Curriculum plan: Science

CONNECTED

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.

The King's CHURCH OF ENGLAND SCHOOL KIDSGROVE Curriculum plan: Science

CONNECTED

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

7

Half term points

AUTUMN 1

Safety in science

Big Idea 1: Forces
Speed and Gravity

Learning to include:
- how forces act as interactive pairs
- balanced and unbalanced forces
- calculating the speed of a moving object
- interpreting distance time graphs
- the effect gravitational field strength

Bitesize

Biology

Big Idea 8: Organisms
Cells and organisms

Bitesize

Learning to include:
- levels of organisation in organisms
- the structure of the skeleton
- movement of joints
- movement of muscles
- how to observe cells
- structure of animal and plant cells
- how specialised cells are adapted
- how substances move into and out of cells
  uni-cellular organisms

AUTUMN 2

Chemistry

Big Idea 5: Matter
Particle model & separating mixtures

Learning to include:
- the particle model
- states of matter
- melting, freezing, boiling
- changes between each state of matter
- how particles move
- the effects of pressure on particles
- solutions and solubility
- filtering, evaporation, distillation, chromatography

Bitesize

Physics

Big Idea 2: Electromagnets
Current and resistance

Bitesize

Learning to include:
- defining and explaining how potential difference affects components
- the effect of resistance on components
- series and parallel circuits
- defining and explaining the effect of current
  electric charge

SPRING 1

Biology

Big Idea 9: Ecosystems
Interdependence and plant reproduction

Learning to include:
- food chains and webs
- interdependence and bioaccumulation
- ecosystems and niche
- competition between organisms
- flowers and pollination
- fertilisation and germination
- methods of seed dispersal

Bitesize

Chemistry

Big Idea 6: Reactions
Metals & Non metals
Acids and Alkali

Bitesize

Learning to include:
- chemical reactions
- acids & alkalis –
  - indicators and ph
  - acid strength
  - neutralization
- making salts
- chemical reactions:
  - metals and oxygen
  - metals and water

metal displacement reaction

SPRING 2

Physics

Big Idea 3: Energy
Energy costs and energy transfer

Learning to include:
- energy in foods and fuels
- energy resources
- calculating energy and power of appliances
- conservation of energy and transferring energy
- energy dissipation and efficiency

Bitesize

Biology

Big Idea 10: Genes
Variation and human reproduction

Bitesize

Learning to include:
- variation between organisms
- continuous and discontinuous variation
- organisms adapting to change
- adolescence
- reproductive systems
- fertilisation and implantation
- development of a foetus
  the menstrual cycle

SUMMER 1

Chemistry

Learning Big Idea 7: Earth
Structure and the Universes

Learning to include:
- the structure of the earth
- sedimentary rocks
- igneous and metamorphic rocks
- the rock cycle
- ceramics
- the solar system
- the structure of the earth
- the phases of the moon

Bitesize

SUMMER 2

Physics

Big Idea 4: Waves
Sound and Light

Learning to include:
- sound waves and speed
- loudness and amplitude
- frequency and pitch
- the ear and hearing
- light waves and speed
- reflection
- refraction
- the eye and vision
- colour

Bitesize

Project
Independent research project based on Jurassic Park – Link: Evolution, Genetic information and DNA

Curriculum plan: Science

CONNECTED

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
8	**Safety in science** **Big Idea 1: Forces** **Contract forces and pressure** Learning to include: • gas exchange • the mechanism of breathing • the effects of drugs, alcohol and smoking on the body • nutrient required by the body • testing foods • unhealthy diet and its impact • the structure of the digestive system • the role of bacteria and enzymes in digestion Bitesize **Biology** **Big idea 8: Organisms** **Breathing and digestion** Learning to include: • friction and drag • the effect of squashing and stretching forces • turning forces • pressure in gases, liquids and solids • impact of stress on solids Bitesize	**Chemistry** **Big Idea 5: Matter** **Elements and the periodic table** Learning to include: • elements, atoms, compounds • identifying chemical formulae • polymers • the periodic table • the properties of groups in the periodic table ○ Group 1 ○ Group 7 ○ Group 0 Bitesize **Physics** **Big Idea 2: Electromagnets** Electromagnets: Magnetism and electromagnets Learning to include: • Magnets and magnetic field • Electromagnets • The use of electromagnets Bitesize	**Biology** **Big Idea 9: Ecosystems** **Respiration and Photosynthesis** Learning to include: • aerobic respiration • anaerobic respiration • biotechnology • the process of photosynthesis • the structure and function of leaves • investigating photosynthesis • the role of plant minerals Bitesize Bitesize	**Chemistry** **Big Idea 6: Reactions** **Chemical energy and types of reactions** Learning to include: • atoms in chemical reactions • combustion • thermal decomposition • conservation of mass • exothermic and endothermic reactions • energy level diagrams • bond energies Bitesize **Physics** **Big Idea 3: Energy** **Work, heating and cooling** Learning to include: • work energy and machines • energy and temperature • energy transfer between particles • energy transfer: radiation and insulation Bitesize Bitesize	**Biology** **Big Idea 10: Genes** **Evolution and inheritance** Learning to include: • the process of natural selection • the history and work of Charles Darwin • preserving biodiversity • inheritance • the structure of DNA • genetics and inherited characteristics • genetic modification Bitesize **Physics** **Big Idea 4: Waves** **Wave effects and properties** Learning to include: • sound waves, water waves and energy • radiation and energy • modelling waves Bitesize	**Chemistry** **Big Idea 7: Earth climate and Earths resources** Learning to include: • global warming • the carbon cycle • climate change • extracting metals • recycling Bitesize **Independent research project based on the Martian**