|  |  |
| --- | --- |
| **Long Term Plan** | In year 10, students will study Biology as a separate discipline building on the knowledge and skills gained at Key Stage 3. Biology is the study of the living world and students will learn about both animals and plants and how they co-exist. Learning how the human body functions and responds to disease helps students to understand key life lessons and their place within the living world. |
| **Learning Cycle** | **Key Concepts and Themes** | **Vocabulary** |
|  | **HT1** | Ecosystems and the impact of humans | * Biodiversity
* Trophic levels in an ecosystem\*
* Waste management and land use
 | Deforestation, biomass, trophic levels, sustainable, biotechnology |
| **Year 10: Biology** | Enzymes and digestion | * The action of enzymes, including the lock and key hypothesis.
* The digestive system and role of bile
 | Enzyme, substrate, active site, denatured, bile, emulsify, absorption |
| **HT1** | The heart | * Blood, the heart and circulation
 | blood vessel, double circulatory system, |
| **HT2** | Non-communicable diseases and Plant tissues | * Health, lifestyle and non-communicable diseases
* Plant tissues,
 | coronary, cardiovascular, risk factor, tumourPalisade mesophyll, Spongy mesophyll |
| **HT3** | Plant organ systems | * Plant organ systems, e.g. leaf
* Transpiration
* Translocation
 | Xylem, Phloem, Stomata, lignin, elongation, evaporation |
| **HT3** | Communicable diseases and human defence systems | * How pathogens cause disease in plants and animals.
* How diseases can be spread, prevented and treated
 | virus, bacteria, fungus, protist, malaria, symptom, treatment, phagocytosis, antibody, vaccination |
| **HT4** | Response to disease | * Development of drugs
* Antibiotics and painkillers
* Use of monoclonal antibodies
* Plant diseases
 | double blind, placebo, lymphocytes, chlorosis, efficacy, antiviral, deficiency |
| **HT4** | Bioenergetics- Photosynthesis | * Photosynthesis
 | Glucose, Energy, Exothermic, Endothermic, Chloroplast, Limiting factor, Optimum, Light intensity, |
| **HT5** | Bioenergetics - Respiration | * Respiration
 | Mitochondria, Aerobic, Anaerobic, Fermentation, Lactic acid, Metabolism |
|  | **HT6** | Recapping Yr9 Cells | * Plant, animal, specialised cells and microscopes
* Culturing cells
* Cell cycle
* Stem cells
* Diffusion, osmosis and active transport
 | Eukaryote, Electron, Ribosome, Palisade cell, Aseptic, Growth phase, DNA replication, Mitosis, Unspecialised, Embryonic, Adult cell, Semi-permeable membrane, ATP, Water potential. |
|  |  |  |
|  |  | **Skill Development** | * Understand how scientific methods and theories develop over time.
* Use a variety of models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.
* Evaluate methods and suggest possible improvements and further investigations.
 |

|  |  |
| --- | --- |
| **Long Term Plan** | In year 10 students will study chemistry as a separate discipline building on the knowledge and skills gained at Key Stage 3. Chemistry is the study of the material world and students will learn how scientific methods and theories have developed over time plus appreciate the power and limitations of science, considering any ethical issues which may arise. |
| **Learning Cycle** | **Key Concepts and Themes** | **Vocabulary** |
| **Year 10: Chemistry** | **HT1** | Structure and Bonding Part 2 | * The understanding of how the structure and bonding of certain materials will affect their uses and application
* To be able to explain the properties based on structure and bonding
 | Ionic, metallic, covalent, giant, molecular, diamond, graphite, composite, ceramics, nanoparticles, alloys, polymers |
| **HT2** | Chemical Changes & Energy Changes | * The understanding of chemical changes by systematically organising results and predicting what new substances are formed in unfamiliar contexts.
* The extraction of important resources from the Earth.
* The understanding of how energy transfers occur during chemical reactions and how this can be measured experimentally.
* Understand how cells and batteries function based on chemical reactions
 | Acid, Electrode, Electrolysis, Electrolyte, Molten, Ore, Oxidation, Reactivity Series, Redox Reaction, Reduction, SaltExothermic, endothermic, activation energy, bond energy, reaction profile, cell, battery, rechargeable |
| **HT3** | Rates of chemical reactions | * How chemical reactions can be manipulated in order to speed them up or slow them down.
* That chemical reactions may be reversible and therefore the effect of different variables needs to be established in order to identify how to maximise the yield of desired product.
 | Catalyst, Enzyme, Collision theory, Surface area, Rate, Particle, Independent variable, Dependent variable, Control variable |
| **HT4** | Chemistry of the atmosphere and Using resources | * The composition of the Earth’s atmosphere and how it has developed over

time, including ancient and recent.* Climate change
* Life cycle assessments
* Potable water
 | Composition, greenhouse gas, anthropogenic, carbon footprint, sustainable, potable water, effluent |
| **HT5** | Quantitative Chemistry | * That chemical equations provide a means of representing chemical reactions
* How chemists use quantitative analysis to determine the formulae of compounds, the equations for reactions and to monitor the yield from chemical reactions
 | Mole, Concentration, Avogadro’s Constant, Limiting Reactant, Concordant, Percentage Yield, Atom Economy, Relative Formula Mass, Reactant, Product  |
| **HT6** | Organic Chemistry  | * The chemistry of carbon compounds, including how crude oil is separated using fractional distillation and the specific nature and reactions of alkanes, alkenes, alcohols and carboxylic acids
* Addition and condensation polymerisation
 | Fractional distillation, crude oil, cracking, hydrocarbon, alkane, alkene, alcohol, carboxylic acid, addition polymerisation, condensation polymerisation, amino acid, polyester, fermentation  |
|  |
|  | **Skill Development** | * Understand how scientific methods and theories develop over time.
* Use a variety of models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.
* Evaluate methods and suggest possible improvements and further investigations.
 |

|  |  |
| --- | --- |
|  **Long Term Plan** | In year 10 students will study physics as a separate discipline building on the knowledge and skills gained at Key Stage 3. Physics seeks to understand the underlying rules which govern the way that objects interact. It also considers larger questions such as the origin and fate of the Universe, which will develop students’ interest and curiosity**. Students taking the optional Triple Award will study a ‘Triple Only’ module in HT1/2 and supplementary material for HT3-6.** |
| **Learning Cycle** | **Key Concepts and Themes** | **Vocabulary** |
|  | **HT1/2 TRIPLE****ONLY** | Space | * Our solar system
* Life cycle of stars
* Satellites
* Red Shift
 | Star, Planet, Dwarf Planet, Red Giant, Redshift, Supernova, Black Hole, Neutron Star, Recessional Velocity, Dark Matter, Dark Energy |
| **Year 10: Physics** | **HT1** | Electricity | * In this topic we use models to help visualise what is happening in circuits so that we can understand everyday applications of electricity.
 | Diode, Potential Difference, Electric Field, Current, Filament Lamp, Light Dependent Resistor (LDR), Mains Electricity, Potential Difference, Resistance, Transformers, The National Grid, Thermistor |
| **HT2** | Particle Model of Matter | * The particle model is widely used to predict the behaviour of solids, liquids and gases and this has many applications in everyday life.
 | Thermal Energy, Condensation, Density, Evaporation, Freezing, Internal Energy, Latent Heat, Melting, Pressure, Specific Heat Capacity, Specific Latent Heat, Sublimation |
| **HT3** | Atomic Structure | * In this topic we track the development of models of the atom. This allows us to understand processes that occur in the nucleus of an atom, such as the emission of radiation.
 | Activity, Alpha Particle, Atomic Number, Background Radiation, Beta Particle, Chain Reaction, Energy Levels, Fission, Gamma Ray, Half-Life, Ions, Irradiation, Isotopes, Nuclear Fission, Nuclear Fusion, Nucleus, Radioactive Decay, |
| **HT4** | Forces 1 | * Understanding forces allows us to analyse a wide variety of situations, such as the motion of a car or skydiver. Applications also include the analysis of structures like buildings and bridges.
 | Contact Forces, Gravity, Resultant force, Scalar, Vector, Weight, Work Done, Energy transfer, Elasticity, Hooke’s Law, Non-contact forces, Electrostatic force |
| **HT5** | Forces 2 | * Isaac Newton formulated the laws of motion which describe how objects move. Understanding these laws allow us to predict the movement of objects.
 | Acceleration, Displacement, Distance, Speed, Velocity, Equilibrium, Inertia, Newton’s Laws, Resultant Force, Speed, Velocity, Weight, Terminal velocity |
| **HT6** | Forces 3 | * Concepts such as momentum lead to an understanding of the forces on objects during collisions. This has applications such as improving car safety.
 | Stopping distance, Thinking distance, Momentum, Reaction time, Conservation of momentum, Braking distance, Collisions, Rate of change of momentum |
|  |  |  |
|  |  | **Skill Development** | * Understand how scientific methods and theories develop over time.
* Use a variety of models to solve problems, make predictions and to develop scientific explanations and understanding of familiar and unfamiliar facts.
* Evaluate methods and suggest possible improvements and further investigations.
 |