Subject	Science	Year Group	11

	C7	B6	P6	B7	C6	B6	P6	C9	C10
Scheme title	**Organic Chemistry**	**Genetics**	**Waves**	**Variation & Evolution**	**Chemical analysis**	**Ecology in Action**	**Space (Triple only)**	**Chemistry of the atmosphere**	**Using resources**
Purpose of scheme	The Chemistry of carbon compounds and their use in the petrochemical industry	Pupils recall the structure of DNA, its function and how it is used to trace human migration. Pupils learn about meiosis and how it allows for gentic variation. Pupils then learn about some gentic diseases and how to construct punnett squares to predict the probability of the offspring inheriting the condition.	Pupils recall the different types of wave and the definition of a wave. Pupils will learn about the properties and uses of waves, with specific examples from the electromagnetic spectrum. Students will learn about the relationship between wave frequency, wavelength and energy. Students will also learn how a ripple tank can be used to observe the behaviour of waves.	Pupils learn about evolution, natural selection, selective breeding, cloning and genetic engineering. They will also look at antibiotic resistance as an example of natural selection.	To describe and carry out methods of qualatitive tests to identify unknown chemicals	To learn about how organisms interact in an ecosystem and the biotic and abiotic factors that effect them. They will then learn how plants and animals are adapted to survive. In addition, they will learn how nutrients, carbon and water are recycled in an ecosystem. Finally pupils will learn about how we as humans are impacting our environment and how we can reduce our impact.	Pupils will learn about the composition of the solar system and its place within the universe. Students will also learn about the life cycle of different types of stars and how this life cycle is affected by fusion and equilibrium of forces. Students will also look into how different types of satellite achieve orbital motion, with reference to gravity and velocity. Students will also discuss the evidence for the Big Bang, with specific reference to red shift.	Students learn about the Earth's early atmosphere and how it developed into the modern atmosphere. Students learn about the greenhouse effect and global warming and how human activities have contributed. Students also learn about atmospheric pollutants.	How the Earth's natural resources are used and how to reduce their use in the interest of sustainable development.
Knowledge in sequence	Pupils build on prior knowledge from C1 and C2 to describe the structure and bonding in hydrocarbons and relate this to their use. Students will learn the processes of separating hydrocarbons which builds on separation methods learned in year 7.	Pupils build on knowledge from KS3 on DNA and variation. They will also build on knowledge from B1 and B5 to compare sexual and asexual reproduction. This knowledge will be beneficial when studying B7 later in the year.	Pupils build on knowledge from the year 7 waves topic which covered light and sound waves (needed for triple content). Pupils also build on knowledge from the year 8 waves topic which covered transverse waves, longitudinal waves, UV light and infrared radiation. Knowledge from the P4 topic from year 10 will also be required to understand the concept of radiation, applicable to the EM spectrum. Knowledge from this topic is needed for P8, the triple only topic on space.	Pupils recap on what causes variation from B6 and KS3. They build on this knowledge to learn about evolution, natural selection, selective breeding, cloning and genetic engineering. They will also look at antibiotic resistance as an example of natural selection. They will then look at extinction. Some of this knowledge will be beneficial when they study B8.	Students build on knowledge from year 7 to practice and describe pure substances and then a new concept of formulations. Students learn about processes of identifying chemicals.	Students build on knowledge from KS3 about ecosystems to understand how ecosystems are organised and how everything is recycled. They will build on this knowledge to then explain how humans are impacting the environment at a local and global level. They will then discuss ways in which we can reduce our impact and conserve the environment for future generations.	Students build upon KS3 knowledge about forces, with particular reference to gravity and the scale of the solar system. Students will also build upon KS4 knowledge from the forces topic, where an understanding of gravity and velocity can be used to explain orbital motion. Existing knowledge of resultant forces can also be used to explain how a star can change during its life cycle. Knowledge from the KS4 radiation topic can also be used to explain fusion and the formation of new elements in a star. Knowledge from the KS4 waves topic is required to understand the concept of red shift.	In C9 students build on their knowledge about the Chemistry of the atmosphere from year 8, and learn about the atmosphere in more detail, including chemical formuae.	Pupils begin to learn the use of the Earth's resources and how to reduce their use. They then move on to learn how potable water is produced and how wasterwater is treated.
Skills	Interpreting data, lab safety, applying science knowledge to real life situations.	Making models, constructing punnett squares, interpretating genetic diagrams, probability	Calculations, rearranging equations, critical thinking, model interpretation.	Applying science knowledge to real life situations. Making conclusions based on data. Debating and understanding different opinions and beliefs.	Carrying out a chromatography investigation, completing a gas test.	using and manipulating equipment, writing a conclusion. Interpretating data + graphs, drawing diagrams to represent scientific concepts	Intepretation of models, use of scales, application of maths to the radius of circles, analysis of evidence, maths skills, critical thinking.	Drawing and interpreting graphs	Drawing and interpreting graphs, calculating mass change.
Key words	Hydrocarbon, fractional distillation, intermolecular forces, alkene, homologous series, volatile, flammable	DNA, genome, gene, chromosomes, meiosis, mitosis, dominant, recessive, allele, homozygous, heterozygous, gamete	Transverse wave, longitudinal wave, frequency, amplitude, rarefaction, wavelength, period, electromagnetic spectrum, wave speed, transmit, gamma ray, x-ray, microwave, ultraviolet, infrared, radio wave.	Variation, evolution, natural selection, cloning, genetic engineering, extinction, species, speciation, binomial system, fossils, antimicrobial resistance, selective breeding.	Formulation, pure, impure, chromatography, mobile phase, stationary phase	ecosystem, organisms, pollution, acid rain, deforestation, global warming, conservation, biodiversity, abiotic, biotic, adaptation, communities, populations, decay	Solar system, orbital motion, natural satellite, artificial satellite, fusion, nebula, gravity, gravitational attractio, gravitational collapse, protostar, red giant, red super giant, white dwarf, black dwarf, supernova, neutron star, black hole, Big Bang theory, red shift.	Atmosphere, green house gases, human activities, pollutants	Sustainable, finite, renewable, non-renewable, life cycle assessment, potable water, wastewater
End point	Pupils are able to name and draw alkanes and describe their properties. Pupils are able to describe how crude oil is separated by fractional distillation and why cracking is needed.	Pupils should be able to describe the structure of DNA. They should be able to compare sexual and asexual reproduction (mitosis and meiosis). They should be able to construct punnett squares to predict the probability of passing on an inherited condition. They should be able to interpretate genetic diagrams to show inheritance and also describe how DNA can be used to map human migration.	Pupils should be able to explain the difference between transverse and longitudinal waves. Students should be able to describe wave motion in terms of their amplitude, wavelength, frequency and period. Students should be able to measure the frequency, wavelength and speed of waves using a ripple tank. Pupils should be able to explain what is meant by the electromagnetic spectrum and describe the trends in frequency, wavelength and energy. Students should also be able to describe the properties (HT) and applications of different wavelengths of the electromagnetic spectrum.	Pupils rshould be able to recall what causes variation. They should be able to describe different theories of evolution and compare the evidence for each. They should explain what natural selection, selective breeding, cloning and genetic engineering are and how they work. They will also look at antimicrobial resistance as an example of natural selection. They should be able to classify organisms and describe the causes of extinction.	Pupils can identify and describe pure and impure substances and formulations. Students can use chromatography and gas tests to identify unknown substances.	Pupils can explain the order of organisation in an ecosystem and describe the biotic and abiotic factors that impact an ecosystem. Pupils should be able to conduct an experiment to investigate the distribution of species in an ecosystem. They should also explain how carbon, water and nutrients are recycled in an ecosystem. They will then be able to describe the causes and effects of deforestation and pollution and discuss ways to reduce these.	Students will be able to describe the composition of the solar system, with reference to planets, natural satellites and the solar system's position in the universe. Students will be able to describe and explain the life cycle of stars there are the size of the Sun and stars that are much larger than the Sun. Students will be able to explain the difference between planets, natural satellites and artificial satellites. Students will be able to explain how satellites can orbit larger planetary objects and how orbital motion can be achieved. HT Students should be able to state how gravity affects velocity and speed in circular orbits. HT Students should be able to state how speed influences the radius of a stable orbit. Students will be able to explain how the concept of red shift can be used to provide evidence that the universe is expanding and therefore provide evidence for the Big Bang. Students should be aware that many concepts regarding the nature of the universe are still not clearly understood: particularly dark mass and dark energy.	Pupils will be able to describe and explain the evolution of the Earth's atmosphere, describe the process of global warming and explain how human activities have contributed to it. Students should be able to describe the cause and effect of atmospheric pollutants.	Pupils are able to describe how the Earth's resources are used and how their use can be reduced.
Assessment Methods	Formative assessment and EOTT	Formative assessment, exam questions and EOTT.	Formative assessment, exam questions and EOTT.	Formative assessment, exam questions and EOTT.	Formative assessment and EOTT	Formative assessment, exam questions and EOTT.	Formative assessment, exam questions and EOTT.	Formative assessment and EOTT.	Formative assessment and EOTT