Parkside School Curriculum Map 2025/6

Science

Year 11 - Biology	
Unit 1	**Unit 2**
B5 – Homeostasis **Purpose:** To understand homeostasis—the body's ability to maintain a stable internal environment—through the study of nervous and hormonal control systems. **Knowledge and Understanding** • Students define homeostasis and its importance, giving specific examples eg, temperature, blood glucose, pH). • They describe the common features of control systems (receptors, coordination centres, effectors). • They describe the structure and function of the nervous system, including the roles of sensory, relay, and motor neurones, and the function of the synapse. • **Bio ONLY:** They describe the parts of the brain (cerebral cortex, cerebellum, medulla) and functions. • **Bio ONLY:** They describe the structure and function of the eye (including accommodation, and defects like myopia/hyperopia and their correction). • They describe the endocrine system, locating key glands (eg, pituitary, pancreas, testis, ovary) • They describe the control of blood glucose by the pancreas (insulin/glucagon and diabetes) • **Bio ONLY:** They describe the control of water, ions, and urea by the kidneys (including urine production and treatment of kidney failure). • They describe hormonal control in reproduction (puberty, menstrual cycle hormones (FSH, oestrogen, LH & Progesterone). • **Bio ONLY:** They describe hormone-linked plant responses (phototropism, gravitropism, auxin).	**B6 – Inheritance, Variation & Evolution** **Purpose:** To explore how genetic information is stored and passed down, generating variation, and how these processes drive evolution and modern biotechnology. **Knowledge and Understanding** • Students describe sexual and asexual reproduction and the processes of meiosis and mitosis. • They describe the structure of DNA (including the double helix, genome, nucleotides) and its role in storing genetic information. • Core Genetics: Define key genetic terms (gamete, allele, genotype, phenotype, dominance) and describe the influence of variation and mutations on phenotype. • Evolution & Classification: Explain the theory of natural selection (Darwin/Wallace) and how new species form. Describe evidence for evolution (fossils, antibiotic resistance) and methods of classification (Linnaean, three-domain). • Biotechnology: Describe the processes of selective breeding, genetic engineering, and cloning. • **Bio ONLY** (DNA/Proteins): Describe the DNA structure (nucleotide units, complementary base pairing), the link between bases, amino acids, and protein synthesis (including folding). • **Bio ONLY:** Describe examples of organisms that reproduce sexually/asexually, and detail various cloning techniques (tissue culture, cuttings, embryo, adult cell).

Parkside School Curriculum Map 2025/6

Science

Skills Developed • **Practical:** Plan and carry out an investigation into the effect of a factor on human reaction time (RP7) • **HT ONLY:** Evaluate the risks and benefits of fertility treatments (IVF) • **Practical:** Investigate the effect of light or gravity on the growth of newly germinated seedlings (RP8)	**Skills Developed** • **Application:** Explaining sex determination and carrying out genetic crosses (using Punnett squares and family trees). Discussing social, economic, and ethical issues concerning embryo screening. • **HT ONLY:** Constructing Punnett squares to predict outcomes of monohybrid crosses. • **Analysis:** Interpreting evolutionary trees.

How will this be assessed?
All Units will be assessed using formative assessment in lessons along with midpoint and end of topic summative assessments.

HT: Higher Tier

Year 11 - Chemistry			
Unit 1	**Unit 2**	**Unit 3**	**Unit 4**
C7 – Organic Chemistry **Purpose:** To understand that the vast chemistry of carbon compounds forms a separate branch of chemistry, focusing on hydrocarbons, their derivatives, and the formation of polymers. **Knowledge and Understanding** • Students describe crude oil (basic composition and source) and recognise the general formula and first four members of the alkanes. • They describe the process of fractional distillation and state the names and	**C8 – Chemical Analysis** **Purpose:** To understand both qualitative chemical tests and the principles of instrumental methods used to identify substances and ensure purity. **Knowledge and Understanding** • Students define a pure substance (using melting/boiling point data) and a formulation. • They describe chromatography (stationary	**C9 – Chemistry in the Atmosphere** **Purpose:** To understand the Earth's dynamic atmosphere, its evolution, the impact of human activities on global climate change, and the problems caused by atmospheric pollutants. **Knowledge and Understanding** • Students describe the composition of the Earth's atmosphere today and how the early atmosphere was formed (volcanic activity, oceans, early life). • They explain how levels of carbon	**C10 – Using Resources** **Purpose:** To understand how industries use natural resources, focusing on the concept of sustainable development, methods for obtaining potable water, and the importance of recycling and material choice. **Knowledge and Understanding** • Students define finite and renewable resources and explain the principles of sustainable development. • They discuss the importance of potable water and describe methods of

uses of the resulting fuel fractions.
- They describe and explain trends in hydrocarbon properties: boiling point, viscosity, and flammability.
- They describe the process of cracking (thermal decomposition) and state that products include alkanes and alkenes.
- **Chem ONLY:** Students define alkenes (C=C functional group, unsaturated), state the names and structural formulae of the first four members, and describe their combustion and addition reactions
- **Chem ONLY:** They state the functional groups, names, and properties of the first four members of the alcohols and carboxylic acids.
- **Chem ONLY:** They describe how alkenes form addition polymers and identify monomers and polymers from diagrams.
- **Chem ONLY:** They describe DNA as a large polymer molecule and state examples of other naturally occurring polymers (eg, proteins, starch, cellulose).

Skills Developed
- **Application:** Writing balanced chemical equations for the complete combustion of hydrocarbons and for cracking.
- **Practical:** Describe the test for alkenes

and mobile phases) for separating mixtures.
- They recall and describe the chemical tests for common gases: hydrogen, oxygen, carbon dioxide, and chlorine.
- **Chem ONLY:** They describe the use of sodium hydroxide solution to identify specific metal ions (producing insoluble hydroxides).
- **Chem ONLY:** They describe how to identify carbonate ions (using acid/limewater) and halide/sulfate ions (using silver nitrate/barium chloride).
- **Chem ONLY:** They state the advantages of instrumental methods (e.g. speed, sensitivity, accuracy) over chemical tests.
- **Chem ONLY:** They describe the principles and interpretation of flame emission spectroscopy to identify metal ions.

Skills Developed
- **Practical:** Interpret and determine the Rf value of compounds from chromatograms.
- **Practical:** Investigate how paper chromatography can be

dioxide decreased (dissolving in oceans, formation of sedimentary rocks, photosynthesis).
- They name key greenhouse gases and describe the mechanism by which they cause the Earth's temperature to rise (trapping long-wave radiation).
- They list human activities that produce greenhouse gases and discuss arguments for and against the idea that human activity causes global climate change.
- They describe the potential side effects of global climate change.
- They define carbon footprint and list actions to reduce it.
- They describe the combustion of fuels as a major source of atmospheric pollutants and name the different gases released.
- They describe the properties and environmental effects of carbon monoxide, sulfur dioxide, and particulates (acid rain, respiratory problems).

Skills Developed
- **Analysis:** Evaluating arguments and evidence related to human-caused global climate change, including discussion of scale, risk, and environmental

production (including desalination).
- They describe the process of sewage treatment.
- They describe, carry out, and interpret simple comparative Life Cycle Assessments (LCAs)
- They discuss how reusing and recycling reduce the consumption of raw resources and energy use.
- **HT ONLY:** They name and describe alternative biological methods for extracting metals, including phytomining and bioleaching, and evaluate these methods.
- **Chem ONLY**: Students define corrosion and describe prevention methods
- **Chem ONLY:** They describe common alloys and the benefits of using them over pure metals.
- **Chem ONLY:** They compare the properties and uses of glass, clay ceramics, polymers (thermosoftening/thermosetting), and composites.
- **Chem ONLY:** They describe the Haber process (reactants, products, chemical equation, and recycling) and the production of NPK fertilisers.
- **Chem ONLY:** They discuss the trade-off between the rate of production and the position of equilibrium in the Haber process.

(using bromine water). • **Chem ONLY:** Drawing fully displayed structural formulae for the first four alkenes and the products of their addition reactions.	used to separate coloured substances (RP6) • **Practical:** Use chemical tests to identify the ions in unknown compounds (RP7) • **Chem ONLY:** Describe how to conduct a flame test and identify metal ions from the results. • **Chem ONLY**: Write balanced equations for reactions of sodium hydroxide & metal ions	implications. • **Prediction:** Predicting the products of combustion of a fuel given information about the fuel's composition and the burning conditions (complete vs. incomplete combustion).	**Skills Developed** • **Practical:** Analysis and purification of water samples from different sources (RP8)

How will this be assessed?
All Units will be assessed using formative assessment in lessons along with midpoint and end of topic summative assessments.

HT: Higher Tier

Year 11 - Physics			
Unit 1	**Unit 2**	**Unit 3**	**Unit 4**
P5 - Forces **Purpose:** To understand forces as vectors, their effects on objects {eg, motion, deformation, turning), and how they relate to momentum and stopping distance. **Knowledge and Understanding** • Students identify and describe scalar and vector quantities • They define and calculate weight & locate the centre of mass. • They describe work done and & the energy	**P6 - Waves** **Purpose:** To understand wave behaviour as a method of energy transfer and communication, focusing on the properties of mechanical waves and the electromagnetic spectrum. **Knowledge and Understanding** • Students describe the difference between transverse and longitudinal waves and give examples of each. • They define wave properties:	**P7 – Magnetism & Electromagnetism** **Purpose:** To understand the relationship between electricity and magnetism, and how this is applied in devices like motors, generators, and transformers. **Knowledge and Understanding** • Students describe the forces (attraction/repulsion) between magnetic poles and distinguish	**P8 - Space** **Purpose:** To understand the scale and structure of the universe, the life cycles of stars, and the evidence supporting the Big Bang theory. **Knowledge and**

transfers involved.
- They describe forces causing stretching, bending, and compression, including elastic and inelastic deformation.
- They describe the linear relationship between force and extension and calculate the stored energy
- They represent motion using distance-time and velocity-time graphs, calculating speed/acceleration from the gradient and distance from the area.
- They state and apply Newton's Laws of Motion and define inertia.
- They describe factors affecting reaction time and explain how to measure it.
- They explain how braking converts kinetic energy to thermal energy and discuss factors affecting braking distance and stopping distance.
- **PHY ONLY:** They apply the concept of moments and the principle of equilibrium.
- **PHY ONLY:** They calculate pressure in fluids and explain upthrust and floating/sinking.
- **PHY ONLY:** They interpret terminal velocity for objects falling through a fluid.
- **HT ONLY:** They use vector diagrams and free body diagrams to resolve forces and determine the resultant force.
- **HT ONLY:** They calculate and apply the conservation of momentum (p = mv) and relate force to the rate of change of momentum

amplitude, wavelength (lambda), frequency (f), period (T), and wave speed (v).
- They calculate wave speed (v = f * lambda) and period (T = 1/f).
- They describe the reflection, absorption, and transmission of waves at boundaries, and construct ray diagrams for reflection and refraction.
- They describe the electromagnetic (EM) spectrum (order, uses, and dangers of each group).
- **PHY ONLY:** They explain the importance of understanding waves for structural design and technology.
- **PHY ONLY:** They describe the use of ultrasound for imaging and compare seismic P and S waves to determine Earth structure.
- **PHY ONLY:** They describe how lenses form images (real/virtual, convex/concave) and relate an object's colour to the light it absorbs, transmits, and reflects.
- **PHY ONLY:** They describe how all bodies emit and absorb infrared radiation and define a perfect black body.
- **HT ONLY:** They explain that radio waves are produced/absorbed by electrical circuits.
- **HT ONLY:** They explain that refraction is caused by changes in wave speed.

between permanent and induced magnets.
- They draw and interpret magnetic field patterns for bar magnets and current-carrying wires/solenoids.
- They explain how a solenoid increases the magnetic effect of a current.
- **HT ONLY:** They state and use Fleming's Left-Hand Rule to predict the force on a conductor in a magnetic field.
- **HT ONLY:** They explain the operation of an electric motor (causing rotation) and calculate the force
- **PHY & HT ONLY:** They describe the generator effect (electromagnetic induction) and explain factors that increase the induced potential difference (p.d.).
- **PHY & HT ONLY:** They explain how the generator effect is used in alternators (a.c.) and dynamos (d.c.) and in moving-coil microphones.
- **PHY & HT ONLY:** They describe the function of transformers (stepping up or down p.d.) and apply the equations linking p.d., turns, current, and power

Understanding
- Students describe the structure of the Solar System and place our Solar System within the context of a galaxy (The Milky Way).
- They explain how stars are formed (from dust and gas) and describe the complete life cycle of stars, comparing Sun-sized stars (ending as a white dwarf) and much more massive stars (ending as a neutron star or black hole).
- They explain how fusion processes within stars create new elements and how supernovae distribute heavy elements throughout the universe.
- **HT ONLY:** They explain that, for circular orbits, the gravitational force causes a constantly changing velocity but an unchanged speed, and how speed affects the stable orbital radius.
- They explain the red-shift of light from distant

Skills Developed • **Calculation:** Using all core formulae, including W = mg, W = Fs, F = ke, a = change in v / t, and F = ma. • **Practical:** Investigating the relationship between force and extension (RP6) • **Practical:** Investigating the effect of varying force and mass on acceleration (RP7)	**Skills Developed** • **Practical:** Measuring the speed of sound and water waves (RP8). • **Practical:** Investigating the reflection and refraction of light (RP9, PHY ONLY). • **Practical:** Investigating the absorption/radiation of infrared by surfaces (RP10). • **Calculation:** Using v = f x lambda and T = 1/f.	transfer (Vp / Vs = Np / Ns and Vs x Is = Vp x Ip). **Skills Developed** • **Practical:** Plotting the magnetic field pattern of a magnet using a compass. • **Analysis:** Interpreting diagrams of electromagnetic devices to explain their function (e.g., relay switches, circuit breakers). • **Calculation:** Using F = BIL **(HT ONLY)** and applying transformer equations **(PHY & HT ONLY).**	galaxies and how this observation is interpreted as evidence for an expanding universe and supports the Big Bang theory. **Skills Developed** • Analysis: Interpreting observational evidence (like red-shift) to support and refine theories about the universe's origin and evolution.

How will this be assessed?
All Units will be assessed using formative assessment in lessons along with midpoint and end of topic summative assessments.

HT: Higher Tier