SUBJECT: Science

CURRICULUM PLAN
2022-23

NESTON HIGH SCHOOL

KS3 and 2 Knowledge and Key skills

YEAR 7	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
BIG IDEAS	*Introductory Unit, Matter 1, Organisms 1*	*Energy 1, Organisms 2*	*Reactions 1, Electricity 1*	*Reactions 2, Organisms 3*	*Matter 2, Forces 1*	*Organisms 4, Waves 1*
Knowledge	Health & Safety, Equipment and Measuring, Structure of animal and plant cells, bacteria and unicellular organisms. Differences between atoms, elements and compounds, chemical symbols and formulae for elements and compounds, conservation of mass changes of state and chemical reactions.	Energy in Matter, Physical changes, Energy transfers, Diffusion of substances into cells	States of matter, particle kinetics, gas pressure, viscosity. Static and current electricity.	Chemical reactions, Combustion, Thermal Decomposition, Exo/Endothermic, Chemical Formula, Chemical equations.Structure and function of major body systems.	The concept of a pure substance and separation techniques. Gravity and Space, Seasons and days	Sound waves.Structure of flowers, plant reproduction and dispersal of seeds, structure and function of human reproductive system, puberty,pregnancy and birth..
Skills	Recognise hazards and risks when prompted, Identify and use the most common laboratory equipment. Draw a bar chart, calculate a mean.Identify one or more control variables and significant other variables. Identify the hypothesis in an investigation from provided sources.	Plot 2 variables from scientific data, use expressions in decimal form, substitute numerical values into algebraic equations.	Select appropriate apparatus from those provided and use with guidance. Using magnification and scale via microscopy.Making accurate measurements. Calculating percentages.	Relate structure to function. Writing chemical formula/ equations. Suggest significant variables in an investigation.Constructing and interpreting tables and diagrams .	Make some accurate observations or whole number measurements to questions and ideas under investigation. Plotting 2 variables from experimental data. Translating information between graphical and numerical form. Constructing bar charts of gestation in different animals.	.Suggest improvements to working methods. Selecting the most appropriate apparatus and method to separate a substance.
Key Vocab	**Hazard, Risk, Variables, Nucleus, chloroplast, cytoplasm,cell membrane, cell wall, mitochodria, ribosomes, vacuole,**	**Particle, atom,solid, liquid, gas,freezing, melting, boiling, condensing, evaporating, diffusion, diaphragm**	**Solid, Liquid, Gas, Kinetic , Viscosity, Charge, Current, Attract, Repel, Parallel, Series, Resistance**	**Oesophagus, stomach, intestine, rectum,enzymes, heart, lungs,alveoli, blood vessels. Combustion, Thermal decomposition, Exothermic, Endothermic**	**Pure, Impure, compound, separation, filtering, evaporating, chromatography, distillation, Mass, weight, gravity, stars, orbit, galaxy**	**Stigma, style, stamen, anther, carpel,penis, testicles, gland, ovary, oviduct, uterus, vagina, cervix, fertilisation, gestation, umbilical cord. Frequency, amplitude, wavelength, transverse wave, longitudinal wave.**

Key Knowledge Transfer

YEAR 8	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
TOPIC	*Introduction- Safety review, Careers in Science. Acids and Alkalis, Ecosystems*	*Balanced and Unbalanced Forces,Healthy Living ,Sound, Chemical reactions*	*Variation, Motion, Energy transfer*	*Energy in reactions, Pressure, Rocks, Photosynthesis/Respiration*	*Light, Evolution*	*Earth atmosphere, Adaptations*
Knowledge	Ecosystems, habitats, food security and interdependence. Uses of acids and alkalis, Neutralisation .	Balanced and unbalanced forces, Hooke's Law. A healthy diet, growth of bacteria, Examples of viruses (Covid). Drugs and their effects. Balanced equations,conservation of mass,combustion, endothermic and exothermic reactions. The properties of sound, pitch, amplitude, wavelength, frequency, use of wave equation, the ear.	Energy transfers in systems. Input/output energy, Calculations of speed, distance, time, acceleration, terminal velocity. Sankey diagrams,calculating efficiency. Energy resources and generating electricity.	Pressure calculations, examples of sedimentary, metamorphic and igneous rocks and how they are formed, rock cycle. Photosynthesis equation,Starch testing of leaves, structure and function of leaves.	Light and vision, the refraction of light, colour. Natural selection, extinction and the importance of biodiversity.	Importance of minerals to plants, carbon cycle and human effects,global warming. Biotic and abiotic factors, plant and animal adaptations.
Skills	Making and recording observations. Making links between units. Translating information between graphical and numerical form. Understanding simple probability.Construct bar charts and line graphs for appropriate data.	Recognise dependent and independent variables. Use appropriate apparatus and materials during lab work. Make and record observations.Change the subject of an equation and calculting means. Identify risks. Constructing tables.	Identifying risks and suggesting improvements to working methods giving reasons. Selecting the most suitable variables to investigate. Constructing and interpreting tables and plotting 2 variables from experimental data.	Interpreting flow charts and diagrams, Substituting into equations and changing the subject of an equationmaking experimental observations, and measurements using a range of different methods,dealing with misconceptions.	Changing the subject of an equation, using units appropriately,plotting graphs from experimental data, suggesting improvements to experiments, talking accurate measurements.	Selecting appropriate independent, dependent and control variables,analysing and evaluating results. Forming a hypothesis and discussion around environmental issues and differing opinions.
Key Vocab	**Habitat, population, food chain, food web,predator prey, acid, alkali, indicator, base , neutralisation, salt**	**Nutrients, carbohydrates, proteins, waves frequency, wavelength, Balanced unbalanced thrust upthrust, springs, Newtons, kilograms,gravity**	**Variation, characteristics, continuous, discontinous, evolution, natural selection, Velocity, acceleration, input, output,electrical.**	**Sedimentary, metamorphic, igneous,porous, cycle , carbon dioxide, light, oxygen, glucose, palisade, spongy, meophyll, stomata, exothermic, endothermic**	**Waves, reflection, refraction,evolution, natural selection, survival of the fittest**	**Light intesity, control variable, negative correlation, carbon cycle, respiration, photosynthesis, combustion, decomposition,climate change, global warming. The principles of sampling as applied to scientific data,**

YEAR 9	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Chemistry TOPIC	*Atomic structure, cells*	*Chemical Changes*	*History of the atom/ ther periodc table*	*Energy changes*	*Revision*	*Electrolysis*
Knowledge	Atomic structure - atoms, elements, compounds and mixtures The development of the model of the atom - plum pudding and nuclear model Relative electrical charges of subatomic particles, size and mass of atoms Relative atomic mass and isotopes Electronic structure	Metals react with oxygen to produce metal oxides reactivity series. Knowledge and understanding are limited to the reduction of oxides using carbon	The development of the model of the atom - plum pudding and nuclear model Reactivity of the the different groups of ther periodic table	When reactions occur energy transfer can be exothermic or endothermic. Understand the difference between endothermic and endothermic. Reaction profiles. The energy change of reactions	Review work completed in KS3	y. Electrolysis of melts/ aluminium electrolysis/ electrolysis of solutions. elecvtrode reactions
Skills	Safe use of a range of equipment to separate chemical mixtures Use SI units and the prefix nano Represent the electronic structures of the first twenty elements	Use these to identify where reduction and oxidation has taken place. Describe how carbon is used to reduce metal oxides. Explain how this takes place in terms of movement of electrons. Write balanced symbol equations/half equations for the displacement of metal oxides	Safe use of a range of equipment to separate chemical mixtures Use SI units and the prefix nano Represent the electronic structures of the first twenty elements	Draw reaction profiles. Investigate energy change of a reaction via practical work.		predict products of electrolysis/ complete half equations of electrolysis cell
Key Vocab	**Element, mixture, compound, atom, molecule, proton, neutron, electron, isotope**	Oxidation/ oxides/ reductions/ electron/ half equation/ OIL RIG	**Element, mixture, compound, atom, molecule, proton, neutron, electron, isotope**	Exothermic/ endiothermic/ energy change/ reaction profile/		Electrolysis/ electrolyte/ electrodes/ cell/ mole/ titration/ concentration/ relative molecule mass

YEAR 9	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Biology	*Cell structure*	*cell structure & function*	*cell transport*	*Hygeine & pathogens*	*Pathogens and the immune system*	*Medicine*
Knowledge	Cell organelles, difference between plant and animal cells. Microscopy. Specialised cells.	Eukaryotic and prokaryotic cells, stem cells, cell cycle, chromosomes	Diffusion, diffusion investigation, osmosis & osmosis investigation	How diseases are spread. Hygeine, How pathogens make us feel ill. Different types of pathogen.	Bacterial diseases, viral diseases, fungal infections, malaria. The immune response, vaccinations	Antibiotics, how we find new medicine. How we test new medicine for safety
Skills	Focusing a microscope, production of a specimen of cells. Writing a method, Microscopy calculations	Recognising differences in eukaryotic and prokaryotic cells. Describing the stages of the cell cycle.	Writing an analysis, analysing results. Describing diffusion & osmosis	Explain how to prevent disease. Explain how different pathogens maker us feel ill.	Know the cause, prevention and cure for bacterial, viral, fungal and malarial diseases	Explain how clinical trials test new medicine. Describe how new medicines have been discovered
Key Vocab	**nucleus, cytoplasm, ribosome, mitochondria**	Eukaryotic, prokaryotic, chromosome, mitosis	**Diffusion, selectively permeable membrane, osmosis**	Pathogen, toxin, hygeine	**bacteria, virus, white blood cell, protist,**	Penicillin, clinical trial, placebo

YEAR 9	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Physics	*Particle model of matter*	*Particle model of matter*	*Atomic structure* *Atoms and nuclear radiation*	*Atoms and nuclear radiation*	*Energy*	*Energy*
Knowledge	Density of Material. Investigate the densities of regulare and irregular solid objects required practical Particle model of matter Changes of state Specific heat capacity Calculating the specific heat capacity of certain metals required practical	Changes of heat and specific latent heat Internal energy Particle motion of gases Pressure, temperature and volume	The structure of an atom Mass number, atomic number and isotopes The development of the model of the atom Radioactive decay and nuclear radiation Background radiation and penetrating power Nuclear equations	Radioactive half-life Hazards and uses of radiation Contamination and irradiation Nuclear fission Nuclear fusion	Stores of energy, Potential energy Kinetic energy Work done Energy transfers Understanding power Energy efficiency and dissipation of energy	Revision End of year review Specific heat capacity Investigating insulation required practical Energy resources and supplies
Skills	Use measurements to determine the density of solid objects and liquids Use measurements to determine the density of solid objects and liquids	Perform an experiment to measure the latent heat of fusion of water, To calculate the energy change involved when the temperature of a material changes Use appropriate apparatus to make and record measurements of mass, time and temperature accurately Use in a safe manner appropriate apparatus to measure energy changes/transfers	Recognise expressions given in standard form Use prefixes and powers of ten for orders of magnitude (eg tera, giga, mega, kilo, centi, milli, micro and nano) To show an understanding of why and describe how scientific methods and theories develop over time	To show an understanding of why and describe how scientific methods and theories develop over time	Recall and apply the Physics equations Investigate the transfer fo energy from a gravitational potential energy store to a kinetic energy store	Recall and apply the Physics equations
Key Vocab	Density, mass, Volume, Specific heat capacity	Internal energy, specific latent heat, specific latent heat of fusion, specific latent heat of vaporisation, pressure, melt, freeze, boil, evaporate, condense, sublimate	Atoms, nucleus, protons, neutrons, electrons, mass number, atomic number, isotopes, radioactive decay, activity, alpha particle, beta particle, gamma ray	half life, contamination, irradiation, nuclear fission	Work done, kinetic energy, elastic potential energy, spring constant, extension, gravitational potential energy, gravitational field strength, power	Energy stores and systems, work done Insulation, Thermal Conductivity