

## YEAR 7 – MASTERY CURRICULUM

## YEAR 8 – MASTERY CURRICULUM

### P2.2 Magnetism

- Students will explore the fundamentals of magnetism as a non-contact force, including different magnetic materials and the rules of attraction and repulsion.
- They will learn about magnetic fields and their properties, gaining the ability to interpret and draw them.
- Students will understand the distinctions between permanent magnets and electromagnets, as well as how simple circuits can turn electromagnets on and off.

### P2.3 Electrical circuits: Resistance

- Students will review current, voltage, and resistance in series and parallel circuits.
- They will learn about the relationship between resistance and wire length, applying measurements to calculate resistance.
- Students will explore the behavior of resistance in series and parallel circuits, using models to explain these

## YEAR 9 – MASTERY CURRICULUM

### P2.4 Light

- Students will learn about light as an energy-transferring wave, its properties, and how it allows us to see objects.
- They will explore ray diagrams to understand the emission, reflection, and formation of shadows by light.
- Students will investigate reflection, including surface types and the law of reflection, as well as refraction, focusing on the process, ray diagrams, and the role of media density.

### P3.1 Acceleration

- Students will explore the effect of forces on object motion and learn about Newton's First and Third Laws.
- They will differentiate between scalar and vector quantities, including speed, velocity, distance, and displacement, and calculate resultant vectors.
- Students will study acceleration as the rate of velocity change, analyse motion using velocity-time graphs, and describe forces based on object motion.

### P3.2 Heating

- Students will learn about energy transfer methods (conduction, convection, and radiation) and the impact of heating on the internal energy of substances.
- They will explore specific heat capacity, calculating and interpreting its values for different materials.
- Students will study specific latent heat of fusion and vaporization, comparing it to specific heat capacity and analysing energy changes.

### P3.3 Sound Waves

- Students will learn about different types of waves, their properties, and the characteristics of sound waves.
- They will calculate wave velocity and investigate it through experiments, while also studying reflection and refraction.
- Students will explore practical applications of waves, including ultrasound and sonar, as well as the role of seismic waves in understanding the Earth's structure.

### P3.4 Home Electricity

- Students will learn about mains electricity, including current types, circuit wiring, plug design, cost calculation, and power and energy calculations for appliances.
- They will explore electricity generation, energy resources, the National Grid, and the role of transformers.
- Students will be introduced to static electricity within the context of the big idea "Electricity transfers Energy."

### P4.3 Electrical Circuits and Energy

- Students further their knowledge of electrical relationships such as current, voltage and resistance to include special types of resistors such as LDR and thermistors
- Students are introduced to the concept of induced potential and the need for transformers in the national grid

### B4.4 Radioactivity

- Students will learn that some atomic nuclei are unstable and undergo radioactive decay to become more stable.
- They will understand that the rate of decay is measured by activity, expressed in becquerels (Bq), and count-rate measures the number of decays recorded per second.
- Students will also learn about the types of nuclear radiation emitted, including alpha particles ( $\alpha$ ), beta particles ( $\beta$ ), gamma rays ( $\gamma$ ), and neutrons ( $n$ ), and their limited knowledge of their properties such as penetration, range, and ionizing power.
- Additionally, they will be able to apply their knowledge to evaluate the best sources of radiation for specific situations and understand the importance of publishing and sharing findings of radiation effects through peer review.

## YEAR 11 – INTERLEAVED CURRICULUM

### P5.1 Force Fields

- Students will learn about the poles of magnets, understanding that like poles repel and unlike poles attract as examples of non-contact forces.
- They will be introduced to permanent and induced magnets and how to distinguish between them
- Students will explore magnetic field patterns using compasses and relate compass behaviour to Earth's magnetic field
- They will also study Fleming's left-hand rule to understand the motor effect

**Revision of Physics** – PPE's used to identify priority areas.

## YEAR 10 – INTERLEAVED CURRICULUM

### P4.1 Movement

- Students begin to link their understanding of energy transfers and forces to explain how work is done on an object
- Students explore Newton's second law and how an object's momentum and other factors affect its stopping distance

### P4.2 Energy Conservation

- Students link their knowledge of the particle model to explain the properties of matter such as density and how difficult it is to raise their temperature
- Pupils learn about power as the rate of energy transfer and how different resources are used to generate electricity

### P1.3 Energy Transfers

- This unit introduces Students to the concept of energy under the big idea 'energy is conserved'.
- Students are introduced to the language of energy; the different energy stores and being able to refer to changes in terms of emptying and filling stores and transfers.
- Students will apply this language to a wide range of observations both in the classroom and their everyday experiences.

### P1.4 Electric Circuits: Current and Voltage

- Students will explore the fundamentals of electric circuits, drawing analogies to the flow of water in a heating system.
- They will understand the distinctions between series and parallel circuits, and the conditions required for current to flow in a circuit.
- Students will learn the definition of current as the rate of charge flow and utilize the equation  $I = Q/t$ .

### P2.1 Movement and Pressure

- Students will learn about speed as a measure of distance covered in a given time and how to calculate speed using distance and time values.
- They will explore changing speeds, including relative motion and acceleration as the rate of speed change.
- Students will understand how to draw and interpret distance-time graphs and calculate speed from them.

### P1.2 Space

- Students will learn about gravity as a non-contact force and its relationship with distance between objects.
- They will explore weight as the effect of gravity on an object's mass, including definitions, units, and the influence of gravitational field strengths.
- The unit covers celestial bodies in orbit, including satellites, the solar system arrangement, eclipses

### P1.1 Contact Forces

- Students will learn about contact and non-contact forces, including magnetism and gravity.
- They will study Newton's First and Third Laws of Motion, understanding balanced and unbalanced forces, and interaction pairs.
- Students will explore deformation of springs, resistive forces (drag and friction), and the impact of different surfaces and lubrication on friction.