Science

ALDER Community High School

Year 7

<table>
<tr><td rowspan="3"></td><td colspan="4">Autumn Term</td></tr>
<tr><td>Physics</td><td>Forces</td><td>Threshold concept: 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
Energy:
Conservation of energy; energy cannot be created or destroyed, only shifted between different stores.

Key knowledge
• Contact and non-contact forces
• Measuring forces
• Representing forces
• Balanced and unbalanced forces
• Resultant forces
• Friction
• Energy stores
• Conservation of energy
• Energy transfers</td><td>Key Vocabulary
Factor
Exert
Contact
Non-contact
Unit
Thermal energy store
Kinetic energy store
Gravitational potential energy store
Mass
Weight
Normal
Upthrust
Friction
Drag
Newton
Scale
Resultant force
Unbalanced force
Balanced force</td></tr>
<tr><td colspan="3">Watch the following videos to recap knowledge:
- How Objects Interact | Force & Motion | Physics | FuseSchool
- Balanced & Unbalanced Forces | Forces & Motion | Physics | FuseSchool
- Conservation Of Energy | Energy | Physics | FuseSchool
- Energy stores - Energy - KS3 Physics - BBC Bitesize
- Force diagrams and resultant forces - Forces and movement - KS3 Physics - BBC Bitesize</td></tr>
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<tr><td rowspan="3"></td><td rowspan="2">Chemistry</td><td rowspan="2">Solids, Liquids and Gases</td><td>Threshold concept: Particle model:
How particles behave in solids, liquids and gases. How particles behave in chemical and physical changes.

Key knowledge
The arrangement and movement of particles in the three states of matter.
Changing state - Melting/freezing/boiling/condensing
Evaporation
Gas pressure
Using Bunsen burners safely</td><td>Key Vocabulary
Arrangement
Compress
Volume
Hazard
Melting
Boiling
Condensing
Evaporation
Sublimation
Deposition</td></tr>
<tr><td colspan="2">Watch the following videos to recap knowledge: What is the arrangement of particles in a solid, liquid and gas? - BBC Bitesize What are changes of state? - BBC Bitesize States of Matter (solids, liquids and gases) | Properties of Matter | Chemistry | FuseSchool</td></tr>
<tr><td>Biology</td><td>Cells</td><td>Threshold concept: Cells and the cell cycle
To include the differences between animal, plant and bacterial cells, cell division, and organisation of cells, tissues and organs.
Transport and exchange surfaces
To include how particles move across membranes via osmosis, diffusion and active transport.

Key knowledge
Structure and function of the organelles within animal cells
Structure and function of the organelles within plant cells
Using a microscope to view cells effectively
Calculating total magnification
Specialised cells and their adaptations
Unicellular and multicellular organisms
Diffusion</td><td>Key Vocabulary

Function
Specialised
Microscope
Magnification
Cell membrane
Cytoplasm
Nucleus
Cell wall
Vacuole
Chloroplast
Adaptation
Unicellular
Multicellular
Microorganism
Diffusion</td></tr>
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			• Diffusion in action across the cell membrane	Passive process Concentration Permeable
			Watch the following videos to recap knowledge: - What are cells | Cells | Biology | FuseSchool - How to use a Microscope | Cells | Biology | FuseSchool - Unicellular organisms - Living organisms - KS3 Biology - BBC Bitesize - What is the process of diffusion? - BBC Bitesize	

	Spring Term			
	Biology	**Inheritance and the genome**	**Threshold concept:** **The genome** To include the structure of DNA, heredity, protein synthesis and the importance of genetic mutation in variation. **Key knowledge** • The nature of heredity including causes of variation • How genetic material is inherited from parents • Structure of DNA • The role of DNA in providing the genetic code • How to extract DNA from a plant • Scientists involved in the discovery of the structure of DNA • Genes and chromosomes	**Key Vocabulary** Reproduction Heredity Inherit Variation Environment Lifestyle Genetic material Genetic code DNA Double helix Genome Chromosome Gene
			Watch the following videos to recap knowledge: - What is DNA? FuseSchool - What Are Chromosomes | Genetics | Biology | FuseSchool - What are causes of variation? - BBC Bitesize - Inheritance - Inheritance and genetics - KS3 Biology - BBC Bitesize - How DNA Can Be Extracted From Fruit | Genetics | Biology | FuseSchool	

<table>
<tr><td rowspan="3"></td><td rowspan="2">Chemistry</td><td rowspan="2">Substances and mixtures</td><td>Threshold concept:
Atoms, Elements, Compounds, Mixtures:
To include the difference between these and common examples.
Transport and exchange surfaces (Biology)
To include how particles move across membranes via osmosis, diffusion and active transport.

Key knowledge
• Melting and boiling points of pure substances and mixtures
• Mixtures – how are solutions formed
• Diffusion – Brownian motion in fluids
• Dissolving and attractive forces between particles
• Solutions, solvent and solutes
• Factors affecting solubility
• Suspensions</td><td>Key Vocabulary
Mixture
Impurity
Solution
Solvent
Solute
Mass
Fluid
Diffusion
Dissolve
Insoluble
Suspension
Apparatus
Solubility</td></tr>
<tr><td colspan="2">Watch the following videos to recap knowledge:
- What are pure substances? - BBC Bitesize
- Dissolving - BBC Bitesize
- What is the process of diffusion? - BBC Bitesize
- What Is An Element, Mixture And Compound? | Properties of Matter | Chemistry | FuseSchool
- What Is Brownian Motion? | Properties of Matter | Chemistry | FuseSchool</td></tr>
<tr><td>Physics</td><td>Sound and light</td><td>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
Sound: Is a longitudinal wave
produced and transmitted by vibrations

Key knowledge
• Sound formation – produced by vibrations</td><td>Key Vocabulary
Pitch
Vibrate
Amplitude
Frequency
Energy
Compression
Medium
Vacuum
Reflect
Echo</td></tr>
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			• How amplitude and frequency relate to pitch and volume • Sound waves transfer energy • Longitudinal waves and vibrations • How sound waves transfer through different mediums (solids, liquids and gases) • Echoes • Light waves - Transverse waves • Representing light waves diagrammatically • Materials and light – Transparent/Translucent/Opaque • Reflection of light - understanding the angle of incidence, angle of reflection and the normal line •	Absorb Transfer Transparent Transmit Translucent Opaque
			Watch the following videos to recap knowledge: - Wave Motion | Waves | Physics | FuseSchool - Ray diagrams | Waves | Physics | FuseSchool - https://youtu.be/qNDH1MHkRyk?si=skEE5ySD_bp_YV-x - Transverse & Longitudinal Waves | Waves | Physics | FuseSchool - Features of waves links to energy transfer guide for KS3 physics students - BBC Bitesize - Ray diagrams and transmission of light guide for KS3 physics students - BBC Bitesize - Reflection guide for KS3 physics students - BBC Bitesize	

	Summer Term			
	Biology	**Organs and organ systems**	**Threshold concept:** **Cells and the cell cycle** To include the differences between animal, plant and bacterial cells, cell division, and organisation of cells, tissues and organs. **Enzymes** To include enzyme function, action, and the factors affecting them. **Transport and exchange surfaces**	**Key Vocabulary** Tissue Organ Skeleton Joint Red blood cell White blood cell Contraction

			To include how particles move across membranes via osmosis, diffusion and active transport. **Key knowledge** • Cells, tissues and organs • Human skeleton structure and functions • Muscles and movement • Biomechanics and the interaction between bones, muscles, tendons and ligaments • Levers and moment calculations • Parts of the human digestive system and their functions • The role of enzymes in digestion • Testing foods for starch and sugar • Bacteria and their role in digestion • Absorption of nutrients in the small intestine	Involuntary Antagonistic Tendon Cartilage Ligament Biomechanics Pivot Moment Digestion Bolus Peristalsis Villi Enzyme Bacteria Flagellum Surface area Diffusion
			Watch the following videos to recap knowledge: - What are skeletal muscles? - Living organisms - KS3 Biology - BBC Bitesize - The structure of the digestive system - Nutrition, digestion and excretion - KS3 Biology - BBC Bitesize - Levels of organisation an organism | Cells | Biology | FuseSchool - The Skeleton | Physiology | Biology | FuseSchool - Small intestine and food absorption | Physiology | Biology | FuseSchool -	
	Chemistry	**Separation techniques**	**Threshold concept:** **Atoms, Elements, Compounds, Mixtures:** To include the difference between these and common examples. **Particle model:** How particles behave in solids, liquids and gases. How particles behave in chemical and physical changes. **Key knowledge** - Understand that mixtures can be separated to become a pure substance	**Key Vocabulary** Mixture Element Compound Pure Insoluble Dissolve Solute Solvent Solution

			- Understand mixtures which have a purpose are known as formulations - Understand mixtures are separated based on their properties - How to separate insoluble and soluble solid from a liquid - How to separate different liquids - Types of distillation: simple vs fractional - Understand how chromatography can be used for chemical analysis and forensics - Practical apparatus and how to write/perform methods - Practical skills to perform different separation techniques	Evaporation Density Boiling point Condense Distillate Fraction Chromatogram Horizontal Medium
			Watch the following videos to recap knowledge: - What is the process of filtration? - BBC Bitesize - Distillation - BBC Bitesize - Chromatography guide for KS3 chemistry students - BBC Bitesize - How To Separate Solutions, Mixtures & Emulsions | Chemical Tests | Chemistry | FuseSchool - Paper & Thin Layer Chromatography | Chemical Tests | Chemistry | FuseSchool	
	Physics	**Earth in Space**	**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 **Key knowledge** • The Earth, moon and sun - Orbits and rotations • Seasons (the Earth's axis) and leap years • Phases of the moon • The solar system • Stars (including the sun) • Asteroids • Gravity	**Key Vocabulary** Axis Orbit Planet Galaxy Universe Asteroid Mass Gravity Attract Repel Hemisphere Heliocentric Geocentric

			• The Milky way (galaxy) • The Universe - The geocentric model of the universe and the heliocentric model of the Solar System • Telescopes	
			Watch the following videos to recap knowledge: - The Solar System Part 1| Astrophysics	Physics	FuseSchool - The Solar System Part 2	Astrophysics	Physics	FuseSchool - Features of our Solar System guide for KS3 physics students - BBC Bitesize - Sun as a star KS3 Physics guide for students - BBC Bitesize - Days, months, years and seasons guide for KS3 physics students - BBC Bitesize - Phases of the Moon: Astronomy and Space for Kids - FreeSchool	
	Biology	**Classification and Variation**	**Threshold concept:** **Ecology** To include interactions and interdependence between organisms. **Key knowledge** • Classification of organisms into kingdoms • Naming organisms using binomial names • Defining species • Classifying organisms using a key • Sampling using a quadrat • Classifying species using differences in cellular features • Reproduction and variation • Causes of variation within species • Continuous and discontinuous variation • Plotting data using bar charts and line graphs	**Key Vocabulary** Variation Reproduction Inherit DNA Species Distribution Population Sample Estimate Quadrat Taxonomy Classification Biodiversity Classification key Kingdom Genus Binomial Continuous variation Discontinuous variation

			Watch the following videos to recap knowledge: - Variation | Genetics | Biology | FuseSchool - How Are Organisms Classified? | Evolution | Biology | FuseSchool - Types of variation - Inheritance and genetics - KS3 Biology - BBC Bitesize - What is classification? - BBC Bitesize