

KS3

Pupils follow a programme of study that incorporates all aspects of Science. This includes elements of Biology, Chemistry and Physics, plus also a development of their Science Skills. An idea of the skills taught and assessed at KS3 is outlined below:

Year 7

BIOLOGY

- Know that all living things are made of cells
- Understand the basic structure of animal and plants cells
- Describe the differences between animal and plant cells
- Know that tissues are made of groups of cells and organs groups of tissues
- Be able to use a microscope to look at cells
- Explain how specialised cells are adapted to do their jobs
- Describe and explain the functions of the male and female reproductive systems
- Understand how fertilisation takes place in plants and animals
- Know how the foetus develops during pregnancy and what during birth
- Describe the main stages in the menstrual cycle
- Be able to analyse the different viewpoints of having a baby at 50 +
- List some of the changes that happen to males and females during puberty
- Know what variation and classification are
- Know the 7 characteristics of all living things
- Describe how living things are classified using the main taxonomic groups
- Explain the main differences between vertebrates and invertebrates
- Be able to use the taxonomic system to classify some example organisms
- Understand that some organisms seem to defy classification

CHEMISTRY

- Understand what an acid and alkali is
- Describe some everyday uses of acids and alkalis
- Use the pH scale to determine whether something is an acid or alkali
- Understand the term neutralisation
- Explain what happens when an acid and alkali are reacted together
- Describe the importance of neutralisation
- Know what a chemical reaction is
- Describe how we know when a chemical reaction has taken place
- Describe the tests for hydrogen, oxygen and carbon dioxide
- Describe what happens when acids react with metals and carbonates
- Describe what new substances are made when materials burn in oxygen
- Construct simple word equations for simple chemical reactions
- Understand what a scientific theory is
- Describe and explain the particles theory behind solids, liquids and gases
- Know the changes of state between solids, liquids and gases
- Know what diffusion is
- Describe what happens during expansion, contraction and compression of solids, liquids and gases
- Describe what happens to simple substances when gas pressure is changed

PHYSICS

- Know why fuels are useful
- Know what the 3 fossil fuels are
- Describe what is meant by the terms 'renewable' and 'non-renewable'
- Describe how fossil fuels are formed
- Understand the impact on the environment of burning fossil fuels
- Explain how living things use energy
- Recognise simple circuit symbols
- Be able to construct simple circuits
- Be able to measure current in a series and parallel circuit
- Know what resistance is
- Understand the hazards of electrical circuits
- Describe the use of fuses
- Be able to measure some simple forces
- Understand what is meant by balanced and unbalanced forces
- Describe why objects float and sink
- Explain why materials stretch
- Describe what weight is
- Describe and explain the effects of friction

Year 8

BIOLOGY

- Know what makes up a balanced diet
- Be able to carry out simple food tests
- Understand where we get our energy from and how it's stored
- Describe how our food is digested
- Explain how oxygen gets into our bodies
- Describe the role of the lungs in gas exchange
- Understand that some microorganisms cause disease
- Know that there are different types of microorganisms
- Understand the role of antibiotics and antibodies in keeping us healthy
- Describe how vaccines work and how we become immune to some diseases
- Know the importance of staying fit and how to stay fit
- Describe the effects of smoking, alcohol and drugs on the body
- Understand how the environment influences the animals and plants living in a habitat
- Know the importance of sampling
- Describe and explain how animals and plants are adapted to their habitats
- Understand predator-prey relationships and the factors that affect population sizes
- Describe the flow of energy in a food chain
- Describe how farmers earnings are affected by the use of fertilisers and biological control

CHEMISTRY

- Know what an atom is

- Understand that an atom is made of protons, neutrons and electrons
- Know the role of some of the key scientists involved in the development of the Periodic table
- Be able to classify elements into metals, non-metals, groups and periods using the Periodic Table
- Understand that elements can be a solid, liquid or a gas
- Know that an element is made of only one type of atom
- Know that a compound is made of two or more elements joined together
- Describe how we know a chemical reaction has taken place
- Understand that compounds have different properties to the elements they're made from
- Know that a molecule is two or more atoms (same or different) joined together
- Be able to construct simple word equations for chemical reactions
- Know what conservation of mass is
- Know that a mixture is made from different substances that aren't chemically joined together
- Understand the terms solute, solvent, solution, soluble and insoluble
- Know that mixtures can be easily separated
- Investigate the factors that affect dissolving
- Describe some of the different methods of separating substances
- Know the difference between atoms, compounds, elements, mixtures and molecules

PHYSICS

- Know the metals that are magnetic and how we can test for magnetism
- Describe how we can build an electromagnet and that factors that affect its strength
- Calculate speed using the distance, speed and time equation
- Describe how different forces can affect speed
- Explain how a parachutist reaches terminal velocity
- Be able to calculate pressure and moments using the appropriate equations
- Know the difference between temperature and heat
- Understand what makes a good conductor/insulator and their uses
- Describe how substances get hotter/colder
- Explain what happens to substances when they contract/expand
- Know the different changes of state between solids, liquids and gases
- Describe how heat energy is transferred through conduction, convection and radiation
- Know how light travels and how we're able to see things
- Understand the principles of reflection and refraction
- Describe how sounds are produced
- Explain how sounds travel through solids, liquids and gases
- Describe how the ear works and why some sounds can be dangerous
- Know that different colours of light have different frequencies

Year 9

BIOLOGY

- Explain what photosynthesis and respiration are and describe how they're carried out
- Be able to relate the structure of leaves to their function
- Describe how the transport of water and gases in plants takes place
- Be able to construct word and symbol equations for photosynthesis and respiration
- Describe how oxygen and carbon dioxide are exchanged in the body
- Identify the different parts of the heart and describe how it works
- Understand what variation is and what causes it

- Know that some characteristics are inherited and some are genetic
- Explain what fertilisation is and describe adaptations of egg and sperm cells
- Describe how selective breeding takes place in plants and animals
- Be able to identify the reproductive organs of plants
- Explain what a clone is and describe how cloning is carried out

CHEMISTRY

- Describe the properties of metals and non-metals
- Be able to construct word and symbol equations for chemical reactions
- Identify the products when metals, metal carbonates and metal oxides react with acids
- Describe how acids and alkalis can be neutralised
- Describe some uses of salts
- Be able to carry out practical's correctly and safely in the laboratory
- State what products are formed when metals react with oxygen and water
- Describe what the reactivity series is
- Explain how the reactivity series can be used to make predictions in chemical reactivity
- Understand what displacement theory is and its importance
- Construct word and symbol equations for the reaction of metals with oxygen and water
- Understand the importance of chemistry in the real world

PHYSICS

- Describe some simple energy transformations
- Understand that some energy is useful and some is wasted
- Describe the different parts of a power station and explain how it works
- Be able to construct series and parallel circuits
- Calculate the cost of electricity
- Explain what resistance is and how it's measured
- Explain what causes days, months, years and seasons
- Know what the solar system consists of
- Describe the difference between weight and mass
- Understand how weight, mass and gravity are related
- Explain what gravity is
- Describe the uses of satellites and explain what keeps them in orbit