

YEAR 8

Autumn Term

Chemistry

Elements and
compounds

Threshold concept:

Atoms, Elements, Compounds, Mixtures:

To include the difference between these and common examples.

General Equations:

To include the law of conservation of mass and why this means we need to balance equations, also includes how to balance equations.

Key knowledge

- Define atom
- Elements and properties
- Physical and chemical properties
- Hazard symbols
- Molecules and compounds
- How to form compounds
- Naming compounds
- Acids and bases
- pH scale and indicators
- Neutralisation and naming salts

Key Vocabulary

Element
Compound
Mixture
Acid
Base
Indicator
Neutralisation

Spiritual, moral, social, cultural

- developing social skills through group and practical work.
- considering the safety of others during practical work.
- Understanding the environmental issues linked to science through chemical hazards

Career links

- Research engineer
- Biomedical engineer
- Perfumer
- Cosmetic scientist
- Organic Chemist
- Inorganic Chemist



			Watch the following videos to recap knowledge: What Is An Element, Mixture And Compound? Properties of Matter Chemistry FuseSchool Elements, compounds and mixtures - BBC Bitesize Atoms and molecules - BBC Bitesize What are elements in science? KS3 guide for chemistry students - BBC Bitesize	
	Physics	Heating and Cooling Electricity Introduction	Threshold concept: Particle model: To describe the structure of Solids, liquids and gases and the changes in state. Electricity: Current as the (rate of) flow of charge. Components with resistance reduce the current. In series circuits the current is the same everywhere in the circuit. In parallel circuits the current divides Electricity is generated using renewable and non-renewable resources Key knowledge • Measuring temperature and units • The difference between chemical and physical change • Particle model - the differences in arrangements, in motion and in closeness of particles explaining • changes of state, shape and density, the anomaly of ice-water transition • Energy in matter - changes with temperature in motion and spacing of particles • Internal energy stored in materials • Conductors and insulators	Key Vocabulary Temperature Thermal Conductor Series Insulator
			Spiritual, moral, social, cultural • Understand how matter and energy behave in the universe • Responsibility of using energy efficiently • Understand how our ideas on how energy transfers through materials and conductors improved the quality of life and supports communities	Career links • Electrical Engineer • Material scientist • Electrician • Energy Engineer



			Watch the following videos to recap knowledge: Changes of state - Solids, liquids and gases - KS3 Physics - BBC Bitesize Solids, liquids and gases - Solids, liquids and gases - KS3 Physics - BBC Bitesize Heating Energy Physics FuseSchool Heat Flow - Conduction, Convection and Radiation	
	Biology	Health, diet and disease	Threshold concept: Disease and immunity To include communicable and non-communicable diseases and the immune response. Key knowledge - Defining health - Nutrients and balanced diets - Food as an energy store - Calculating energy gained from food using data from a practical investigation - Starvation and deficiency diseases - Obesity, cardiovascular disease and BMI calculations - Effects of exercise on heart and breathing rate	Key Vocabulary disease balanced diet deficiency disease Body Mass Index (BMI) cellular respiration
			Spiritual, moral, social, cultural - Development of an awareness of the mental, physical and social aspects that contribute to health, including paired discussion. - Improve knowledge of the importance of a balanced diet and the risks associated with obesity	Career links - Clinical Dietitian - Public Health Nutritionist - Performance nutritionist - Food scientist - Diabetes specialist - Gastroenterologist - Medicine development - Epidemiologist



Watch the following videos to recap knowledge:

[Healthy diet - Nutrition, digestion and excretion - KS3 Biology - BBC Bitesize](#)

[Obesity - Nutrition, digestion and excretion - KS3 Biology - BBC Bitesize](#)

[Malnutrition - Nutrition, digestion and excretion - KS3 Biology - BBC Bitesize](#)

[Balanced diet | Health | Biology | FuseSchool](#)

Spring Term

Chemistry

**Understanding
chemical reactions**

Threshold concept:

Atoms, Elements, Compounds, Mixtures:

To include the difference between these and common examples.

General Equations:

To include the law of conservation of mass and why this means we need to balance equations, also includes how to balance equations.

Key knowledge

- Know the difference between a physical and chemical reaction.
Physical - reversible and no new products. Chemical - irreversible and new products.
- Write word equations and understand terms reactants and products.
- Write chemical formula correctly.
- Understand the conservation of mass. Balance simple equations.
- Understand when an acid reacts with a metal it always forms a salt and hydrogen.
- Name salts formed when metal + acid
- Know oxidation means the addition of oxygen to form a metal oxide
- Know precipitation is a reaction when 2 liquid react to form an insoluble solid. To know substances can be broken down using heat.

Key Vocabulary

Effervescence
Reactants
Products
Diatomic
Conservation
Oxidation
Precipitation
Decomposition



		Spiritual, moral, social, cultural . - developing social skills through group and practical work. - considering the safety of others during practical work. - Understanding the environmental issues linked to science through chemical hazards - Students consider the moral and social impact of multiple chemical and industrial processes on the environment	Career links - Chemistry technician - Research scientist - Food scientist - Perfumiest - Organic Chemist - Medicinal Chemist
		Watch the following videos to recap knowledge: What is a chemical reaction? - BBC Bitesize Writing word equations - BBC Bitesize Writing symbol equations - BBC Bitesize What is a neutralisation reaction? - BBC Bitesize Chemical Equations Environmental Chemistry Chemistry FuseSchool How To Balance Equations - Part 1 Chemical Calculations Chemistry FuseSchool	
Physics	Images and how we see	Threshold concept: Light: Visible light as a spectrum of colours of different wavelengths and frequencies Light travels in straight lines called rays, which can change direction at a boundary between different media Light travels in straight lines called rays, which can change direction at a boundary between different media Key knowledge - Know that law of reflection. - Know how a dense object slows down the wavefronts of light, refraction. - Know that a spectrum is made from white light, colours are difference wavelengths of light, how colour effects in absorption and diffuse reflection. - Know how colour filters absorb or transmit different wavelengths of light. - Know the parts of the eye and photosensitive material in the retina. - Know the different type of lenses and how to use them in cameras.	Key Vocabulary Medium incident reflected refracted absorb transmit



		Spiritual, moral, social, cultural • Understand how light allows us to see and understand the world around us. • Consider responsible use of technologies that rely on light • Understand that light-based technologies improve communication and quality of life • Understand how light can be used in art, photography and architecture	Career links • Optometrist • Photographer • Optical Engineer • Ophthalmologist
		Watch the following videos to recap knowledge: - Ray diagrams Waves Physics FuseSchool - Wave Behaviour Waves Physics FuseSchool - Ray diagrams and transmission of light guide for KS3 physics students - BBC Bitesize - Reflection guide for KS3 physics students - BBC Bitesize - Refraction and lenses guide for KS3 physics students - BBC Bitesize	
	Biology	Reproduction in humans and plants	Key Vocabulary sexual reproduction zygote hormone fertilisation embryo menstruation pollination



			Spiritual, moral, social, cultural • Focus on the social importance of understanding the menstrual cycle, for both boys and girls • Teamwork and social skills developed during grouped seed dispersal investigation	Career links • Fertility counsellor • Fertility nurse • General Practitioner • Surgeon • Plant Science lecturer • Plant geneticist
			Watch the following videos to recap knowledge: Human reproduction - Reproduction - KS3 Biology - BBC Bitesize Fertilisation - Reproduction- KS3 Biology - BBC Bitesize Puberty and The Hormones Involved Physiology Biology FuseSchool Changes that occur during the menstrual cycle - Reproduction - KS3 Biology - BBC Bitesize What is pollination? Reproduction - KS3 Biology - BBC Bitesize Fruit and seeds - Reproduction - KS3 Biology - BBC Bitesize What Is The Menstrual Cycle? Physiology Biology FuseSchool	



Summer Term

	Summer Term			
	Chemistry	Fuels and energetics	Threshold concept: Energy in chemical: reactions: To include the concepts of exo/endothermic reactions in terms of bond breaking and making and the concepts of activation energy. Key knowledge • Energy changes in a reaction • What exothermic and endothermic means • Energy needed for a reaction to start • How catalysts change the energy in a reaction	Key Vocabulary Exothermic Endothermic Activation energy Catalyst
			Spiritual, moral, social, cultural • developing social skills through group and practical work. • considering the safety of others during practical work. • Understanding the environmental issues linked to science through chemical hazards	Career links • Energy engineer • Chemical Engineer • Environmental Scientist • Petroleum Engineer • Combustion Scientist
			Watch the following videos to recap knowledge: - What are exothermic and endothermic reactions? - BBC Bitesize - Catalysts guide for KS3 chemistry students - BBC Bitesize - What Are Endothermic & Exothermic Reactions Chemistry FuseSchool - What Are Catalysts? Reactions Chemistry FuseSchool	
Chemistry	Earth's resources	Threshold concept: Atoms, Elements, Compounds, Mixtures: To include the difference between these and common examples. Key knowledge • Structure of the Earth • Types of rock • The Rock cycle • Igneous rock • Metamorphic rock	Key Vocabulary Igneous Metamorphic Sedimentary Crust Core	



		Spiritual, moral, social, cultural • developing social skills through group and practical work. • considering the safety of others during practical work.	Career links - Geologist - Geoscientist - Petrophysicist - Genomic scientist - Hydrogeologist -	
		Watch the following videos to recap knowledge: - Structure Of The Earth & Its Different Layers Environmental Chemistry Chemistry FuseSchool - What Is The Rock Cycle? Environmental Chemistry Chemistry FuseSchool - The rock cycle - The Earth and atmosphere - KS3 Chemistry - BBC Bitesize - Rock types - The Earth and atmosphere - KS3 Chemistry - BBC Bitesize		
	Physics	Motion and forces	Threshold concept: Motion: Speed is the rate of change of distance, and acceleration is the rate of change of speed/velocity Forces: Forces, both contact and non-contact, can be represented with arrows and the motion of an object depends on the resultant force acting on the object Key knowledge Describing motion • speed and the quantitative relationship between average speed, distance and time (speed = distance ÷ time) • the representation of a journey on a distance-time graph • Relative motion: trains and cars passing one another.	Key Vocabulary Speed Acceleration Work Moment Elastic Collisions



		Forces - forces as pushes or pulls, arising from the interaction between two objects - using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces - moment as the turning effect of a force - forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water - forces measured in newtons, measurements of stretch or compression as force is changed - force-extension linear relation; Hooke's Law as a special case - work done and energy changes on deformation	
		Spiritual, moral, social, cultural - Reflect on humanities ability to discover natural universal laws - Understand the importance of safety when designing vehicles, bridges and machinery - Work collaboratively in practical investigations	Career links - Mechanical engineer - Civil Engineer - Automotive Engineer - Aerospace Engineer
		Watch the following videos to recap knowledge: Introduction to forces - Forces and movement - KS3 Physics - BBC Bitesize Force diagrams and resultant forces - Forces and movement - KS3 Physics - BBC Bitesize Motion and speed - Forces and movement - KS3 Physics - BBC Bitesize Moments - Forces and movement - KS3 Physics - BBC Bitesize Forces That Cause Change Forces & Motion Physics FuseSchool Calculating Speed Forces & Motion Physics FuseSchool Moments Forces & Motion Physics FuseSchool	
Biology	Interdependence and organisms in the environment	Threshold concept: Ecology To include interactions and interdependence between organisms. Key knowledge	Key Vocabulary producer ecosystem interdependence



			• Food chains • Food webs • Ecosystems and habitats • Chemicals in farming and bioaccumulation • Interdependence within ecosystems • Pyramids of number • Pyramids of biomass • Estimating populations of organisms using sampling techniques • Sampling using quadrats and belt transects	biomass quadrat
			Spiritual, moral, social, cultural • Ethics of chemical use in farming and its impact on bioaccumulation • Developing an understanding of our moral obligation to live sustainably and maintain biodiversity	Career links • Ecologist • Park ranger • Environmental scientist • Wildlife biologist • Sustainability consultant • Environmental educator • Urban ecologist • Conservation specialist
			Watch the following videos to recap knowledge: Food Chains & Food Webs Ecology & Environment Biology FuseSchool What Is An Ecosystem? Ecology & Environment Biology FuseSchool Bioaccumulation - KS3 Biology - BBC Bitesize Ecological Pyramids Ecology & Environment Biology FuseSchool What Is Environmental Sampling? Ecology & Environment Biology FuseSchool	