|  |  |
| --- | --- |
| **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** | 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 |
| **Year 10: Biology** | The heart and non-communicable diseases | * Blood, the heart and circulation
* Health, lifestyle and non-communicable diseases
 | blood vessel, double circulatory system, coronary, cardiovascular, risk factor, tumour |
| **HT2** | Plants | * Plant tissues,
* 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 |
| **HT5** | Bioenergetics | * Photosynthesis
* Respiration
 | Glucose, Energy, Exothermic, Endothermic, Chloroplast, Limiting factor, Optimum, Light intensity, Mitochondria, Aerobic, Anaerobic, Fermentation, Lactic acid, Metabolism |
| **HT6** | Homeostasis | * The nervous system
 | Stimulus, Receptor, Reflex arc, Motor neuron, Sensory neuron, Relay neuron, Impulse, Effector, Muscles, Coordinator, |
|  |  |  |
|  |  | **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 BondingPart 1 | * That atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures.
* Theories of bonding are explained and linked to properties.
 | Ion, Ionic bond, Electrostatic attraction, Metal, Non-metal, Molecule, Macromolecular, Covalent bond, Metallic bond, Intermolecular forces, Delocalised electrons |
| **HT2** | Structure and BondingPart 2 (Materials) | * How scientists use the knowledge of structure and bonding to engineer new materials with desirable properties.
 | Alloy, Fullerenes, Nanoparticles, Polymer, Graphene, Nanotechnology |
| **HT3** | Chemical 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.
 | Acid, Electrode, Electrolysis, Electrolyte, Molten, Ore, Oxidation, Reactivity Series, Redox Reaction, Reduction, Salt |
| **HT4** | Exothermic and Endothermic Reactions | * How the interaction of particles often involves transfers of energy due to the breaking and formation of bonds.
* These interactions between particles can produce heating or cooling effects that are used in a range of everyday applications such as the production of electricity.
 | Activation energy, Bond energy, Combustion, Endothermic, Energy level diagram, Exothermic, Reaction profile |
| **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** | 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 |
|  |  |  |
|  |  | **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. |
| **Learning Cycle** | **Key Concepts and Themes** | **Vocabulary** |
| **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.
 |