FLEETWOOD HIGH SCHOOL: CURRICULUM OVERVIEW

Year 7 - *By the end of year 7 students are able to;*	
Subject specific knowledge	Working scientifically skills
Particles • Describe the differences between atoms, elements, compounds and mixtures using particle models. • Describe the development of atomic theory. • Explain how compounds are formed. • Compare the arrangement and movement of particles in solids, liquids and gases. Cells • Identify and compare the structures and functions of animal, plant, prokaryotic and eukaryotic cells. • Use a light microscope safely to observe cells and collect observations. • Explain how cells were discovered and how cells become specialised. • Describe levels of organisation from cells to organ systems. Energy • Identify different energy stores and explain how energy is transferred. • Explain how food stores chemical energy and investigate energy in foods. • Describe how thermal energy is transferred and ways to reduce unwanted transfer. Fast and Furious Reactions • Describe the development and structure of the periodic table. • Describe the structure of the atom and the role of subatomic particles. • Compare the properties of metals and non-metals and describe trends in the periodic table. • Explain and investigate the reactivity series of metals. Separating Mixtures • Describe the differences between elements, compounds and mixtures, including dissolving and pure substances. • Investigate separation technqiues. • Identify the properties of acids and alkalis using indicators. • Explain neutralisation and its applications. Forces • Describe forces and distinguish between scalar and vector quantities. • Name forces. • Explain the effects of elasticity and friction in everyday situations.	• Define **accuracy, precision, repeatability and reproducibilit**y in investigations in *Particles, Energy and Forces* • Explain **how scientific ideas develop over time** in *Energy and Forces* • **Identify hazards and evaluate risks** in practical work in *Energy, Separating Chemicals, Fast and Furious Reactions and Forces* • **Make and record detailed observations** in *Cells and Reproduction and Fast and Furious Reactions* • **Make logical predictions** using scientific knowledge and evidence in *Particles, Energy, Fast and Furious Reactions and Forces* • **Plan and carry out investigations** while identifying variables *in Energy and Forces* • **Select and use appropriate scientific equipment** safely and accurately in *Particles, Cells and Reproduction, Energy, Separating Chemicals, Fast and Furious Reactions and Forces* • **Record measurements accurately** in *Particles, Energy and Forces* • **Apply mathematical skills and calculations** in scientific contexts in *Particles, Energy and Forces* • **Present data clearly using tables, charts and graphs** in *Energy and Forces* • **Analyse data, identify patterns** and draw evidence-based conclusions in *Energy, Fast and Furious Reactions and Forces* • **Use data to support or refute predictions** and hypotheses in *Energy, Fast and Furious Reactions and Forces* • **Identify sources of random and systematic error** in *Energy and Forces* • **Evaluate the quality and reliability of data** in *Energy and Forces* • **Use correct scientific units and chemical terminology** in *Particles, Energy and Forces* • **Complete scientific calculations accurately** in *Particles* • **Calculate and use averages** appropriately in investigations in *Particles, Energy and Forces*

FLEETWOOD HIGH SCHOOL: CURRICULUM OVERVIEW

Year 8 - *By the end of year 8 students are able to;*

Subject specific knowledge	**Working scientifically skills**
Keeping Healthy • Recall the structure and function of organelles in animal and plant cells. • Explain aerobic and anaerobic respiration in animals, plants and yeast. • Describe the structure and function of the lungs, heart and blood vessels. • Explain diffusion and gas exchange in the lungs. • Describe the roles of the skeleton, joints and muscles in movement. • Describe the effects of exercise on the body. • Describe the effects of asthma, smoking and recreational drugs on health. Chemical Reactions • Recall elements, compounds and chemical reactions using particle models. • Explain the difference between physical and chemical changes. • Name compounds and write word equations. • Identify elements from chemical formulae and balance simple chemical equations. • Recall atomic structure, • Describe electron arrangement • Name and identify the types of bonding. • Describe conservation of mass in chemical reactions. • Explain combustion, oxidation and thermal decomposition reactions. • Compare exothermic and endothermic reactions. • Describe the properties of acids and alkalis and their reactions. Electricity and Magnetism • Describe the properties of conductors and insulators. • Identify and use electrical circuit symbols correctly. • Compare current and potential difference in series and parallel circuits. • Describe resistance and power in electrical devices. • Explain static electricity and electric fields. • Describe the properties of magnets and magnetic fields. • Explain how electromagnets work.	• **Define and evaluate accuracy, precision, repeatability and reproducibility** in investigations in *Chemical Reactions, Ecology, Inheritance and Variation and Waves.* • **Explain how scientific ideas develop over time** and the importance of peer review in *Chemical Reactions and Waves.* • **Identify hazards and evaluate risks** in practical work in *Chemical Reactions, Energy from Food/Respiration and Waves.* • **Make and record** detailed qualitative and quantitative **observations** in *Waves*. • **Make logical predictions using scientific knowledge** and evidence in *Keeping Healthy, Chemical Reactions and Waves.* • **Plan and carry out investigations while identifying variables** in *Chemical Reactions, Energy from Food Waves.* • **Select and use appropriate scientific equipment** safely and accurately in *Chemical Reactions, Energy from Food and Waves.* • **Record measurements accurately and evaluate the effectiveness of methods** in *Chemical Reactions, Ecology, Inheritance and Variation, Energy from Food/Respiration and Waves.* • **Explain and apply sampling techniques** where appropriate in *Ecology, Inheritance and Variation and Waves.* • **Apply mathematical skills and calculations** in scientific contexts in *Chemical Reactions and Waves.* • **Present data clearly using tables, charts and graphs** in *Keeping Healthy and Waves.* • **Analyse data, identify patterns and draw evidence-based conclusions** in *Chemical Reactions, Ecology, Inheritance and Variation and Waves.* • **Use data to support or refute predictions and hypotheses** in *Keeping Healthy, Chemical Reactions and Waves.* • **Identify sources of random and systematic error** in *Ecology, Inheritance and Variation and Waves.* • **Evaluate the quality and reliability of data** in *Keeping Healthy and Waves.* • **Use correct scientific units and chemical terminology** in *Keeping Healthy, Chemical Reactions, Energy from Food and Waves.* • **Complete scientific calculations** accurately in *Chemical Reactions and Energy from Food.* • **Calculate and use averages** appropriately in investigations in *Keeping Healthy, Ecology, Inheritance and Variation and Waves.*

FLEETWOOD HIGH SCHOOL: CURRICULUM OVERVIEW

Ecology • Describe how living organisms are grouped and classified. • Explain how energy is transferred through food chains and ecosystems. • Compare genetic and environmental variation. • Describe how genetic information is passed from one generation to the next. • Explain how adaptations help organisms survive in their environments. • Describe natural selection and evolution. • Explain the causes and effects of extinction and the importance of biodiversity. Energy from Food • Describe the main food groups and the importance of a balanced diet. • Explain how digestion breaks down food using organs, enzymes and bacteria. • Carry out positive result food tests. • Describe photosynthesis and the role of chlorophyll in plants. • Describe how leaves are adapted for photosynthesis and water movement. • Explain plant reproduction and pollination. Waves • Describe the features and properties of waves. • Compare transverse and longitudinal waves. • Calculate wave speed using the wave equation. • Explain reflection and refraction of waves. • Describe how sound is produced, transmitted and detected. • Explain the relationship between frequency and pitch. • Describe how light travels and interacts with different materials. • Explain how colour, filters, lenses and the eye allow us to see.	

FLEETWOOD HIGH SCHOOL: CURRICULUM OVERVIEW

Year 9 - *By the end of year 9 students are able to;*	
Subject specific knowledge	Working scientifically skills
Energy • Identify different energy stores and pathways for energy transfer. • Explain how work is done when forces cause movement. • Calculate and describe gravitational potential, kinetic and elastic potential energy. • Explain the relationship between force and extension using Hooke's Law. • Describe efficiency and power in everyday energy transfers. Atomic Structure • Describe the structure of atoms and the arrangement of subatomic particles. • Draw electron configurations. • Define an ion and draw ions. • Write chemical formulae and balance chemical equations. • Describe isotopes. • Explain how scientific ideas about the atom have changed over time. • Compare elements, compounds and mixtures and describe methods of separation. Cell Biology and Cell Division • Describe the structure and function of cells and cell organelles. • Compare eukaryotic and prokaryotic cells. • Use microscopes to observe cells and calculate magnification. • Explain the adaptations of specialised cells. • Define diffusion, osmosis and active transport. • Describe cell division and its role in growth and repair. • Explain the role of stem cells and differentiation. The Periodic Table • Describe the layout and organisation of the periodic table. • Explain how the periodic table developed over time. • Explain the properties and reactivity of alkali metals, halogens and noble gases. • Use patterns in the periodic table to predict properties of elements.	• Pay attention to objectivity and concern for **accuracy, precision, repeatability and** • **reproducibility** – *energy* • Understand that **scientific methods and theories develop** as earlier explanations are modified to take account of new evidence and ideas, together with the importance of publishing results and peer review - *atomic structure and the periodic table* • Evaluate **risks** - t*he periodic table* • Ask questions and **develop a line of enquiry based on observations** of the real world, alongside prior knowledge and experience **make predictions using scientific knowledge** and understanding - *the periodic table* • Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including **identifying independent, dependent and control variables,** where appropriate - *energy changes* • **Use appropriate techniques, apparatus,** and materials during fieldwork and laboratory work, paying attention to health and safety - *atomic structure* • **Apply mathematical concepts** and calculate results - *energy* • **Present observations** and data using appropriate methods, including tables and graphs - *treating and preventing disease* • **Interpret observations** and data, including identifying patterns and **using observations and data to draw conclusions** - *treating and preventing disease* • **Present reasoned explanations**, including explaining data in relation to predictions and hypotheses - *the periodic table* • **Use and derive simple equations and carry out appropriate calculation -** *energy*

FLEETWOOD HIGH SCHOOL: CURRICULUM OVERVIEW

Energy Transfer from Heating and Energy Resources

- Explain how thermal energy is transferred by conduction and insulation.
- Describe methods used to reduce unwanted energy transfer in homes.
- Explain changing energy demands and how electricity is generated.
- Compare renewable and non-renewable energy resources.
- Describe how different power stations meet changes in energy demand.

Energy Changes

- Compare exothermic and endothermic reactions.
- Interpret reaction profiles and energy changes during reactions.
- Explain energy transfers using bond breaking and bond making.
- Investigate temperature changes during chemical reactions.

Bioenergetics

- Explain the process of photosynthesis.
- Describe factors that affect the rate of photosynthesis.
- Describe how plants use glucose produced during photosynthesis.
- Compare aerobic and anaerobic respiration.
- Explain the effects of exercise on the body and respiration.
- Describe the role of metabolism in living organisms.

Treating and Preventing Disease

- Describe the difference between health and disease.
- Explain how pathogens cause infectious diseases.
- Describe risk factors linked to non-communicable diseases.
- Explain the causes and effects of cancer and smoking-related diseases.
- Describe how medicines are developed and tested.
- Compare the uses of antibiotics and painkillers.

Chemistry of the Atmosphere

- Describe the composition of the Earth's early and modern atmosphere.
- Explain the role of greenhouse gases in climate change.
- Describe evidence and impacts of global climate change.
- Explain ways to reduce carbon footprints.
- Describe sources and effects of atmospheric pollutants.

FLEETWOOD HIGH SCHOOL: CURRICULUM OVERVIEW

Year 10 - *By the end of year 10 students are able to;*	
Subject specific knowledge	Working scientifically skills
Infection and response • Describe the differences between health and disease. • Explain how pathogens (bacteria, virus, protist and fungus) cause communicable diseases in plants and animals. • Describe the human body's primary and secondary defence systems. • Explain how plant diseases are transmitted and controlled. • Describe how new drugs are discovered and developed. • Explain how vaccines work to prevent infection. • Describe the causes and treatments of cancer. Organisation • Describe the organisation of cells into tissues, organs and organ systems. • Explain the structure and function of the digestive system. • Describe how food tests identify nutrients. • Explain how enzymes catalyse digestion. • Describe factors affecting enzyme activity (temperature, pH, concentration). • Explain how the digestive system is adapted for efficient absorption. • Describe how substances are transported in living organisms. • Describe the process of diffusion and osmosis. • Describe the structure and function of the heart and blood vessels. • Explain how the components of blood are adapted for their functions. • Describe the process of gas exchange in the lungs. • Explain how the lungs are adapted for efficient gas exchange. • Describe how lifestyle factors affect the heart. • Explain transpiration in plants and factors affecting it.	• **Develop a hypothesis** that can be tested through investigation in *Microbiology (Biology only), Enzymes and Density.* • **Write a method, including identifying variables**, in *Microbiology (Biology only), Electrolysis, Specific Heat Capacity and I-V Characteristics.* • **Select appropriate equipment for an investigation** in *Light Microscopes, Soluble Salts, Electrolysis, Energy Changes, Specific Heat Capacity, Thermal Insulation (triple only) and Resistance.* • **Write a risk assessment and identify ways to reduce risks** in *Microbiology (Biology only), Food Tests, Soluble Salts, Titrations (Chemistry only), Electrolysis, Resistance and I-V Characteristics.* • **Recognise when sampling techniques** are needed to ensure collected samples are representative in *Enzymes*. • **Read scales accurately** when collecting data in *Light Microscopes, Enzymes, Soluble Salts and Titrations (Chemistry only).* • **Design and record data into an appropriate results table** in *Osmosis, Food Tests, Photosynthesis and Titrations (Chemistry only).* • **Evaluate methods and determine whether they are valid** in *Food Tests and Energy Changes.* • **Plot relationships between two variables** using experimental data in *Osmosis and Photosynthesis.* • **Translate data between different forms**, including graphs, tables and numerical values, in *Osmosis and Photosynthesis.* • **Calculate and interpret means and ranges from data sets** in *Enzymes, Energy Changes, Thermal Insulation (Physics only), Resistance and I-V Characteristics.* • **Describe and evaluate uncertainty in measurements** in *Titrations (Chemistry only) and Density.* • **Identify patterns and trends in data** and relate them to a hypothesis in *Thermal Insulation (Physics only), Resistance and I-V Characteristics.* • **Evaluate data in terms of accuracy, precision, repeatability and reproducibility** in *Specific Heat Capacity and Thermal Insulation (Physics only).* • **Identify potential sources of random and systematic error** in *Energy Changes, Specific Heat Capacity, Resistance and I-V Characteristics.* • **Explain anomalous results and assess how errors may have affected outcomes** in *Thermal Insulation (Physics only) and Density*.

FLEETWOOD HIGH SCHOOL: CURRICULUM OVERVIEW

Bonding and Structure

- Describe the states of matter in terms of particle arrangement and energy.
- Explain ionic bonding using electron transfer.
- Explain covalent bonding using shared pairs of electrons.
- Describe metallic bonding and its properties.
- Explain how bonding influences the properties of substances.
- Describe the structure and properties of giant covalent substances.

Chemical Changes

- Describe the reactivity series of metals and its applications.
- Explain oxidation and reduction in terms of oxygen and electrons.
- Describe how metals are extracted based on their reactivity.
- Explain the process of electrolysis.
- Describe the pH scale and how it is measured.
- Explain reactions between metals and acids.
- Describe neutralisation reactions.
- Explain how to prepare soluble salts.

Quantitative Chemistry

- Calculate relative formula mass (Mr).
- Explain the law of conservation of mass.
- Describe how mass changes in reactions involving gases.
- Calculate moles and use the mole concept
- Calculate concentration of solutions.

Particle Model of Matter

- Describe density in terms of mass and volume.
- Calculate density using experimental data.
- Explain changes of state using particle theory.
- Describe internal energy and energy transfers.
- Explain specific heat capacity and specific latent heat.
- Describe particle motion in gases and its effect on pressure.

FLEETWOOD HIGH SCHOOL: CURRICULUM OVERVIEW

Electricity • Describe electric current as the flow of charge. • Explain potential difference and its role in circuits. • Describe resistance and factors affecting it. • Compare series and parallel circuits. • Explain how resistors behave in different circuits. • Describe the differences between AC and DC current. • Explain how mains electricity is supplied and used safely. • Calculate electrical power and energy transfer. • Describe how electricity is distributed in the national grid. Atomic Structure • Describe the structure of an atom. • Explain the concept of isotopes. • Describe the historical development of atomic models. • Explain radioactive decay and types of nuclear radiation. • Distinguish between irradiation and contamination. • Complete and interpret nuclear equations. • Explain half-life. Forces (Part 1) • Describe scalar and vector quantities. • Explain the difference between distance and displacement. • Describe forces between interacting objects. • Calculate resultant forces. • Explain Hooke's Law and elastic behaviour. • Describe elastic potential energy. • Explain the concept of centre of mass.	