The Holden School

Curriculum Intent

Science

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Subjects included: Science (Biology, Chemistry and Physics)

Science Curriculum Intent

At The Holden School, our science curriculum aims to ignite the spark that can change a student's perception of science from subject, to interest and eventually on to passion. We aim to give light to how science influences all of our lives on a daily basis, how the advances of the past have lead us to the present and how the advances made now can take us to the future.

It is our belief that science in not just an academic subject, but an entwined mixture of both academic and practical. This is why we give our students the most opportunities possible to undertake practical experiments to supplement and cement their understanding on key concepts. Throughout the curriculum, there is opportunity to work both independently and as groups to promote **resilience, independence** and **social skills**.

Staff continually use and model tier 3 scientific vocabulary throughout discussion and student interactions and in turn promote the same from students.

The schools work towards their highest potential and **being the best they can be** by **nurturing strengths, diversity** and **independence**. Effective use of assessment allows pupils and teachers to reflect on the learning that has taken place, increases motivation for learning and helps to demonstrate impact. Assessment is regular and informs all parties of progress, however, is often informal and avoids any anxiety. The Science curriculum make use of the AQA Unit awards programmes with all of our pupils in as many areas as possible to assist them to gain certification. This enables all pupils to gain certification which is nationally recognized and appropriate to their own individual needs and also helps to improve pupil self-esteem and confidence.

The science curriculum is rife with cross-curricular opportunities. These include; the use of mathematics (particularly in physics), the science behind sports, the scientific enhancements in history and many more.

Topic	Year / Key Stage	Learning Objective
Longitudinal and transverse waves (Physics)	KS4	Recognise that waves transfer energy not physical materials.
Longitudinal and transverse waves (Physics)	KS4	Distinguish between transverse and longitudinal waves.
Longitudinal and transverse waves (Physics)	KS4	Know that sound waves need a medium (material) to travel through.
Wave properties (Physics)	KS4	Identify wavelength and amplitude on a diagram of a transverse wave.
Wave properties (Physics)	KS4	Use the wave equation and recall the correct units for wave speed, frequency and wavelength.
The electromagnetic spectrum (Physics)	KS4	Recall the order of the spectrum (but not the values of wavelength or frequency).
The electromagnetic spectrum (Physics)	KS4	Identify the risks associated with ultraviolet waves, X-rays and gamma rays.
Uses of the electromagnetic spectrum (Physics)	KS4	Recall the seven components of the e-m spectrum.
Uses of the electromagnetic spectrum (Physics)	KS4	Explain why each type of radiation is suitable for its use.

Teaching and Learning in Science

What does excellent teaching and learning look like in Science?

At The Holden School, we believe that outstanding teaching in science can enthuse students in the subject. The best science lessons will give plenty of opportunities for students to take a hands on approach and again a feeling of responsibility in their own science education. This is achieved through frequent independent and group work.

The staff aim to give all students equal access to material being taught, but bespoke and differentiated to effectively meet the specific needs of each individual student.

Outstanding teaching in science at The Holden School will allow students to leave with a clear understanding of the world around them and the best attainable outcome for them individually.

How is Science taught in the Holden School Curriculum (EYFS, KS1 & KS2)?

Throughout EYFS, KS1 and KS2, students are introduced to fundamental concepts in Science. Students will follow the Plan Bee Curriculum which follows the National Curriculum for Science. This curriculum provides an excellent starting point for students' journey into the subject, setting foundations that will be built upon throughout the rest of the students' Science education. This begins with topics like; Identifying Plants and Animals, Materials, Structure of the Human Body and works towards knowledge of Circuits, Evolution and Space. Throughout this period, students will be encouraged to be curious, investigative and join in on discussion.

Teaching and Learning in Science

How is Science taught in the Holden School Curriculum (KS3)?

Upon starting KS3, this is where Science becomes split into the 3 key sciences; Biology, Chemistry and Physics. Students are introduced to key practical and investigational skills and how to conduct successful scientific experiments. The comprehensive curriculum for KS3 builds upon the foundational knowledge gained previously, follows the National Curriculum and allows opportunity for students to achieve AQA Awards. With excellent resources, teachers will be able to make many lessons have at least some practical elements, which can often cement students understanding. Frequent discussion during lessons will allow teachers to make even more accurate assessment of students understanding, but will also allow students to have a more hands-on approach to their science education. All objectives are clearly differentiated to create stretch and challenge for all pupils to progress. Due to class sizes, feedback to student can be given in lessons.

How is Science taught in the Holden School Curriculum (KS4)?

Science in KS4 is taught to further build upon previous knowledge by revisiting previous concepts and exploring in further detail and complexity. Further enhancing investigation skills and providing a practical environment for learning. Frequent discussion during lessons will allow for accurate assessment of understanding. All objectives are clearly differentiated to create stretch and challenge for all pupils to progress. Due to class sizes, feedback to student can be given in lessons. The KS4 Curriculum follows the National Curriculum and AQA guidance to allow opportunity for students to achieve AQA awards.

Topic	Year / Key Stage	Learning Objective
Energy transfer in electrical appliances (Physics)	KS4	Name the units used in a domestic electricity meter to measure energy (kWh).
Energy transfer in electrical appliances (Physics)	KS4	Decide which of a selection of appliances has transferred the most energy for a known period of time.
Magnets (Physics)	KS4	Recall that the poles of a magnet are where the magnetic forces are strongest.
Magnets (Physics)	KS4	Recall that like poles attract and unlike poles repel and recognise these as non-contact forces.
Magnets (Physics)	KS4	Describe the pattern of magnetic fields between two magnets.
Electromagnets and solenoids (Physics)	KS4	Recall that a current in a wire produces a magnetic field around the wire.
Electromagnets and solenoids (Physics)	KS4	Recall that increasing the current increases the strength of a magnetic field.
Electromagnets and solenoids (Physics)	KS4	Construct a simple electromagnet from a solenoid and an iron core.
Electromagnets and solenoids (Physics)	KS4	Recall uses of electromagnets in relays and scrapyards.

Topic	Year / Key Stage	Learning Objective
Current in a circuit (Physics)	KS4	Recognise that current in a component depends on the resistance in the circuit.
d.c. and a.c. current (Physics)	KS4	Recall that direct current is supplied by cells and batteries.
d.c. and a.c. current (Physics)	KS4	Recall that mains electricity is alternating current.
d.c. and a.c. current (Physics)	KS4	Recall that UK mains electricity has a frequency of 50Hz and is 230V.
Wiring a plug (Physics)	KS4	Recall the colour-coding for three-core flex and the appropriate terminal for each wire.
Wiring a plug (Physics)	KS4	Explain how the earth wire protects the user and how the fuse protects the appliance.
Wiring a plug (Physics)	KS4	Recall that double-insulated appliances do not need an earth wire.
Energy transfer in electrical appliances	KS4	Read a domestic electricity meter to measure the amount of energy used.
Energy transfer in electrical appliances (Physics)	KS4	Recall the unit for power (W). Recognise that heating devices have the highest power ratings.

Teaching and Learning in Science

How is reading promoted in Science?

All teachers of Science will be aware of each student's current reading age and blank level assessment. This will ensure that all resources and tasks within lessons will be bespoke and differentiated appropriately to each student. As well as encouraging independent reading where appropriate, for activities such as reading scientific articles or texts. With appropriate levels tailored to each student, this will encourage development in reading ability.

How is careers promoted in Science?

Careers in Science will be promoted by showing different careers within each taught topic, and where learning those topics can lead. Throughout science, different careers can be explored, with possible opportunity to visit science professions.

How is Social, Moral, Spiritual, Cultural (SMSC) and British Values promoted in Science?

SMSC is promoted through the science curriculum by understanding that science is a universal language for everybody, and everyone can have an interest in science. There will also be opportunities for social discussion around certain points that socially have different perspectives. There is opportunity to work with other subjects to more broadly cover SMSC related topics, such as reproduction being aided by sex education from PSHE.

Measuring Impact in Science

At The Holden School we use an online platform called SOLAR (Special On Line Academic Records) to record student attainment in science. This system uses the 'Holden School Steps' Assessment Framework.

The Holden School Steps cover a broad range of ability, from the 'Foundation Learning Skills' (FLS) that cover Early Years education, through to the main 'Steps' curriculum that takes students from Year 1 through to Year 11. This helps to provide staff with additional guidance on the sequence and progression of knowledge and skills within the science curriculum, helping to ensure that learning builds upon prior attainment.

The expectation for progress for students is that they will master 80% of the curriculum each year to achieve mastery of that step, before moving on to the next step.

Students are encouraged to gain external accreditation for their learning from the earliest opportunity. This can be through awarding bodies, such as the AQA Unit Award Schemes and Entry Level Qualifications. The aspirational goal for all students is that they leave with the highest level of appropriate qualifications they can access, within their areas of interest and ability.

In the future, the school will be working towards implementing GCSE qualifications for students, where it would be appropriate.

Skills and Progression

All the knowledge and skills that we would like our leaners to achieve by the end of year 11 are set out in sequential order on SOLAR. It is our intention to ensure that all children progress at the expected rate so they area able to achieve their personal best. We have ordered the knowledge and skills in a sequential way and these can be seen on the following pages.

Topic	Year / Key Stage	Learning Objective
Weather conditions and braking distances (Physics)	KS4	Explain how the braking distance of a vehicle can be affected by adverse road and weather conditions and the poor condition of the vehicle.
Radioactivity (Physics)	KS4	Recall that some atomic nuclei are unstable and produce ionising radiation.
Radioactivity (Physics)	KS4	Recall that nuclear radiation may be emitted as: · alpha particles · beta particles · gamma rays.
Radioactivity (Physics)	KS4	Describe the penetration of materials and range in air of ionising radiation.
Radioactivity (Physics)	KS4	Describe the uses and dangers of the three types of radiation.
Current in a circuit	KS4	Describe a current as a flow of electrical charge.
Current in a circuit (Physics)	KS4	Construct a simple series circuit.
Current in a circuit (Physics)	KS4	Measure current using an ammeter in series.
Current in a circuit (Physics)	KS4	Measure voltage using a voltmeter in parallel across a component.

Topic	Year / Key Stage	Learning Objective
Speed (Physics)	KS4	Recall the units for speed as metres per second, kilometres per hour and miles per hour.
Speed (Physics)	KS4	Calculate average speed using the equation: speed = distance/time.
Stopping distances (Physics)	KS4	Recall that the stopping distance of a vehicle is the sum of the distance the vehicle travels during the driver's reaction time (thinking distance) and the distance it travels under the braking force (braking distance).
Stopping distances (Physics)	KS4	Explain that, for a given braking force, the greater the speed of the vehicle, the greater the stopping distance.
Reaction times and stopping distances (Physics)	KS4	Recognise that the typical reaction time for a person ranges from 0.5s to 0.9s.
Reaction times and stopping distances (Physics)	KS4	Measure human reaction times.
Reaction times and stopping distances (Physics)	KS4	Describe how a driver's reaction time can be affected by tiredness, drugs and alcohol and distractions.

Topic	Year / Key Stage	Learning Objective
Seasonal Change	Year 1	To find out about different seasons and how to describe them
Seasonal Change	Year 1	To find out about the season and how they are different
Seasonal Change	Year 1	To find out how animals are affected by the seasons
Seasonal Change	Year 1	To find out how humans are affected by the seasons
Seasonal Change	Year 1	To find out about the day length is affected by the seasons
Seasonal Change	Year 1	To investigate the weather during the seasons
Seasonal Change	Year 1	Seasonal Change Working Scientifically
My Body	Year 1	To be able to name, label and identify body parts
My Body	Year 1	To explore what parts of our bodies we use for
My Body	Year 1	To find out about the five senses, in particular sense

Topic	Year / Key Stage	Learning Objective
My Body	Year 1	To explore the sense of touch
My Body	Year 1	To explore the sense of smell
My Body	Year 1	To explore the sense of taste
My Body	Year 1	To explore the sense of sound
My Body	Year 1	My Body Working Scientifically
Identifying Animals	Year 1	To be able to identify and name a variety of common animals
Identifying Animals	Year 1	To be able to identify and name a variety of common UK mammals
Identifying Animals	Year 1	To be able to identify and compare a variety of common UK birds and reptiles
Identifying Animals	Year 1	To be able to identify and compare a variety of common UK fish and amphibians
Identifying Animals	Year 1	To be able to identify and sort carnivores, herbivores and omnivores

Topic	Year / Key Stage	Learning Objective
Energy transfers and efficiency (Physics)	KS4	Explain how the rate of cooling of a building is affected by the thickness and thermal conductivity of its walls.
Energy transfers and efficiency (Physics)	KS4	Recall that the higher the thermal conductivity of a material, the higher the rate of energy transfer by conduction across the material.
Energy resources (Physics)	KS4	Explain what is meant by 'fuel' and 'fossil fuel.
Energy resources (Physics)	KS4	Identify energy resources as renewable or non-renewable.
Types of forces (Physics)	KS4	Describe a force as a push or pull acting on an object due to an interaction with another force.
Types of forces (Physics)	KS4	Recall that forces are either: contact forces or non-contact forces.
Effects of forces (Physics)	KS4	Explain that work is done when a force causes an object to move through a distance (No calculations needed). Explain that when work is done against frictional forces acting on an object, there is a rise in temperature.
Speed (Physics)	KS4	Recall that speed is measured by the distance travelled in a certain time.

Topic	Year / Key Stage	Learning Objective
Human genetics (Biology)	KS4	Recall that humans have 23 pairs of chromosomes. One pair determines sex, XX for female and XY for male.
Human genetics (Biology)	KS4	Recall that in genetic engineering, genes can be cut from chromosomes and transferred into the cells of other organisms.
Human genetics (Biology)	KS4	Recognise that there are risks and benefits in genetic engineering.
Changes in energy storage (Physics)	KS4	Describe the change in the way energy is stored in a simple system change such as when a kettle boils.
Changes in energy storage (Physics)	KS4	Recognise that not all the changes are useful.
Changes in energy storage (Physics)	KS4	Identify the main energy wastages in a range of devices.
Energy transfers and efficiency (Physics)	KS4	Recognise that energy cannot be created or destroyed.
Energy transfers and efficiency (Physics)	KS4	Explain that in any energy transfer, some energy is stored in less useful ways and is described as 'wasted' energy. Identify ways in which the unwanted energy transfers can be reduced.

Topic	Year / Key Stage	Learning Objective
Identifying Animals	Year 1	To be able to take care of animals
Identifying Animals	Year 1	To collect data about animals and answer questions
Identifying Animals	Year 1	Identifying Animals Working Scientifically
Identifying Plants	Year 1	To find out what a plant is
Identifying Plants	Year 1	To identify and describe garden plants
Identifying Plants	Year 1	To identify and describe wild plants
Identifying Plants	Year 1	To identify and describe a range of trees
Identifying Plants	Year 1	To identify different parts of a plant
Identifying Plants	Year 1	To make observations of growing plants
Identifying Plants	Year 1	Identifying Plants Working Scientifically
Seaside Objects	Year 1	To be able to identify a variety of common materials

Topic	Year / Key Stage	Learning Objective
Seaside Objects	Year 1	To explore wooden objects and my properties
Seaside Objects	Year 1	To explore rock, its form and its properties
Seaside Objects	Year 1	To explore plastic and how it can be used depending on its properties
Seaside Objects	Year 1	To recap what we have learned about seaside objects
Seaside Objects	Year 1	Seaside Objects Working Scientifically
Everyday Materials	Year 1	To be able to identify a variety of common materials
Everyday Materials	Year 1	To be able to distinguish between an object and the material from which it is made
Everyday Materials	Year 1	To be able to describe materials according to their properties
Everyday Materials	Year 1	To be able to describe why some materials suit certain objects better than others
Everyday Materials	Year 1	To carry out an experiment to find out which materials are waterproof

Topic	Year / Key Stage	Learning Objective
Sexual and asexual reproduction (Biology)	KS4	Recall that sexual reproduction involves the joining of male and female sex cells.
Sexual and asexual reproduction (Biology)	KS4	Recall that sexual reproduction involves the mixing of genetic information and so variation in the offspring.
Sexual and asexual reproduction (Biology)	KS4	Recall that asexual reproduction involves only one parent.
Sexual and asexual reproduction (Biology)	KS4	Recall that, in asexual reproduction, there is only one set of genetic information.
Sexual and asexual reproduction (Biology)	KS4	Recall that these identical offspring are called clones
Human genetics (Biology)	KS4	Recall that a cell has cytoplasm and a nucleus that controls the actions of the cell.
Human genetics (Biology)	KS4	Recall that the genetic material in the nucleus of a cell is DNA.
Human genetics (Biology)	KS4	Recall that DNA is contained in chromosomes.
Human genetics (Biology)	KS4	Recall that chromosomes carry genes that control the characteristics of the human body.

Topic	Year / Key Stage	Learning Objective
Pollution and the effects of human population growth (Biology)	KS4	Recall that air can be polluted by smoke and gases such as sulfur dioxide which can cause acid rain.
Pollution and the effects of human population growth (Biology)	KS4	Recall that landfill and toxic chemicals such as pesticides and herbicides contribute to land and water
Pollution and the effects of human population growth (Biology)	KS4	Describe how rapid human population growth leads to more resource use and more waste.
Evolution, natural and artificial selection (Biology)	KS4	Recall Darwin's theory that all living things evolved from simple life forms.
Evolution, natural and artificial selection (Biology)	KS4	Describe how the fossil record is evidence for this.
Evolution, natural and artificial selection (Biology)	KS4	Describe how fossils form.
Evolution, natural and artificial selection (Biology)	KS4	Recall that in natural selection, individuals with characteristics most suited to their environment are most likely to survive and breed.
Evolution, natural and artificial selection (Biology)	KS4	Recall that artificial selection is the process by which humans breed plants and animals for particular traits.
Evolution, natural and artificial selection (Biology)	KS4	Describe examples of animals and plants artificially selected for human requirements.

Topic	Year / Key Stage	Learning Objective
Everyday Materials	Year 1	To recap what we have learned about everyday materials
Everyday Materials	Year 1	Everyday Materials Working Scientifically
What Are Toys Made From	Year 1	To be able to identify and name a variety of everyday materials used to make toys
What Are Toys Made From	Year 1	To explore and describe wooden toys and their properties
What Are Toys Made From	Year 1	To explore and describe plastic toys and their properties
What Are Toys Made From	Year 1	To explore and describe metal toys and their properties
What Are Toys Made From	Year 1	To explore and describe fabric toys and their properties
What Are Toys Made From	Year 1	To recap what we have learned about what materials toys are made from
What Are Toys Made From	Year 1	What Are Toys Made From Working Scientifically

Topic	Year / Key Stage	Learning Objective
Exploring Everyday Materials	Year 2	To be able to identify a variety of materials and sort them according to a variety of criteria.
Exploring Everyday Materials	Year 2	To be able to identify natural and man-made materials
Exploring Everyday Materials	Year 2	To identify that some materials can change shape by squashing, bending, twisting and stretching, and others cannot
Exploring Everyday Materials	Year 2	To identify the suitability of metal and plastic for a variety of purposes
Exploring Everyday Materials	Year 2	To identify different products that can be made from wood, their features and their purposes
Exploring Everyday Materials	Year 2	To identify different materials that are used for the same product
Exploring Everyday Materials	Year 2	To identify material inventions and discoveries
Exploring Everyday Materials	Year 2	Exploring Everyday Materials Working Scientifically
Living in Habitats	Year 2	To be able to identify things that are living, things that are dead and things that have never been alive

Topic	Year / Key Stage	Learning Objective
Food chains and webs (Biology)	KS4	Recall the stages of a simple food chain starting with a producer.
Food chains and webs (Biology)	KS4	Describe the food chains in a food web and the links between species in the web.
Decomposition and recycling (Biology)	KS4	Recall that decay is a stage in the food chain/web process.
Decomposition and recycling (Biology)	KS4	Explain that microorganisms are responsible for decay and return carbon to the atmosphere to be used by plants in photosynthesis.
Competition (Biology)	KS4	Recall that plants often compete with each other for light, space, water and nutrients.
Competition (Biology)	KS4	Recall that animals often compete with each other for food, mates and territory.
Environmental changes (Biology)	KS4	Describe how animals and plants are affected by living and non-living factors that alter their environments
Environmental changes (Biology)	KS4	Recall a living and non-living factor that could alter an environment eg rainfall, average temperature, competitors and predators.
Pollution and the effects of human population growth (Biology)	KS4	Recall that water can be polluted by sewage, fertiliser or toxic chemicals.

Topic	Year / Key Stage	Learning Objective
Hormones can be used to control fertility. (Biology)	KS4	Recall that hormones can be used to inhibit or stimulate egg production.
Hormones can be used to control fertility. (Biology)	KS4	Recall that oral contraceptives contain hormones to inhibit eggs from maturing.
Hormones can be used to control fertility. (Biology)	KS4	Recall that fertility drugs stimulate eggs to mature.
Hormones can be used to control fertility. (Biology)	KS4	Evaluate the benefits and drawbacks of hormonal fertility control.
The Sun as the source of energy and the role of plants in photosynthesis. (Biology)	KS4	Recall that the sun is the source of energy for living organisms.
The Sun as the source of energy and the role of plants in photosynthesis. (Biology)	KS4	Describe how green plants and algae trap sunlight energy and use it to make glucose. Recall that this
The Sun as the source of energy and the role of plants in photosynthesis. (Biology)	KS4	Recall the word equation for photosynthesis.
Animals and plants may be adapted for survival in the conditions where they normally live (Biology)	KS4	Explain how different organisms are adapted when shown an image or description

Topic	Year / Key Stage	Learning Objective
Living in Habitats	Year 2	To understand that living things need suitable habitats
Living in Habitats	Year 2	To explore the plants and animals that live in seaside habitats
Living in Habitats	Year 2	To be able to explore plants and animals in an unfamiliar habitat
Living in Habitats	Year 2	To be able to explore and describe a micro-habitat
Living in Habitats	Year 2	To explore food chains in a habitat
Living in Habitats	Year 2	Living in Habitats Working Scientifically
Growth and Survival	Year 2	To find out about the offspring of a variety of different animals
Growth and Survival	Year 2	To find out about the different ways in which animals reproduce
Growth and Survival	Year 2	To explore how humans grow as they get older

Topic	Year / Key Stage	Learning Objective
Growth and Survival	Year 2	To find out what animals, including humans, need to survive
Growth and Survival	Year 2	To explore the environment as a fact of survival for animals, including humans
Growth and Survival	Year 2	To find out how to eat a healthy, balanced diet
Growth and Survival	Year 2	To find out why exercise is important to keep our bodies healthy
Growth and Survival	Year 2	Growth and Survival Working Scientifically
Growing Plants	Year 2	To understand different seeds grow into different plants and to describe them
Growing Plants	Year 2	To understand that plants can be grown from bulbs
Growing Plants	Year 2	To be able to explain how and why seeds are dispersed
Growing Plants	Year 2	To plan, carry out and evaluate an investigation into the conditions that affect germination

Topic	Year / Key Stage	Learning Objective
Medicinal drugs (Biology)	KS4	Recognise that people can become dependent or addicted to drugs and suffer withdrawal symptoms without them. Recall that antibiotics such as penicillin can kill bacterial pathogens.
Medicinal drugs (Biology)	KS4	Recall that they cannot be used against viral pathogens.
The nervous system (Biology)	KS4	Recall that the human body has automatic control systems: the nervous and (endocrine) hormonal systems.
The nervous system (Biology)	KS4	Recall that reflex actions are automatic and rapid. Describe examples of common reflex responses.
Hormonal control (Biology)	KS4	Recall that hormones are secreted by glands and are transported to target organs by the bloodstream.
Hormonal control (Biology)	KS4	Recall that the menstrual cycle is controlled by several hormones some of which promote egg release.
Hormonal control (Biology)	KS4	Recall that the menstrual cycle is controlled by several hormones some of which promote egg release.
Hormonal control (Biology)	KS4	Recognise the main features of the menstrual cycle described diagrammatically

Topic	Year / Key Stage	Learning Objective
Lifestyle and health (Biology)	KS4	Recognise that people who exercise regularly are usually fitter than people who take little exercise.
Infectious diseases (Biology)	KS4	Recall that infectious diseases are caused by microorganisms called pathogens.
Infectious diseases (Biology)	KS4	Recall that pathogens include both bacteria and viruses and may produce poisons (toxins) that make us feel ill.
Infectious diseases (Biology)	KS4	Recall that viruses damage the cells in which they reproduce.
The role of white blood cells (Biology)	KS4	Recognise the two main types of white blood cells: those that ingest bacterial cells and those that produce antibodies.
The role of white blood cells (Biology)	KS4	Recall that vaccination is used to stimulate the immune response using dead or inactive forms of a pathogen to produce antibodies.
The role of white blood cells (Biology)	KS4	Describe how vaccination is used in the prevention of disease.
Medicinal drugs (Biology)	KS4	Recall that medical drugs are developed and carefully tested before they can be used to relieve illness.
Medicinal drugs (Biology)	KS4	Recall that drugs change the chemical processes in the human body.

Topic	Year / Key Stage	Learning Objective
Growing Plants	Year 2	To observe and describe how a plant changes over time
Growing Plants	Year 2	Growing Plants Working Scientifically
Super Scientists	Year 2	To investigate the affect gravity has on everyday objects
Super Scientists	Year 2	To investigate what happens to light when it passes through different transparent objects
Super Scientists	Year 2	To investigate whether sound can pass through materials
Super Scientists	Year 2	To investigate our senses and reflexes
Super Scientists	Year 2	To investigate how germs are transferred by touching things
The Secret World of Plants	Year 2	To find out what plants need to grow
The Secret World of Plants	Year 2	To find out what a plant needs to stay healthy

Topic	Year / Key Stage	Learning Objective
The Secret World of Plants	Year 2	To explore and compare plants that are living, dying or dead, and discover how we can help dying plants live longer, or reproduce
The Secret World of Plants	Year 2	To observe and describe how plants grow
The Secret World of Plants	Year 2	To begin to describe how plants mature and reproduce
The Secret World of Plants	Year 2	The Secret World of Plants Working Scientifically
Health and Movement	Year 3	To identify humans get the nutrition the need from what they eat
Health and Movement	Year 3	To identify that a balanced diet is needed in order to stay healthy
Health and Movement	Year 3	To investigate which foods different animals eat
Health and Movement	Year 3	To carry out an investigation to find out what pets eat
Health and Movement	Year 3	To explore human and animal skeletons

Topic	Year / Key Stage	Learning Objective
The human digestive system (Biology)	KS4	Understand the role of enzymes in digestion.
Respiration (Biology)	KS4	Recall that respiration is a cellular process that releases energy
Respiration (Biology)	KS4	Understand that breathing and respiration are not the same
Respiration (Biology)	KS4	Recall that glucose comes from the diet and oxygen and carbon dioxide gases are exchanged through the lungs
Respiration (Biology)	KS4	Recall the word equation for respiration: glucose + oxygen → carbon dioxide + water
Lifestyle and health (Biology)	KS4	Demonstrate an understanding of the effect that lifestyle can have on people's health eg the links between: · diet, exercise and obesity and type 2 diabetes; · smoking and cancer; · alcohol and liver and brain function.
Lifestyle and health (Biology)	KS4	Describe the right balance of energy and different food groups required for good health.

Topic	Year / Key Stage	Learning Objective
Tissues, organs and systems (Biology)	KS4	Recall these definitions: · Tissue – a group of cells with a similar structure and function; · Organ – groups (aggregations) of tissues performing similar functions; · Organ systems – organs which work together.
Tissues, organs and systems (Biology)	KS4	Recognise the position of the major organs (brain, heart, liver, lungs, kidneys and reproductive organs) in the human body.
Tissues, organs and systems (Biology)	KS4	Describe the functions of the major organs.
Tissues, organs and systems (Biology)	KS4	Recall that the human circulatory system is made up of the heart and the blood.
Tissues, organs and systems (Biology)	KS4	Describe how the heart pumps blood round the body in a dual cir-
Tissues, organs and systems (Biology)	KS4	Recall that blood transports oxygen, proteins and other chemical substances around the body.
Tissues, organs and systems (Biology)	KS4	Recognise the different types of blood cells.
The human digestive system (Biology)	KS4	Recall the parts of the human digestive system and be able to identify them on a diagram.

Topic	Year / Key Stage	Learning Objective
Health and Movement	Year 3	To find out about how the skeleton supports and protects the body and to investigate how invertebrates are supported
Health and Movement	Year 3	To find out what muscles are and how skeletal muscles help us move
Health and Movement	Year 3	Health and Movement Working Scientifically
Forces and Magnets	Year 3	To explore what forces are and notice that some forces need contact between two objects
Forces and Magnets	Year 3	To compare how things move on different surfaces
Forces and Magnets	Year 3	To explore how magnetic forces work
Forces and Magnets	Year 3	To be able to identify magnetic materials
Forces and Magnets	Year 3	To investigate uses for magnets
Forces and Magnets	Year 3	Forces and Magnets Working Scientifically

Topic	Year / Key Stage	Learning Objective
Rocks, Fossils and Soils	Year 3	To be able to identify naturally occurring rocks and explore their uses
Rocks, Fossils and Soils	Year 3	To be able to group rocks according to their characteristics
Rocks, Fossils and Soils	Year 3	To be able to plan, carry out and evaluate experiments to compare rocks
Rocks, Fossils and Soils	Year 3	To identify rocks that used for a particular purpose
Rocks, Fossils and Soils	Year 3	To explore how soil is formed
Rocks, Fossils and Soils	Year 3	To explore what fossils are and how they are formed
Rocks, Fossils and Soils	Year 3	To be able to identify fossilised remains
Rocks, Fossils and Soils	Year 3	Rocks, Fossils and Soils Working Scientifically
How Plants Grow	Year 3	Identify and describe the functions of the roots of a flowering plant

Topic	Year / Key Stage	Learning Objective
Human influences on the atmosphere (Chemistry)	KS4	Recall that carbon dioxide is produced by burning fossil fuels.
Human influences on the atmosphere (Chemistry)	KS4	Recall that methane is produced from landfills and farming.
Human influences on the atmosphere (Chemistry)	KS4	Describe the effects of increased carbon dioxide and methane on the temperature of the atmosphere.
Water for drinking (Chemistry)	KS4	Recall that safe drinking water has few dissolved substances and low levels of microbes.
Water for drinking (Chemistry)	KS4	Describe how safe drinking water is produced by filtration and sterilisation.
Animal cells (Biology)	KS4	Recall the parts of human cells: · Nucleus – controls the activities of the cells and contains the genetic material; · Cytoplasm – where most chemical activities take place; · Cell membrane – controls the passage of substances in and out of cells.
Animal cells (Biology)	KS4	Describe how specialised cells are adapted for their function.

Topic	Year / Key Stage	Learning Objective
Crude oil and fuels (Chemistry)	KS4	Recall that crude oil is a mixture of a large number of compounds.
Crude oil and fuels (Chemistry)	KS4	Describe the location of crude oil.
Crude oil and fuels (Chemistry)	KS4	Explain how useful fuels, such as petrol and diesel, are produced from crude oil by fractional distillation.
Burning fuels (Chemistry)	KS4	Recall that the products of total combustion of a fuel are carbon dioxide, water vapour and oxides of nitrogen.
Burning fuels (Chemistry)	KS4	Recall that some fuels produce sulfur dioxide when burned.
Burning fuels (Chemistry)	KS4	Recall that partial combustion due to a limited air supply results in the production of carbon monoxide and, often, soot particles.
Burning fuels (Chemistry)	KS4	Explain why burning fossil fuels may harm the environment.
Burning fuels (Chemistry)	KS4	Recall that: · oxides of sulfur and nitrogen (NOX) cause acid rain and may harm human health. · carbon monoxide can cause death. · Solid particles can cause global dimming and harm human health.

Topic	Year / Key Stage	Learning Objective
How Plants Grow	Year 3	To investigate the way in which water is transported within plants
How Plants Grow	Year 3	To identify and describe the functions of leaves in flowering plants
How Plants Grow	Year 3	To explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal
How Plants Grow	Year 3	To explore some of the ways flowering plants disperse their seeds
How Plants Grow	Year 3	To understand the structure of seeds and their importance as a food source
How Plants Grow	Year 3	How Plants Grow Working Scientifically
Light and Shadows	Year 3	To recognise that we need light in order to see
Light and Shadows	Year 3	To explore the Sun as a light source and recognise the difference between night and day
Light and Shadows	Year 3	To investigate what shadows are and why they are formed

Topic	Year / Key Stage	Learning Objective
Light and Shadows	Year 3	To investigate how shadows behave
Light and Shadows	Year 3	To investigate how the size of shadows change throughout the day
Light and Shadows	Year 3	To explore how light is reflected from surfaces
Light and Shadows	Year 3	Light and Shadows Working Scientifically
Circuits and Conductors	Year 4	To investigate circuits and their different components
Circuits and Conductors	Year 4	To investigate the difference between mains-powered and battery-powered circuits
Circuits and Conductors	Year 4	To recognise some common conductors and insulators, and associate metals with being good conductors
Circuits and Conductors	Year 4	To investigate the purpose of conducting and insulating materials
Circuits and Conductors	Year 4	To be able to use knowledge of conductors and insulators to create switches to complete a circuit

Topic	Year / Key Stage	Learning Objective
Energy and rate of reaction (Chemistry)	KS4	Describe reactions that take in energy from the surroundings so the temperature decreases. (Endothermic Reaction)
Increasing the rate of a chemical reaction (Chemistry)	KS4	Describe the increase in the rate of a reaction caused by increasing the: · temperature · concentration of reactants · surface area of reactants or by adding a catalyst.
Increasing the rate of a chemical reaction (Chemistry)	KS4	Measure and record the: · time for a reactant to be used up. · volume of gas produced · time for a solution to change colour/clarity.
Changes in Earth's atmosphere (Chemistry)	KS4	Describe how the Earth's current atmosphere developed.
Changes in Earth's atmosphere (Chemistry)	KS4	Recall the word equation for photosynthesis.
Changes in Earth's atmosphere (Chemistry)	KS4	Describe how photosynthesis led to changes in the early atmosphere.
The current atmosphere (Chemistry)	KS4	Describe how most carbon dioxide from the early atmosphere has been locked up as carbonates and fossils in rocks.
The current atmosphere (Chemistry)	KS4	Recall the present composition of the Earth's atmosphere.

Topic	Year / Key Stage	Learning Objective
Acids and metal reactions (Chemistry)	KS4	Recall that sulfuric acid produces sulphates.
Acids and metal reactions (Chemistry)	KS4	Write word equations for the reactions when given the names of the reactants.
Acids and metal reactions (Chemistry)	KS4	Describe the test for hydrogen.
Neutralisation (Chemistry)	KS4	Recall that an acid is neutralised by an alkali or base to produce a salt and water.
Neutralisation (Chemistry)	KS4	Recall that an acid is neutralised by a carbonate to produce a salt, water and carbon dioxide.
Neutralisation (Chemistry)	KS4	Write word equations for the reactions when given the names of the reactants.
Neutralisation (Chemistry)	KS4	Describe the test for carbon dioxide.
Neutralisation (Chemistry)	KS4	Describe how to crystallise a salt solution to produce solid salt.
Energy and rate of reaction (Chemistry)	KS4	Describe reactions that transfer energy to the surroundings so that temperature increases. (Exothermic Reaction)

Topic	Year / Key Stage	Learning Objective
Circuits and Conductors	Year 4	To be able to plan and carry out an experiment to see how to change the brightness of a bulb
Circuits and Conductors	Year 4	Circuits and Conductors Working Scientifically
Changing Sounds	Year 4	To find out sounds are made when objects or materials vibrate
Changing Sounds	Year 4	To investigate whether sounds can travel through different materials
Changing Sounds	Year 4	To explore the relationship between distance and volume
Changing Sounds	Year 4	To find out that some materials are effective at preventing vibrations from sound sources reaching the ear
Changing Sounds	Year 4	To investigate how sounds can be different pitches and volumes
Changing Sounds	Year 4	To find out how the length, tightness and thickness of a string affects its pitch
Changing Sounds	Year 4	To find out how sounds can be made by air vibrating and how to change the pitch of notes produced by vibrating air

Topic	Year / Key Stage	Learning Objective
Changing Sounds	Year 4	Changing Sound Working Scientifically
States of Matter	Year 4	To compare and group materials together according to whether they are solids or liquids
States of Matter	Year 4	To identify and explore the properties of gas
States of Matter	Year 4	To observe that materials change state when they are heated or cooled
States of Matter	Year 4	To research the temperature in degrees Celsius at which materials change state
States of Matter	Year 4	To understand the process of evaporation
States of Matter	Year 4	To understand the process of condensation
States of Matter	Year 4	To understand the part played by evaporation and condensation in the water cycle and the rate of evaporation with
States of Matter	Year 4	States of Matter Working Scientifically

Topic	Year / Key Stage	Learning Objective
Properties of metals (Chemistry)	KS4	Recall that metals are: · good conductors of electricity · good conductors of thermal energy.
Properties of metals (Chemistry)	KS4	Recognise that the uses of a metal depend on its properties eg copper and aluminium.
Alloys (Chemistry)	KS4	Recall that most metals in everyday use are alloys because the pure metals are too soft for many uses eg iron, gold and aluminium.
Alloys (Chemistry)	KS4	Recall that an alloy is produced by mixing small amount of other elements with the metal.
Alloys (Chemistry)	KS4	Recall that steel is an alloy made by mixing carbon and other metals with iron.
Alloys (Chemistry)	KS4	Recall that polymers are made from small molecules called monomers joined together in very long chains.
Acids and metal reactions (Chemistry)	KS4	Recall that acids react with some metals to produce hydrogen.
Acids and metal reactions (Chemistry)	KS4	Recall that hydrochloric acid produces chlorides.

Topic	Year / Key Stage	Learning Objective
Chromatography (Chemistry)	KS4	Recognise that in paper chromatography, a solvent moves through the paper carrying different compounds different distances.
Metals and ores (Chemistry)	KS4	Recall that unreactive metals are found in the Earth as metals.
Metals and ores (Chemistry)	KS4	Recall that most metals are found as compounds that need chemical reactions to extract the metal.
Metals and ores (Chemistry)	KS4	Recall that metals less reactive than carbon can be extracted by heating the metal ore with carbon.
Metals and ores (Chemistry)	KS4	Describe an ore as a rock containing enough metal to make it economic to extract it.
Metals and ores (Chemistry)	KS4	Recognise that large amounts of rock have to be quarried or mined to get metal ores.
Metals and ores (Chemistry)	KS4	Recognise that we can reduce the effects of extracting metals by recycling.
Metals and ores (Chemistry)	KS4	Describe some of the social, economic and environmental effects of mining and recycling metals.
Properties of metals (Chemistry)	KS4	Recall that metals have giant structures of atoms with strong bonds between the atoms so most metals have high melting points.

Topic	Year / Key Stage	Learning Objective
Eating and Digestion	Year 4	To be able to classify carnivores, herbivores and omnivores
Eating and Digestion	Year 4	To be able to construct and interpret a variety of food chains
Eating and Digestion	Year 4	To identify the different types of teeth in humans and identify their functions
Eating and Digestion	Year 4	To explore different ways of keeping teeth healthy
Eating and Digestion	Year 4	To investigate how the digestive system works
Eating and Digestion	Year 4	To be able to describe the functions of the basic parts of the digestive system
Eating and Digestion	Year 4	Eating and Digestion Working Scientifically
Living in Environments	Year 4	To be able to identify a variety of habitats and explore why organisms live in different habitats
Living in Environments	Year 4	To be able to group organisms according to their characteristics

Topic	Year / Key Stage	Learning Objective
Living in Environments	Year 4	To be able to classify animals into specific groups according to their characteristics
Living in Environments	Year 4	To be able to use a classification key to identify animals
Living in Environments	Year 4	To be able to classify and identify a variety of British plants
Living in Environments	Year 4	To explore human impacts on habitats and environments
Living in Environments	Year 4	Living in Environments Working Scientifically
What Do Scientists Do	Year 4	To identify the steps involved in the scientific method
What Do Scientists Do	Year 4	To generate suitable enquiry questions and make careful observations
What Do Scientists Do	Year 4	To plan a comparative fair test
What Do Scientists Do	Year 4	To draw conclusions from careful observations

Topic	Year / Key Stage	Learning Objective
States of matter (Chemistry)	KS4	Recall the three states of matter: solid, liquid and gas.
States of matter (Chemistry)	KS4	Describe the changes between the three states using the terms melting, boiling, condensing and freezing.
States of matter (Chemistry)	KS4	Explain the three states of matter using a simple particle model.
Forms (allotropes) of carbon (Chemistry)	KS4	Recall that diamond and graphite are both forms of carbon.
Forms (allotropes) of carbon (Chemistry)	KS4	Recognise the difference in the structure of diamond and graphite.
Forms (allotropes) of carbon (Chemistry)	KS4	Explain that the different properties of diamond and graphite depend on the different structures.
Mixtures (Chemistry)	KS4	Recall that a mixture contains two or more substances that are not chemically combined.
Mixtures (Chemistry)	KS4	Identify the appropriate method to separate mixtures by filtration, distillation, crystallisation or chromatography.
Chromatography (Chemistry)	KS4	Describe how to separate mixtures by chromatography.

Topic	Year / Key Stage	Learning Objective
Waves, wave properties (Physics)	KS3	Comparing transverse and longitudinal waves
Atoms and elements (Chemistry)	KS4	Recall that all substances are made of atoms.
Atoms and elements (Chemistry)	KS4	Recall that an atom is the smallest part of an element.
Atoms and elements (Chemistry)	KS4	Describe the distribution of elements in the periodic table.
Atoms and elements (Chemistry)	KS4	Recall that elements in the same group of the periodic table have similar properties.
Elements and compounds (Chemistry)	KS4	Recall that when atoms combine with different atoms a compound is formed.
Elements and compounds (Chemistry)	KS4	Recall that compounds can be made by metals combining with non-metals or by non-metals combining with other non-metals.
Elements and compounds (Chemistry)	KS4	Recognise simple compounds from their names.
Elements and compounds (Chemistry)	KS4	Write word equations for simple reactions.

Topic	Year / Key Stage	Learning Objective
What Do Scientists Do	Year 4	To create a hypothesis and plan an investigation to answer an enquiry question
What Do Scientists Do	Year 4	To conduct a practical experiment, recording findings in a table and draw conclusions from data
What Do Scientists Do	Year 4	What Do Scientists Do Working Scientifically
Properties and Changes of Materials	Year 5	To know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
Properties and Changes of Materials	Year 5	That some changes of state of dissolving and mixing processes can be reversed through filtering, sieving and evaporation
Properties and Changes of Materials	Year 5	Explain that some changes form new materials, and these changes are not usually reversible
Properties and Changes of Materials	Year 5	Explain that some changes, caused by heating or cooling form new materials, and that these changes are not often reversible
Properties and Changes of Materials	Year 5	Explain that changes caused by burning form new materials, and these changes are not reversible
Properties and Changes of Materials	Year 5	To group together everyday materials based on their properties

Topic	Year / Key Stage	Learning Objective
Properties and Changes of Materials	Year 5	To give reasons based on comparative and fair tests, for the particular uses of everyday materials
Earth and Space	Year 5	To describe the movements of the Sun, Earth and Moon
Earth and Space	Year 5	To explore how the rotation of the Earth creates day and night
Earth and Space	Year 5	To learn how the Earth's tilt creates seasons
Earth and Space	Year 5	To learn about the phases of the Moon
Earth and Space	Year 5	To discover how theories about our solar system have changed
Earth and Space	Year 5	To investigate planets in the solar system
Forces in Action	Year 5	To explain unsupported objects fall towards Earth because of the force of gravity acting between the Earth and falling object
Forces in Action	Year 5	To identify the effects of friction acting between moving surfaces

Topic	Year / Key Stage	Learning Objective
Forces, Contact forces (Physics)	KS3	Investigating Hooke's Law
Forces, Pressure (Physics)	KS3	Exploring pressure on a solid surface
Forces, Pressure (Physics)	KS3	Exploring pressure in a fluid
Forces, Pressure (Physics)	KS3	Calculating pressure
Forces, Pressure (Physics)	KS3	Explaining floating and sinking
Waves, Wave effects (Physics)	KS3	Exploring sound
Waves, Wave effects (Physics)	KS3	Sound systems
Waves, wave properties (Physics)	KS3	Exploring light
Waves, wave properties (Physics)	KS3	Exploring waves

Topic	Year / Key Stage	Learning Objective
Energy, Work (Physics)	KS3	Doing work
Energy, Work (Physics)	KS3	Making work easier
Energy, heating and cooling (Physics)	KS3	Explaining thermal energy
Energy, heating and cooling (Physics)	KS3	How heat travels
Energy, heating and cooling (Physics)	KS3	How to stop heat from travelling
Energy, heating and cooling (Physics)	KS3	Energy and temperature
Forces, Contact forces (Physics)	KS3	Analysing equilibrium
Forces, Contact forces (Physics)	KS3	What a drag! Forces associated with rubbing and
Forces, Contact forces (Physics)	KS3	Understanding stretch and compression

Topic	Year / Key Stage	Learning Objective
Forces in Action	Year 5	To identify and explain the effects of air resistance
Forces in Action	Year 5	To identify and explain the effects of water resistance
Forces in Action	Year 5	To identify levers and pulleys allow a smaller force to have a greater effect
Forces in Action	Year 5	To recognise that gears allow a smaller force to have a greater effect
Life Cycles	Year 5	To describe the process of sexual reproduction in flowering plants
Life Cycles	Year 5	To describe the process of asexual reproduction in plants
Life Cycles	Year 5	To describe the process of sexual reproduction in animals
Life Cycles	Year 5	To observe and compare the life cycles of animals in our local environment with other animals around the world
Life Cycles	Year 5	To compare how different animals reproduce and grow

Topic	Year / Key Stage	Learning Objective
Life Cycles	Year 5	To find out about the work of naturalists
Changes and Reproduction	Year 5	To recognise the stages of growth and development in humans
Changes and Reproduction	Year 5	To know the stages in the gestation period in humans and compare them to other animals
Changes and Reproduction	Year 5	To recognise the stages of development during childhood and understand the needs of children at those stages
Changes and Reproduction	Year 5	To understand the initial changes inside and outside the body during puberty
Changes and Reproduction	Year 5	To know the changes that occur during puberty and how they differ for boys and girls
Changes and Reproduction	Year 5	To understand how the body changes during adulthood and old age
Evolution and Inheritance	Year 6	To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
Evolution and Inheritance	Year 6	To identify how animals and plants are adapted to suit their environment in different ways

Topic	Year / Key Stage	Learning Objective
Waves, sound (Physics)	KS3	Describing sound
Waves, sound (Physics)	KS3	Hearing sounds
Waves, sound (Physics)	KS3	Echoes, reflection and absorption of sound
Waves, sound (Physics)	KS3	Learning about the reflection and absorption of sound
Waves, sound (Physics)	KS3	Exploring properties of light
Waves, sound (Physics)	KS3	Exploring reflection
Waves, sound (Physics)	KS3	Exploring refraction
Waves, sound (Physics)	KS3	Seeing clearly
Waves, sound (Physics)	KS3	Exploring coloured light

Topic	Year / Key Stage	Learning Objective
Electromagnets, Electromagnets (Physics)	KS3	Investigating strength of electro-magnets
Electromagnets, Voltage and resistance (Physics)	KS3	Describing electric circuits
Electromagnets, Voltage and resistance (Physics)	KS3	Understanding energy in circuits
Electromagnets, Voltage and resistance (Physics)	KS3	Explaining resistance
Electromagnets, Voltage and resistance (Physics)	KS3	Comparing series and parallel circuits
Electromagnets, Voltage and resistance (Physics)	KS3	Investigating static charge
Electromagnets, Voltage and resistance (Physics)	KS3	Explaining static charge
Electromagnets, Voltage and resistance (Physics)	KS3	Explaining static charge
Waves, sound (Physics)	KS3	Exploring sound

Topic	Year / Key Stage	Learning Objective
Evolution and Inheritance	Year 6	To understand that adaptation of plants and animals to suit their environment may lead to evolution
Evolution and Inheritance	Year 6	To find out how the work of scientists has developed our understanding of the process of evolution
Evolution and Inheritance	Year 6	To recognise that living things have changed over time and that a number of factors can affect a species' evolution
Evolution and Inheritance	Year 6	To understand how humans have evolved over time, and how human behaviour can affect change in species over time
Seeing Light	Year 6	To recall facts about how shadows are formed
Seeing Light	Year 6	To investigate how we can change shadows
Seeing Light	Year 6	To understand how our eyes allows us to see
Seeing Light	Year 6	To understand how we see objects
Seeing Light	Year 6	To investigate reflection

Topic	Year / Key Stage	Learning Objective
Seeing Light	Year 6	To learn about refraction
Seeing Light	Year 6	To investigate the colours in white light
Changing Circuits	Year 6	To recap knowledge of electricity and circuits
Changing Circuits	Year 6	To investigate ways in which the brightness of a bulb or speed of motor is changed
Changing Circuits	Year 6	To be able to recognise and use conventional symbols for circuits
Changing Circuits	Year 6	To be able to plan, carry out and evaluate an experiment to see how changing the wire in a circuit affects the brightness of a bulb
Changing Circuits	Year 6	To be able to review and asses understanding of circuits
Healthy Bodies	Year 6	To find out how scientific ideas about food and diet were tested in the past and how this has contributed to our knowledge of a balanced diet
Healthy Bodies	Year 6	To investigate some food groups and find out why a variety of foods is important for a healthy diet

Topic	Year / Key Stage	Learning Objective
Energy, Energy transfer (Physics)	KS3	Getting the electricity we need
Energy, Energy transfer (Physics)	KS3	Using electricity responsibly
Energy, Energy transfer (Physics)	KS3	Stores and transfers
Energy, Energy transfer (Physics)	KS3	Exploring energy transfers
Energy, Energy transfer (Physics)	KS3	Understanding potential energy and kinetic energy
Energy, Energy transfer (Physics)	KS3	Understanding elastic potential energy
Electromagnets, Magnetism (Physics)	KS3	Forces and fields
Electromagnets, Magnetism (Physics)	KS3	Using ideas about fields
Electromagnets, Electromagnets (Physics)	KS3	Investigating electromagnetism

Topic	Year / Key Stage	Learning Objective
Forces, Speed (Physics)	KS3	Investigating the motion of a car on a ramp
Forces, Speed (Physics)	KS3	Understanding relative motion
Forces, Gravity (Physics)	KS3	Understanding forces
Forces, Gravity (Physics)	KS3	Understanding gravitational fields
Forces, Gravity (Physics)	KS3	Understanding mass and weight
Forces, Gravity (Physics)	KS3	Understanding gravity
Energy, Energy transfer (Physics)	KS3	Understanding energy transfers by fuels and food
Energy, Energy transfer (Physics)	KS3	Comparing rates of energy transfer
Energy, Energy transfer (Physics)	KS3	Looking at the cost of energy use in the home

Topic	Year / Key Stage	Learning Objective
Healthy Bodies	Year 6	To find out how water and nutrients are transported in the human body
Healthy Bodies	Year 6	To investigate what happens to the heart when we exercise and why
Healthy Bodies	Year 6	To investigate how muscles move the skeleton and how muscle actively requires increased blood flow
Healthy Bodies	Year 6	To investigate how muscles move the skeleton and how muscle actively requires increased blood flow
Healthy Bodies	Year 6	To evaluate what we can do to keep our bodies healthy
Classifying Organisms	Year 6	To recap ways of grouping organisms according to their characteristics
Classifying Organisms	Year 6	To explore ways of distinguishing between organisms which have similar characteristics
Classifying Organisms	Year 6	To be able to classify plants according to their characteristics
Classifying Organisms	Year 6	To find out about Carl Linnaeus and his classification system

Topic	Year / Key Stage	Learning Objective
Classifying Organisms	Year 6	To explore what micro-organisms are and how they can be grouped
Classifying Organisms	Year 6	To be able to identify and classify organisms in the local area
Great British Scientists	Year 6	To investigate and explain Newton's three laws of motion
Great British Scientists	Year 6	To explore the phenomenon of light and colour
Great British Scientists	Year 6	To investigate the effects of gravity
Great British Scientists	Year 6	To explore the work of Anning, Darwin and Wallace on evolution
Great British Scientists	Year 6	To plan an investigation considering variables and measurements taken
Great British Scientists	Year 6	To explore the movement of gears in relation to their size and number
Earth, Climate (Chemistry)	KS3	Understanding our atmosphere

Topic	Year / Key Stage	Learning Objective
Genes, Evolution (Evolution)	KS3	Understanding the importance of biodiversity
Genes, Evolution (Evolution)	KS3	Explaining extinction
Genes, Inheritance (Biology)	KS3	Understanding the nature of genetic material
Genes, Inheritance (Biology)	KS3	Exploring the role of chromosomes
Genes, Inheritance (Biology)	KS3	Understanding variation
Genes, Inheritance (Biology)	KS3	Modelling inheritance
Forces, Speed (Physics)	KS3	Understanding speed
Forces, Speed (Physics)	KS3	Describing journeys with distance–time graphs
Forces, Speed (Physics)	KS3	Exploring journeys on distance–time graphs

Topic	Year / Key Stage	Learning Objective
Ecosystems, Respiration (Biology)	KS3	Understanding anaerobic respiration
Ecosystems, Respiration (Biology)	KS3	Investigating fermentation
Ecosystems, Respiration (Biology)	KS3	Comparing aerobic and anaerobic respiration
Ecosystems, Photosynthesis (Biology)	KS3	Exploring how plants make food
Ecosystems, Photosynthesis (Biology)	KS3	Looking at leaves
Ecosystems, Photosynthesis (Biology)	KS3	Exploring the movement of water and minerals in plants
Ecosystems, Photosynthesis (Biology)	KS3	Investigating the importance of minerals to plants
Ecosystems, Photosynthesis (Biology)	KS3	Investigating photosynthesis
Genes, Evolution (Evolution)	KS3	Explaining natural selection

Topic	Year / Key Stage	Learning Objective
Earth, Climate (Chemistry)	KS3	Understanding how carbon is recycled
Earth, Climate (Chemistry)	KS3	Exploring how humans affect the carbon cycle
Earth, Climate (Chemistry)	KS3	Understanding global warming
Earth, Earth Resources (Chemistry)	KS3	Exploring damage to the Earth's resources
Earth, Earth Resources (Chemistry)	KS3	Considering the importance of recycling
Earth, Earth Resources (Chemistry)	KS3	How to extract metals
Matter (Chemistry)	KS3	Looking at the periodic table of elements
Matter, Periodic Table (Chemistry)	KS3	Exploring metals in the periodic table
Matter, Periodic Table (Chemistry)	KS3	Exploring non-metals in the periodic table

Topic	Year / Key Stage	Learning Objective
Matter, Periodic Table (Chemistry)	KS3	Analysing wider patterns within the periodic table
Matter, Elements (Chemistry)	KS3	Combining elements
Matter, Elements (Chemistry)	KS3	Comparing elements and compounds
Matter, Elements (Chemistry)	KS3	Exploring polymers
Matter, Elements (Chemistry)	KS3	Exploring ceramics and composites
Matter, Particle Model (Chemistry)	KS3	Using particles to explain matter.
Matter, Particle Model (Chemistry)	KS3	Understanding solids
Matter, Particle Model (Chemistry)	KS3	Understanding liquids and gases
Matter, Particle Model (Chemistry)	KS3	Exploring diffusion

Topic	Year / Key Stage	Learning Objective
Genes, Variation (Biology)	KS3	Exploring the causes of variation
Genes, Variation (Biology)	KS3	Considering the importance of variation
Genes, Human Reproduction (Biology)	KS3	Understanding the female reproductive system and fertility
Genes, Human Reproduction (Biology)	KS3	Understanding the male reproductive system and fertilisation
Genes, Human Reproduction (Biology)	KS3	Learning how a foetus develops
Genes, Human Reproduction (Biology)	KS3	Understanding factors affecting a developing foetus
Genes, Human Reproduction (Biology)	KS3	Communicating ideas about smoking in pregnancy
Ecosystems, Respiration (Biology)	KS3	Understanding aerobic respiration
Ecosystems, Respiration (Biology)	KS3	Exploring respiration in sport

Topic	Year / Key Stage	Learning Objective
Organisms, Movement (Biology)	KS3	Exploring the human skeleton.
Organisms, Movement (Biology)	KS3	Understanding the role of joints and muscles.
Organisms, Movement (Biology)	KS3	Examining interacting muscles.
Organisms, Movement (Biology)	KS3	Understanding organisation in multicellular organisms
Organisms, Movement (Biology)	KS3	Describing plant and animal cells
Organisms, Movement (Biology)	KS3	Understanding adaptations of cells
Organisms, Movement (Biology)	KS3	Exploring cells
Organisms, Movement (Biology)	KS3	Understanding unicellular organisms
Genes, Variation (Biology)	KS3	Looking at variation

Topic	Year / Key Stage	Learning Objective
Matter, Particle Model (Chemistry)	KS3	Explaining changes of state
Matter, Separating Mixtures (Chemistry)	KS3	Separating mixtures
Matter, Separating Mixtures (Chemistry)	KS3	Exploring solutions
Matter, Separating Mixtures (Chemistry)	KS3	Understanding distillation
Matter, Separating Mixtures (Chemistry)	KS3	Exploring chromatography
Earth, Earth structure (Physics and Chemistry)	KS3	Understanding the structure of the Earth
Earth, Earth structure (Physics and Chemistry)	KS3	Exploring igneous rocks
Earth, Earth structure (Physics and Chemistry)	KS3	Exploring sedimentary rocks
Earth, Earth structure (Physics and Chemistry)	KS3	Exploring metamorphic rocks

Topic	Year / Key Stage	Learning Objective
Earth, Earth structure (Physics and Chemistry)	KS3	Understanding the rock cycle
Earth, Earth structure (Physics and Chemistry)	KS3	Describing stars and galaxies
Earth, Earth structure (Physics and Chemistry)	KS3	Explaining the effects of the Earth's motion
Earth, Earth structure (Physics and Chemistry)	KS3	Exploring our neighbours in the Universe
Earth, Earth structure (Physics and Chemistry)	KS3	Using models in science
Reactions, Chemical Energy (Chemistry)	KS3	Understanding exothermic reactions
Reactions, Chemical Energy (Chemistry)	KS3	Comparing endothermic and exothermic changes
Reactions, Chemical Energy (Chemistry)	KS3	Investigating endothermic reactions
Reactions, Chemical Energy (Chemistry)	KS3	Explaining the use of catalysts

Topic	Year / Key Stage	Learning Objective
Ecosystems, Interdependence (Biology)	KS3	Understanding how fruits disperse seeds
Organisms, Breathing (Biology)	KS3	Understanding how we breathe
Organisms, Breathing (Biology)	KS3	Measuring breathing
Organisms, Breathing (Biology)	KS3	Explaining gas exchange in humans
Organisms, Digestion (Biology)	KS3	Exploring the effects of disease and lifestyle
Organisms, Digestion (Biology)	KS3	Exploring a healthy diet
Organisms, Digestion (Biology)	KS3	Understanding the effects of an unbalanced diet
Organisms, Digestion (Biology)	KS3	Understanding the human digestive system
Organisms, Digestion (Biology)	KS3	Understanding the roles of the digestive organs

Topic	Year / Key Stage	Learning Objective
Reactions, Acids and Alkalis (Chemistry)	KS3	Exploring alkalis
Reactions, Acids and Alkalis (Chemistry)	KS3	Exploring alkalis
Reactions, Acids and Alkalis (Chemistry)	KS3	Exploring neutralisation
Ecosystems, Interdependence (Biology)	KS3	Understanding food webs
Ecosystems, Interdependence (Biology)	KS3	Understanding the effects of toxins in the environment
Ecosystems, Interdependence (Biology)	KS3	Exploring the importance of insects
Ecosystems, Interdependence (Biology)	KS3	Exploring flowering plants
Ecosystems, Interdependence (Biology)	KS3	Exploring flowering plants
Ecosystems, Interdependence (Biology)	KS3	Understanding how seeds are dispersed

Topic	Year / Key Stage	Learning Objective
Reactions, Types of Reaction (Chemistry)	KS3	Exploring combustion
Reactions, Types of Reaction (Chemistry)	KS3	Exploring the use of fuels
Reactions, Types of Reaction (Chemistry)	KS3	Understanding thermal decomposition
Reactions, Types of Reaction (Chemistry)	KS3	Explaining changes
Reactions, Metals and Non-metals (Chemistry)	KS3	Using metals and non-metals
Reactions, Metals and Non-metals (Chemistry)	KS3	Exploring the reactions of acids with metals
Reactions, Metals and Non-metals (Chemistry)	KS3	The order of metals and carbon in the reactivity series
Reactions, Metals and Non-metals (Chemistry)	KS3	Understanding oxidation reactions
Reactions, Acids and Alkalis (Chemistry)	KS3	Exploring acids