matter. Gamma rays can cause electrons to leave atoms, which can be detected (by a detector such as a GM tube). | Thick lead. |
| **Microwave** | Form of electromagnetic radiation with fairly low frequency and low energy. Used in communications and cooking. | Radar dishes, mobile phones, satellite dishes. | Thin metal sheeting. |
| **Infra-red** | Form of electromagnetic radiation with a longer wavelength than visible light. Includes most thermal radiation emitted by objects. | Thermal infrared cameras, infra-red detectors on televisions, security motion detectors. | Tin foil, wood. |
| **Radio wave** | A form of electromagnetic radiation with the longest wavelengths. Used for communication, these electromagnetic waves have the least energy, and the lowest frequency. | Radio telescopes, mobile phone antennae, radio antennae. | Copper can be used, as it absorbs radio waves. Electromagnetic shielding works as well, surrounding a cable in a wire mesh that acts as an electromagnet. |

**Unit 2 Physics P5:**

**Electromagnetic Waves**

1. What type of wave are electromagnetic waves?

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4. Can electromagnetic waves travel through a vacuum?

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**Sound Waves**

1. What type of wave are sound waves?

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4. Can sound waves travel through a vacuum?

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P5 Help sheet:

**Electromagnetic Waves**

**1. What type of wave are electromagnetic waves?**

Electromagnetic waves are transverse waves.

**2. What speed do electromagnetic waves travel at?**

In a vacuum, electromagnetic waves travel at a speed of 300,000,000 m/s.

**3. When they travel, can electromagnetic waves be reflected and refracted?**

Electromagnetic waves can be reflected and refracted. For example, light reflects off a mirror, and is refracted when it travels between two media that differ in density.

**4. Can electromagnetic waves travel through a vacuum?**

Electromagnetic waves can travel through a vacuum.

**5. How can electromagnetic waves be used for communication?**

Electromagnetic waves can be used for communication with radios, television, and mobile phones.

**Sound Waves**

**1. What type of wave are sound waves?**

Sound waves are longitudinal waves.

**2. What speed do sound waves travel at?**

In air, sound waves travel at 240 m/s.

**3. When they travel, can sound waves be reflected and refracted?**

Sound waves can reflect off a solid surface (an echo) and they can refract as they travel between media of different densities.

**4. Can sound waves travel through a vacuum?**

Sound waves require particles to travel, so do not travel through a vacuum.

**5. How can sound waves be used for communication?**

Sound waves can be used for individuals to communicate between through air (speaking, shouting, tapping, musical instruments), water (sonar in submarines and ships), and solids.