



KEY STAGE 2 SEQUENCING – Science

2023 - 2024

ACADEMIC

AUTUMN 1
Living things and their habitats

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics

AUTUMN 2
Plants

- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- Investigate the way in which water is transported within plants

- Produce a display on Habitats and plants
- Look at plants underneath a microscope

ENGAGEMENT

SPRING 1
Forces

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

SPRING 2
Earth and space

- Describe the movement of the Earth and other planets relative to the sun in the solar system
- Describe the movement of the moon relative to the Earth
- Describe the sun, Earth and moon as approximately spherical bodies
- Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky

- Test different forces using practical equipment
- Create a paper mache solar system

SUMMER 1
Rocks

- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- Describe in simple terms how fossils are formed when things that have lived are trapped within rock
- Recognise that soils are made from rocks and organic matter

SUMMER 2
Working scientifically

- Asking simple questions and recognising that they can be answered in different ways
- Observing closely, using simple equipment
- Performing simple tests
- Identifying and classifying
- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions

- Collect and draw rocks
- Research Practicals

2022 - 2023

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ACADEMIC

AUTUMN 1
Animals including humans

- Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- Describe the ways in which nutrients and water are transported within animals, including humans

AUTUMN 2
Evolution and inheritance

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

- Create posters on the important parts of the human body
- Look and draw different dinosaurs and how they have evolved

ENGAGEMENT

SPRING 1
Light

- Recognise that light appears to travel in straight lines
- Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them

SPRING 2
Electricity

- Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- Use recognised symbols when representing a simple circuit in a diagram

- Create series and Parallel circuits
- Practical on colours

SUMMER 1
Properties and changes of materials

- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets
- Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating

SUMMER 2
States of matter

- Compare and group materials together, according to whether they are solids, liquids or gases
- Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature

- Describe and draw what items are made of
- Experiments on solid, liquid and gas

The KS2 Science scheme of work provides a comprehensive range of activities that are both age appropriate and sufficient to meet the needs of the pupils. The units together cover the National Curriculum for Science giving pupils in KS2 the opportunity to access Science learning objectives and age-appropriate activities with differentiated learning outcomes to suit individual developmental abilities.

Throughout the 2-year rolling curriculum, topics related to Biology, Physics and Chemistry will be taught in cycle, interlinking each year to build and develop scientific knowledge and skills. The development of scientific working skills will be targeted within each topic through practical experiments and encouraging scientific thinking.



KEY STAGE 3 SEQUENCING – Science

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2023 - 2024

ACADEMIC

AUTUMN 1

Nutrition and digestion

- The content of a healthy human diet: carbohydrates, lipids (fats and oils), proteins, vitamins, minerals, dietary fibre and water, and why each is needed
- Calculations of energy requirements in a healthy daily diet
- The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases
- The tissues and organs of the human digestive system, including adaptations to function and how the digestive system digests food (enzymes simply as biological catalysts)
- The importance of bacteria in the human digestive system

AUTUMN 2

Gas exchange systems

- The structure and functions of the gas exchange system in humans, including adaptations to function
- The mechanism of breathing to move air in and out of the lungs, using a pressure model to explain the movement of gases, including simple measurements of lung volume
- The impact of exercise, asthma and smoking on the human gas exchange system
- The role of leaf stomata in gas exchange in plants

SPRING 1

Materials

- The order of metals and carbon in the reactivity series
- The use of carbon in obtaining metals from metal oxides
- Properties of ceramics, polymers and composites (qualitative)

SPRING 2

Earth and atmosphere

- The composition of the Earth
- The structure of the Earth
- The rock cycle and the formation of igneous, sedimentary and metamorphic rocks
- Earth as a source of limited resources and the efficacy of recycling
- The composition of the atmosphere
- The production of carbon dioxide by human activity and the impact on climate

SUMMER 1

Forces

- Forces as pushes or pulls, arising from the interaction between 2 objects
- Using force arrows in diagrams, adding forces in 1 dimension, balanced and unbalanced forces
- Moment as the turning effect of a force
- Forces: associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way; resistance to motion of air and water

SUMMER 2

Static electricity and magnetism

- Separation of positive or negative charges when objects are rubbed together; transfer of electrons, forces between charged objects
- The idea of electric field, forces acting across the space between objects not in contact
- Magnetic poles, attraction and repulsion
- Magnetic fields by plotting with compass, representation by field lines
- Earth's magnetism, compass and navigation
- The magnetic effect of a current, electromagnets, DC motors (principles only)

ENGAGEMENT

AUTUMN 1

- Produce a healthy diet log
- Create recipes

AUTUMN 2

- Exercise and fitness

SPRING 1

- Test metals for strength

SPRING 2

- How can the centre improve its recycling?

SUMMER 1

- Exercise tests for forces

SUMMER 2

- Testing magnets around the school

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2022 - 2023

ACADEMIC

AUTUMN 1

Cells and organisation

- Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope
- The functions of the cell wall, cell membrane, cytoplasm, nucleus, vacuole, mitochondria and chloroplasts
- The similarities and differences between plant and animal cells
- The role of diffusion in the movement of materials in and between cells
- From cells to tissues to organs to systems to organisms

AUTUMN 2

The skeletal and muscular systems

- The structure and functions of the human skeleton, to include support, protection, movement and making blood cells
- Biomechanics – the interaction between skeleton and muscles, including the measurement of force exerted by different muscles
- The function of muscles and examples of antagonistic muscles

SPRING 1

The particulate nature of matter

- The properties of the different states of matter (solid, liquid and gas) in terms of the particle model, including gas pressure
- Changes of state in terms of the particle model

SPRING 2

The periodic table

- The varying physical and chemical properties of different elements
- The principles underpinning the Mendeleev periodic table
- The periodic table: periods and groups; metals and non-metals
- Patterns in reactions can be predicted with reference to the periodic table
- The properties of metals and non-metals
- The chemical properties of metal and non-metal oxides with respect to acidity

SUMMER 1

Calculation of fuel uses and costs in the domestic context

- Comparing energy values of different foods (from labels) (kJ)
- Comparing power ratings of appliances in watts (W, kW)
- Comparing amounts of energy transferred (J, kJ, kW hour)
- Domestic fuel bills, fuel use and costs
- Fuels and energy resources

SUMMER 2

Energy changes and transfers

- Simple machines give bigger force but at the expense of smaller movement (and vice versa): product of force and displacement unchanged
- Other processes that involve energy transfer: changing motion, dropping an object, completing an electrical circuit, stretching a spring, metabolism of food, burning fuels

ENGAGEMENT

AUTUMN 1

- Display on Animal and plants cells
- Create a Bingo game (key words)

AUTUMN 2

- Draw and label a skeleton
- Fitness activity on muscles

SPRING 1

- Posters and displays based on solid, liquid and gases

SPRING 2

- Top trump cards on the different elements

SUMMER 1

- Look at energy bills and compare them

SUMMER 2

- Create practicals using a slinky
- Create series and parallel circuits

KS3 Science is linked to the National Curriculum composites, comprising of Biology, Chemistry and Physics topics. The aim of KS3 science is to enthuse students with appreciation of scientific learning, allowing them to discover how things work and build on their knowledge from key stage 2. We aim to provide a grounding in the basic concepts of Biology, Chemistry and Physics as well as looking at scientific problem solving and use of evidence to develop theories and explanations. The emphasis of KS3 is on practical and investigative work with a constant effort to relate what we teach to the world around them.

Together, the knowledge and practical experiences gained in key stage 3 will provide a solid grounding for moving on to Entry level and/or GCSE Biology in key stage 4.



SOUTH DERBYSHIRE SUPPORT CENTRE



KEY STAGE 4 SEQUENCING – (Science)

2023 - 2024

AUTUMN 1
GCSE Biology Paper 1

- Homeostasis and plants

Entry Level Science
Paper 1: Biology 1A

- Inheritance and modification Cells
- Genetics, Inheritance and modification

AUTUMN 2
GCSE Biology paper 1

- Ecosystem

Entry Level Science
Paper 2: Biology 1B

- Prevention and medicines
- Health

ACADEMIC

SPRING 1
GCSE Biology Paper 1

- Evolution, inheritance and variation

Entry level Science
Paper 3: Chemistry 1A

- Ionic bonding
- Covalent bonding
- Metallic bonding
- States of matter

SPRING 2
Biology Paper 1 (Catch up/Year 10)

- Cell Biology
- Organisation and transport
- Infections and responses
- Bio-energetics (Co-ordination and control)

Entry Level Science
Paper 4: Chemistry 1B

- Breaking down ionic compounds
- Acids
- Metals

SUMMER 1
GCSE Biology exam and revision techniques

- Basics of biology
- Differences between paper 1 and paper 2
- How to answer 8 mark questions?
- How to revise
- Exam Preparation

Entry Level science
Paper 5: Physics 1A

- Motion
- Forces
- Energy

Paper 6: Physics 1B

- Atoms
- Radiation

SUMMER 2
Entry level Preparation and Science Basics

- Introduction to biology
- Introduction to chemistry
- Introduction to Physics
- Scientific skills and practicals
- Maths in Science

ENGAGEMENT

AUTUMN 1

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

AUTUMN 2

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

SPRING 1

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

SPRING 2

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

SUMMER 1

- Work on Revision book
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- Create Posters on displays

SUMMER 2

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

2021 - 2023

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AUTUMN 1
GCSE Biology Paper 1

- Cell Biology

Entry Level Science
Paper 1: Biology 1A

- Cells
- genetic

AUTUMN 2
GCSE Biology paper 1

- Organisation and transport system

Entry Level Science
Paper 2: Biology 1B

- Health
- Disease and the development of medicines
- Disease

ACADEMIC

SPRING 1
GCSE Biology Paper 1

- Infection and responses

Entry level Science
Paper 3: Chemistry 1A

- Atoms
- Compounds and states of matter
- Atomic structure
- The periodic table

SPRING 2
GCSE Biology Paper 1

- Bio-energetics (Coordination and control)

Entry Level Science
Paper 4: Chemistry 1B

- Separating mixtures
- Breaking down substances
- Acids and metals
- Methods of separating and purifying substances

SUMMER 1
GCSE Biology exam and revision techniques

- Basics of biology
- Differences between paper 1 and paper 2
- How to answer 8 mark questions?
- How to revise
- Exam Preparation

Entry Level science
Paper 5: Physics 1A

- Forces
- Movement and energy

Paper 6: Physics 1B

- Waves and radiation Waves
- Electromagnetic spectrum

SUMMER 2
Entry level Preparation and Science Basics

- Introduction to biology
- Introduction to chemistry
- Introduction to Physics
- Scientific skills and practicals
- Maths in Science

ENGAGEMENT

AUTUMN 1

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

AUTUMN 2

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

SPRING 1

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

SPRING 2

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

SUMMER 1

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

SUMMER 2

- Work on Revision book
- Century online and BKSB
- Create Posters on displays

Key stage 4 Science has been designed to provide access to a breadth of scientific knowledge through learning key theory, developing scientific thinking and practical experience, giving pupils the opportunity to gain a Science qualification. The scheme is based on the Pearson Edexcel Entry Level Certificate in Science which has specifically been designed to closely match the GCSE programme of study and provide a progression route to GCSE Biology. The certificate supports advancement in science by cementing core understanding and maximising engagement with the subject. Throughout the year, topics will be revisited for the purpose of revision prior to Entry level assessment, practical application of theory and subject knowledge enhancement for those moving on to take a GCSE qualification



KEY STAGE 4 SEQUENCING – My Futures (Science)

2023 - 2024

ACADEMIC

AUTUMN 1
Homoestatsis and plants

- Photosynthesis as the key process for food production and therefore biomass for life
- The process of photosynthesis
- Factors affecting the rate of photosynthesis
- Homeostasis

AUTUMN 2
Ecosystem

- Levels of organisation within an ecosystem
- Some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community
- How materials cycle through abiotic and biotic components of ecosystems
- The role of microorganisms (decomposers) in the cycling of materials through an ecosystem
- Organisms are interdependent and are adapted to their environment
- The importance of biodiversity
- Methods of identifying species and measuring distribution, frequency and abundance of species within a habitat
- Positive and negative human interactions with ecosystems

SPRING 1
Evolution, inheritance and variation

- The genome as the entire genetic material of an organism
- How the genome, and its interaction with the environment, influence the development of the phenotype of an organism
- The potential impact of genomics on medicine
- Most phenotypic features being the result of multiple, rather than single, genes
- Single gene inheritance and single gene crosses with dominant and recessive phenotypes
- Sex determination in humans
- Genetic variation in populations of a species
- The process of natural selection leading to evolution
- The evidence for evolution
- Developments in biology affecting classification
- The importance of selective breeding of plants and animals in agriculture
- The uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology

SPRING 2
Biology Paper 1 (Catch up/Year 10)

- Cell Biology
- Organisationa and transport
- Infections and responces
- Bio-energetics (Co-ordination and control)

SUMMER 1
GCSE Biology exam and revision techniques

- Basics of biology
- Differences between paper 1 and paper 2
- How to answer 8 mark questions?
- How to revise
- Exam Preparation

SUMMER 2
Entry level Preparation and Science Basics

- Introduction to biology
- Introduction to chemistry
- Introduction to Physics
- Scientific skills and practicals
- Maths in Science

ENGAGEMENT

AUTUMN 1

- Work on Revision book
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- Create Posters on displays

AUTUMN 2

- Work on Revision book
- Century online and BKSB
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SPRING 1

- Work on Revision book
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SPRING 2

- Work on Revision book
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- Create Posters on displays

SUMMER 1

- Work on Revision book
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- Create Posters on displays

SUMMER 2

- Work on Revision book
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- Create Posters on displays

2021

ACADEMIC

2021 - 2023

AUTUMN 1
Cell Biology

- Cells as the basic structural unit of all organisms; adaptations of cells related to their functions; the main sub-cellular structures of eukaryotic and prokaryotic cells
- Stem cells in animals and meristems in plants
- Enzymes
- Factors affecting the rate of enzymatic reactions
- The importance of cellular respiration; the processes of aerobic and anaerobic respiration
- Carbohydrates, proteins, nucleic acids and lipids as key biological molecules

AUTUMN 2
Organisation and transport system

- The need for transport systems in multicellular organisms, including plants
- The relationship between the structure and functions of the human circulatory system

SPRING 1
Infection and responces

- The relationship between health and disease
- Communicable diseases including sexually transmitted infections in humans (including HIV/AIDS)
- Non-communicable diseases
- Bacteria, viruses and fungi as pathogens in animals and plants
- Body defences against pathogens and the role of the immune system against disease
- Reducing and preventing the spread of infectious diseases in animals and plants
- The process of discovery and development of new medicines
- The impact of lifestyle factors on the incidence of non-communicable diseases

SPRING 2
Bio-energetics (Coordination and control)

- Principles of nervous coordination and control in humans
- The relationship between the structure and function of the human nervous system
- The relationship between structure and function in a reflex arc
- Principles of hormonal coordination and control in humans
- Hormones in human reproduction, hormonal and non-hormonal methods of contraception
- Homeostasis

SUMMER 1
GCSE Biology exam and revision techniques

- Basics of biology
- Differences between paper 1 and paper 2
- How to answer 8 mark questions?
- How to revise
- Exam Preparation

SUMMER 2
Entry level Preparation and Science Basics

- Introduction to biology
- Introduction to chemistry
- Introduction to Physics
- Scientific skills and practicals
- Maths in Science

ENGAGEMENT

AUTUMN 1

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AUTUMN 2

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SPRING 1

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SPRING 2

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SUMMER 1

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