The King's CHURCH OF ENGLAND ACADEMY KIDSGROVE

Curriculum plan: Science

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INTENT:

"Look deep into nature, and then you will understand everything better"

Albert Einstein

The intent of the science department is to convey to students that science underpins everything.

At The King's, we study:

- **Physics** to be able to understand the fundamental principles that govern all Energy and matter in the Universe. Physics gives us tools to understand nature from the scale of a sub-a-tomic particles up to the inter-galactic scale of the universe;
- **Chemistry** to be able to understand the nature of substances: how they are composed, their behaviours, and their physical and chemical properties. Chemistry allows us to identify unknown substances, monitor concentrations and synthesize new chemicals. Above all, chemistry is about finding solutions to the problems that concern us and our surroundings;
- **Biology** to be able to understand life and thereby understand ourselves. Biology allows us an understanding od the amazing complexity of many life processes and mechanisms. Biology encourages us to seek out reasons for strange, surprising and sometimes usual observations.

Science provides some incredibly challenging topics helping to gauge an awareness of topical issues and their impact on the climate, earth as well as human growth.

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Please click on the icons to access our online portal where you can learn more about each topic

Half term points

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
7	**Big Idea 7, 8, 9** Cells: the building blocks of life  **Learning to include:** • How cells work for an organism • How plants are adapted to reproduce • Reproduction in humans	**Big Idea 1** Mixing, dissolving and separating  **Learning to include:** • Using laboratory equipment • Distillation • Solubility • Chromatography	**Big Idea 7, 8, 9** Cells: the building blocks of life  **Learning to include:** • How cells work for an organism • How plants are adapted to reproduce • Reproduction in humans **Big Idea 1** Elements, compounds, and reactions **Learning to include:** • Elements and atoms	**Big Idea 7,8** Eating, drinking, and breathing  **Learning to include:** • A healthy diet • The digestive system • The breathing system	**Big Idea 1** Elements, compounds, and reactions **Learning to include:** • Elements and atoms • The periodic tables • Using simple models • Reactions 	**Big Idea 7,8** Eating, drinking, and breathing  **Learning to include:** • A healthy diet • The digestive system • The breathing system

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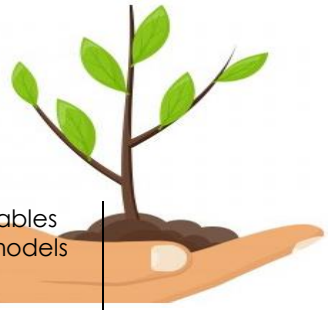

- The periodic tables
- Using simple models
- Reactions

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	Big Idea 2,3, 4 Forces and their effect	**Big Idea 1, 2:** Exploring the basics of electricity	**Big Idea 2,3, 4** Forces and their effect	**Big Idea 1** Mixing, dissolving and separating **Learning to include:** • Using laboratory equipment • Distillation • Solubility • Chromatography	**Big Idea 1, 3** Energy transfers and sounds **Learning to include:** • Energy • Useful and useless energy transfers • Transferring more energy • Energy is carried by sound	**Big Idea 1, 3** Energy transfers and sounds **Learning to include:** • Energy • Useful and useless energy transfers • Transferring more energy • Energy is carried by sound **Project** Independent research project based on Jurassic Park – Link: Evolution, Genetic information and DNA

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	Learning to include: • types of force • things that forces do • useful and unwanted friction • levers and turning forces Bitesize	**Learning to include:** • electricity is the flow of charge • how charge is produced • what is current? • What is resistance? • What is potential difference? Bitesize	**Learning to include:** • types of force • things that forces do • useful and unwanted friction • levers and turning forces Bitesize			

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	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
8	**Big Idea 7, 8** Getting the energy the body needs **Learning to include:** • The skeleton • Muscles • Aerobic respiration • Anaerobic respiration	**Big Idea 8** Looking at plants and eco-systems **Learning to include:** • Healthy plants • Producers • Relationships in the environment **Big Idea 1** Exploring chemical changes **Learning to include:** • Acids, alkalis, and indicators • Reactions of acids and alkalis • Combustion	**Big Idea 7, 8** Getting the energy the body needs **Learning to include:** • The skeleton • Muscles • Aerobic respiration • Anaerobic respiration **Big Idea 1** Explaining physical changes **Learning to include:** • using then particle model to explain the states of matter • using the particle model to explain properties • particles in physical	**Big Idea 7, 8** Our health and the effect of drugs **Learning to include:** • cigarettes and alcohol • effects if drugs • preventing and treating infection • disease	**Big Idea 8** Looking at plants and eco-systems **Learning to include:** • Healthy plants • Producers • Relationships in the environment • Modification **Big Idea 1** Exploring chemical changes **Learning to include:** • Acids, alkalis, and indicators • Reactions of acids and alkalis • Combustion	**Big Idea 7, 8** Our health and the effect of drugs **Learning to include:** • cigarettes and alcohol • effects if drugs • preventing and treating infection • disease

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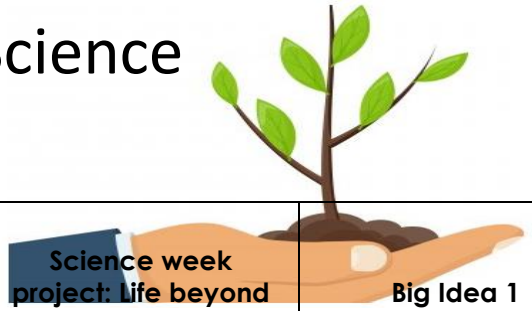

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	Big Idea 1 Explaining physical changes **Learning to include:** • using then particle model to explain the states of matter • using the particle model to explain properties • particles in physical and chemical changes Bitesize	**Big Idea 1** Exploring contact and non-contact forces **Learning to include:** • gravity and space travel • electrostatic and magnetic forces • pressure, floating and sinking Bitesize	**Science week project: Life beyond Earth**	**Big Idea 1** Exploring contact and non-contact forces **Learning to include:** • gravity and space travel • electrostatic and magnetic forces • pressure, floating and sinking Bitesize Bitesize	**Big Idea 1, 2** Magnetism and electricity **Learning to include:** • how magnets work • electromagnets • explaining electric circuits • series and parallel circuits Bitesize	**Big Idea 1, 2** Magnetism and electricity **Learning to include:** • how magnets work • electromagnets • explaining electric circuits series and parallel circuits

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Half term points

AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Big Idea 7, 8, 9: Cells: the building blocks of life	**Big Idea 4, 5:** Using our Earth sustainably **Learning to include:** • the earth's atmosphere has changed over time and is still changing now • some human activities are thought to affect the rate at which the atmosphere is changing • technological advances impact on the quality of our atmosphere • the earth's resources are limited and may be damaged • the need to use land must be balanced against the impact on the earth's resources Bitesize	**Big Idea 7, 8, 9:** Cells: the building blocks of life **Learning to include:** • What we can see under the electron microscope – and how to calculate magnification. • The similarities and differences between prokaryotic and eukaryotic cells and orders of magnitude. • The roles of osmosis and active transport in the movement of materials in and between cells. Bitesize **Big Idea 7, 8, 9:** Obtaining useful materials **Learning to include:** • Metals found in rocks called ores • Changes are needed to remove the metal from the ores so they can be useful • Metal ores are obtained from mines, but these can have	**Big Idea 9, 10:** Variation for survival **Learning to include:** • Variation within a species can be measured • Humans value some variations in plants and animals more than others • There is a common method for naming organisms • Carl Linnaeus was a pioneer in the field of classification • Variation between organisms ensured that some organisms survive • Variation between animals causes competition Bitesize **Big Idea 2,3:** Motion on earth and in space **Learning to include:** • The gravitation field strength around an object depends on the mass of the object and its	**Big Idea 4, 5:** Using our Earth sustainably **Learning to include:** • Nature constantly recycles materials • There are benefits and limitations to the recycling of materials]some recycled materials are down-cycled to less desirable products • There is a relationship between the shape of a volcano and the type of magma it produces • Magma solidifies to form igneous rock • Fossils can form in sedimentary rock • The rock cycle • Mountains form from movement of the earth's crust Bitesize **Big Idea 1, 2:** Exploring the basics of electricity **Learning to include:** • How to calculate the charge flow in an electric circuit • How to work out the	**Big Idea 9, 10:** Variation for survival **Learning to include:** • DNA has a very complex structure, understanding this allows us to determine features • Chromosomes and genes are portions of DNA that carry inherited information • Wilkins, Franklin, Watson and Crick played important roles in discovering the structure of DNA • Chromosomes from each parent are passed on during reproduction • The features that you are determined by the form of the genes you inherit from your parents • Some genes can mask the effects of others • A small change in chromosome can cause a genetic defect Bitesize

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			negative impacts • The reactivity series is a list of metals arranged in order of their reactivity • More reactive elements will remove less reactive elements from their compounds **Big Idea 2, 4:** Waves and energy transfer **Learning to include:** • Conduction and radiation are important ways of moving energy from place to place • The quantity of energy transferred in a change can be measured • How quickly energy is transferred is important and this can also be measured • Fuel bills show how much energy cost	distance from the centre of the field • Gravity accounts for most of the patterns in motion in the universe • The motion of earth around the sun and the tilt of the earth's axis account for variations in day length and for seasonal changes • The sun is our nearest star and billions others are present in the universe • Distances in space are so vast that special units are used to measure them	resistance and potential difference in an electric circuit. • How mains electricity differs from electricity supplied by batteries. • How to calculate the power of an electrical appliance.	**Big Idea 2, 4:** Waves and energy transfer **Learning to include:** • Waves in water are transverse waves that carry energy • Water waves, like sound waves, need a medium to travel through • Water waves can be reflected • Light travels as transverse waves that carry energy • Light waves can travel through a vacuum • Light can be reflected, absorbed and refracted • White light can be split into a spectrum of colours

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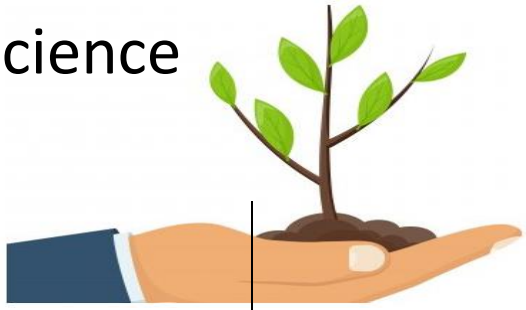

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Learning to include:

- What we can see under the electron microscope – and how to calculate magnification.
- The similarities and differences between prokaryotic and eukaryotic cells and orders of magnitude.
- The roles of osmosis and active transport in the movement of materials in and between cells.

Big Idea 7, 8, 9:
Obtaining useful materials

Learning to include:

- Metals found in rocks called ores
- Changes are needed to remove the metal from the ores so they can be useful
- Metal ores are obtained from mines, but these can have negative impacts
- The reactivity series is a list of metals arranged in order of their reactivity
- More reactive elements will remove less reactive elements

Big Idea 1, 2:
Exploring the basics of electricity

Learning to include:

- How to calculate the charge flow in an electric circuit
- How to work out the resistance and potential difference in an electric circuit.
- How mains electricity differs from electricity supplied by batteries.
- How to calculate the power of an electrical appliance.

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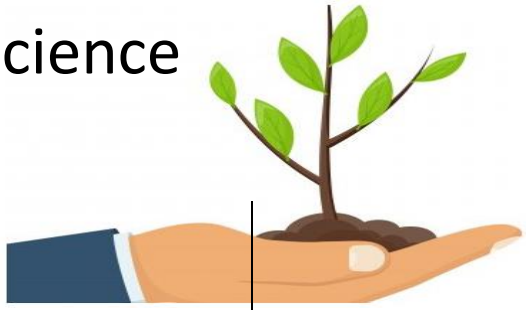

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from their compounds
- Metal carbonates can be decomposed by heat

Big Idea 2,3: Motion on Earth and in space

Learning to include:
- If two or more forces are acting on a stationary object, the forces are in balance
- A moving object will continue at the same speed and in the same direction unless an unbalanced force acts upon it
- Objects motion can be represented on distance-time graphs
- The motion of two objects can be compared and their relative speed calculated

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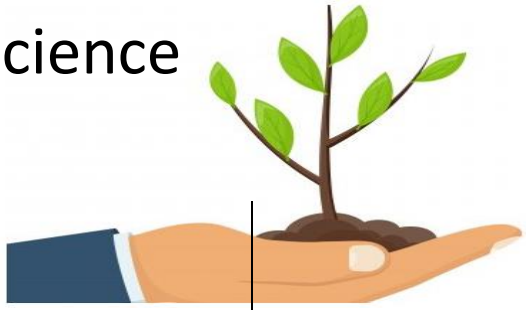

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