

## Science

### Curriculum Principles

**By the end of their all-through education, a student of science at Dixons Trinity Chapeltown will:**

- know fundamental scientific principles from biology, chemistry and physics that will provide a foundation for understanding and navigating the world. Student knowledge is structured around the big ideas in science which range from the particulate nature of matter, to the cellular basis of living organisms, to the structure of the universe.
- understand the processes of scientific inquiry that leads to the creation and development of concepts and theories. Students will understand how science can be used to explain observations and make predictions about natural phenomena.

**Our unifying ‘sentence’ is: “The science department empowered students to explore scientific concepts and to achieve academic excellence, whilst instilling a sense of excitement and curiosity about natural phenomena.”**

**In order to achieve a true understanding of science topics have been intelligently sequenced based on the following rationale:**

- scientific knowledge is broadly hierarchical in nature – students must have a secure understanding of each key block of knowledge before progressing onto the next stage. Therefore, in order to support this, topics have been meticulously planned and ordered to ensure that students are always building on and deepening their previous learning.
- in biology, primary students are introduced to different animals (including humans) in EYFS, further animals and plants and their life processes in Base Camp and this is then revisited in more depth at Lower Peak. Then at Middle Peak students learn about the structure, function and behaviour of living organisms in detail, building up from the microscopic cellular level to the macro-scale interactions in an ecosystem. These topics are extended at Upper Peak, with the expectation that students learn to apply this knowledge and make links with other topics.
- in chemistry, primary students are introduced to the properties of everyday materials. In EYFS, students explore ideas such as: floating, sinking and melting. In Base Camp students investigate different materials and their uses, before moving onto more abstract concepts such as solubility, conductivity and changes of state in Lower Peak. In Middle Peak, students start with a rigorous grounding in the fundamentals of secondary level chemistry: states of matter, the periodic table, chemical reactions and the behaviour of materials. Having mastered the foundation knowledge, students are fully equipped with the necessary knowledge and skills to tackle the more challenging Upper Peak content, such as chemical bonding and quantitative chemistry.
- in physics, primary students are introduced to the fundamentals of forces, electricity, sound, light and space – focusing on concrete concepts and experiences. These topics are taught explicitly in Base Camp and then revisited in more depth in Lower Peak. In Middle Peak, students continue to study these topics, as well as introducing more challenging concepts such as energy, pressure and density. In Upper Peak the focus shifts to a more quantitative appreciation of the subject matter and develops mathematical skills.
- experimental work is a key feature of all lessons in primary phase so that students can build confidence working practically and can start to appreciate the nature of scientific enquiry. Each year, primary students undertake either two or three extended investigations. At the start of Y7, ‘working scientifically’ skills are taught explicitly. These skills have been carefully mapped across all topics throughout Middle Peak and Upper Peak so that students are given many opportunities to apply and develop these concepts. For example, each topic deliberately includes several opportunities to revisit graph and table interpretation skills.

**The science curriculum will address social disadvantage by addressing gaps in students’ knowledge and skills:**

- at primary, students are tracked against core assessment standards and expectations three times per year. Underachievement is identified and students are targeted in lessons to meet objectives through 1:1 support, small group work and feedback.
- at the start of Y7, students sit a baseline assessment covering key skills and knowledge from the Primary National Curriculum. This allows for early intervention to be put in place to ensure that all students can access the Middle Peak curriculum from a level playing field, independent of their background. In addition, our curriculum is designed around the most disadvantaged learners. We are careful not to assume any prior general knowledge or cultural capital and always teach new knowledge explicitly.
- The Education Endowment Foundation published a major report in 2017 examining the disadvantaged attainment gap in science. The strongest factor affecting pupils’ science scores is their literacy levels. In our department, we actively promote literacy every lesson through reading, annotating and discussing challenging texts. We also support children to answer questions in full sentences by verbally modelling sentence starters, giving adequate thinking time and allowing children to ‘turn and talk’ with a partner. We plan frequent extended writing tasks and support children with verbal rehearsal activities, sentence starters and keywords.
- disadvantaged students and those from identified underrepresented groups receive priority for extra intervention sessions. For example, students have the opportunity to receive additional guidance and tutoring in small groups to close specific gaps in their understanding during weekly ‘Prep’ and ‘Morning Mastery’ sessions. These groups are reallocated twice a cycle based on question level analysis from cycle assessments and teacher judgement based on classwork. Teachers also prioritise these students when creating and implementing their Intervention Prevention plans. Disadvantaged students are also always prioritised when selecting



students for small group trips to museums and universities and for science competitions. At GCSE level, students are provided with suitable revision resources (e.g. revision guides and stationary) to give all students a fair opportunity to be successful.

- all students are taught the same rigorous curriculum. Although students at secondary level are taught in groups, we have the same high expectations of all students – we do not narrow or dilute the curriculum. All students are taught from the same student work booklets so that everyone is given access to the same powerful and catalytic knowledge. That being said, teachers understand the need to supplement the work booklets with additional practice/scaffolds or extension material, as required for individual students.
- students with special educational needs or disabilities are given extra support through the use of Double Staffing. Students are taught in small groups so that individual needs can be catered for. Students with profound barriers to learning receive additional teaching and practice of core concepts to achieve mastery. Students who are new to English receive support with vocabulary and literacy.

**We fully believe science can contribute to the personal development of students at DTC:**

- the social development of our students is nurtured through the explicit teaching and practice of effective teamwork and communication skills when working in groups for scientific investigations. Groups are selected by the teacher to ensure that students learn to effectively collaborate with others from different backgrounds or from outside of their friendship circle.
- science naturally provides many opportunities for balanced discussions of moral and ethical issues. For example, we explore the moral complexities of organ transplant, the controversial use of genetic engineering and the disputed use of stem cells for disease treatment. Students are given time to discuss these issues both in pairs and as a class to allow students to develop spiritually.
- when teaching topics such as the theory of evolution and the Big Bang theory, this provides a chance to develop students' cultural awareness as we can discuss viewpoints of these theories from different religions and cultures. We also discuss historical sexism in scientific developments – for example, the famous case of Rosalind Franklin's discovery of the structure of DNA.
- science lessons also provide a wealth of opportunities to explore personal development relating to physical and mental health. For example, students study the effects of smoking, drugs and alcohol from both a scientific and social perspective. When teaching about the digestive system, students are taught about the importance of a balanced diet and how to interpret nutritional information.
- we want students to become respectful and responsible citizens who contribute positively to society. For example, students are taught in detail about global warming, pollution and energy resources so that they understand the importance of recycling, reducing waste and cutting down their carbon footprint.
- our science curriculum contributed to the whole academy anti-racism agenda. We ensure that we teach about prominent scientific figures that are representative of all cultures and ethnicities, for example George Washington Carver and Henrietta Lacks.

**From Lower Peak onwards, our belief is that homework should be interleaved-revision of powerful knowledge that has been modelled and taught in lessons. This knowledge is recalled and applied through a range of low-stakes quizzing and practice.**

**Opportunities are built in to make links to the world of work to enhance the careers, advice and guidance that students are exposed to:**

- each topic in Middle and Upper Peaks have a 'careers spotlight', where students will explore a profession linked to that particular unit of work. For example, when Y8 students study chemical reactions, they learn about careers in chemical engineering.
- problem solving activities are built into the curriculum that allow students to apply scientific knowledge to certain career based scenarios. For example, when learning about health and disease in Middle Peak, students have to write an explanation to a patient from the point of view of a doctor explaining why they are prescribing painkillers rather than antibiotics.
- Students visit Cannon Hall farm, Filey Beach and a local nature reserve in Base Camp and Lower Peak to support their work on animal life cycles and habitats. Middle Peak students visit the Thackray Medical Museum to explore medicine through time and the work of medical professionals.

**A true love of science involves learning about various cultural domains. We teach beyond the specification requirements, but do ensure students are well prepared to be successful in GCSE examinations:**

- opportunities to explore the history and philosophy of science are embedded into the curriculum. For example, in primary phase, students investigate the work of key scientists such as Mary Anning and Jane Goodall. This continues at secondary, mainly taking the form of reading rich texts about an array of topics, such as: the history of space exploration, Semmelweis' work on Germ Theory and how new chemical elements get their names. Whilst not examined, they are included for engagement and to build cultural capital.
- although students' practical skills are no longer examined through coursework, we believe it is absolutely essential that all students can plan and carry out practicals using laboratory equipment safely and accurately so that they are fully prepared for future study and employment. In Middle Peak, we want students to be exposed to a wide variety of engaging practicals, such as investigations into the effectiveness of different brands of indigestion tablets and hand sanitiser and finding the best metal for making frying pans. In Upper Peak there is a greater focus on the GCSE Required Practical – but we are not restricted to this list of experiments.
- students that wish to develop their science knowledge beyond the curriculum can select STEM Club for their co-curricular elective. As part of this club, students are given opportunities to represent the academy at competitions and to gain a CREST award. There is also an ever-growing collection of science based non-fiction books in the iBase which are very popular with our students. Throughout the year, there are also opportunities to take part in science quizzes and contests to earn highly-coveted house points.



## Curriculum Overview

All children are entitled to a curriculum and to the powerful knowledge which will open doors and maximise their life chances. Below is a high-level overview of the critical knowledge children will learn in this particular subject, at each key stage from Reception through to Year 11, in order to equip students with the cultural capital they need to succeed in life. The curriculum is planned vertically and horizontally giving thought to the optimum knowledge sequence for building secure schema.

		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
EYFS	<b>Knowledge introduced</b>	<b>Understanding the World / Physical Development</b> Humans: My body, facial features, own basic hygiene and oral hygiene, keeping healthy, healthy choices Plants: observing plants, including poppies, caring for living things, noticing changes over time. Seasons: seasonal change	<b>Understanding the World</b> Materials: investigating water/ice, magnetic materials Earth and Space: the moon, name some planets in our solar system; astronauts (Tim Peake) Plants: planting seeds and watching them grow Seasons: seasonal change	<b>Understanding the World</b> Animals: egg to chick; names of common animals in different habitats, invertebrates (use term minibeast) in our environment Habitats: comparing environments e.g. tropical, ocean, desert Seasons: seasonal change
	<b>Skills introduced</b>	Question words to ask questions; how to observe closely; how to notice patterns; how to sort and group; how to care for living things; how to dress, go to the toilet, wash hands and brush teeth	How to describe what they see; fair/not fair (when adults are helping with investigations); how to use books to find more information	How to compare similarities and differences scientifically; how to care for animals; basic recording - tally charts
	<b>Knowledge revisited</b>		Parts of plants, seasonal change	Seasonal change, parts of animals
	<b>Skills revisited</b>		Caring for living things, observing scientifically; asking questions about the world they live in	Caring for living things; observing scientifically; asking questions; hygiene skills
	<b>Continuous Provision</b>	Characteristics of effective learning: finding out and exploring; using senses to explore the world; observing and paying attention to detail; creating and thinking critically; asking questions; finding ways to solve problems; making predictions and testing their ideas; developing ideas of cause and effect; evaluating		
YEAR 1	<b>Knowledge introduced</b>	<b>Bodies and Senses</b> Draw and label basic parts of the human body; understand the five senses and associated body parts <b>Animals</b> Describe structures of animals (e.g. gills, claws, scales, tentacles, fins, skin, hair, fur, tail, feathers, skeleton, whiskers); name common animals; understand key features of different families of common animals within the broad groups of mammals, reptiles, amphibians, fish, birds (students do not need to classify into these groups yet); identify carnivores, herbivores and omnivores	<b>Everyday Materials</b> Identify and sort everyday materials by their physical properties; use properties to describe materials, including wood, plastic, glass, fabric, metal and rock; identify materials which are transparent and opaque <b>Experimenting with Materials</b> How to answer our own scientific questions; experimenting with materials; reporting scientific findings	<b>Plants</b> Identify and name common wild and garden plants, including deciduous and evergreen trees; describe the structure of common flowering plants and trees; identify fruits and vegetables <b>Gardening</b> Planting and caring for bulbs and seeds, including flowers; identify fruits and vegetables observing how plants grow over time; reporting scientific findings
		<b>Seasonal Changes</b> Observe changes across the four seasons; describe weather associated with the seasons and how day length varies; how plants in our local environment change across the seasons; (skill: use thermometers to compare temperatures throughout the seasons)		
	<b>Skills introduced</b>	Ask simple scientific questions; observe closely, using simple equipment (e.g. hand lenses); fair tests; classifying using Venn diagrams; block graphs; 1st scientific investigation (linked to senses)	Perform simple tests; make basic predictions; identifying and classifying using scientific vocabulary; using simple equipment (e.g. timers), block graphs; tables of results	Use observations and ideas to suggest answers to questions; identifying properties; using simple equipment (e.g. tape measures/rulers)
	<b>Knowledge revisited</b>	Describing myself, Animals (invertebrates and chicks)	Five senses; materials (water)	Local environment; planting in EYFS, parts of a flower
	<b>Skills revisited</b>	Question words; tally charts, observational skills; fair or not fair; sorting and grouping	Asking simple scientific questions, use resources responsibly; observing closely; sorting & grouping	Making basic predictions; describing observations, taking care of living things



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
YEAR 2	<b>Knowledge introduced</b>	<p><b>Living Things and their Habitats (Local)</b> Differences between things that are living, dead, and have never been alive; 7 processes of living things; describe how different habitats provide for the basic needs of different kinds of animals; name a variety of animals in their habitats, including microhabitats</p> <p><b>Everyday Materials</b> Identify everyday materials and explain how their uses relate to their properties; explore how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching; natural, man-made and recyclable materials; inventions of Charles Macintosh</p>	<p><b>Food chains &amp; Keeping Healthy</b> How animals obtain food from other animals; simple food chains; sources of food; importance of a healthy diet, exercise, good hygiene</p> <p><b>Animals including Humans</b> Animals, including humans have offspring which grow into adults; describe the basic needs of animals for survival; observations of how animals grow (e.g. life cycle of a butterfly)</p>	<p><b>Plants</b> Identify common seeds and bulbs; flowering plant life cycle; conditions for germination; describe how plants need air, water, light and a suitable temperature to grow and stay healthy</p> <p><b>Living Things and their Habitats (Worldwide)</b> Comparing habitats: seashore, woodland, ocean, rainforest; global warming; human impact on habitats</p>
	<b>Skills introduced</b>	Use different types of scientific enquiry to gather and record data; notice similarities, differences and patterns; draw food chains	How to carry out simple comparative tests; using simple equipment to gather data, where appropriate to answer questions	Observe changes over time; find out information using secondary sources of information
	<b>Knowledge revisited</b>	Common animals; similarities between living things; animal diet; life processes; habitats	Properties of common materials; group materials by their physical properties	Structure of common plants; life cycles; seasons and climate
	<b>Skills revisited</b>	Scientific observation; asking and answering scientific questions; identifying and classifying; grouping	Scientific observations; recording observations; comparing materials using scientific vocabulary; describe changes	Interpreting basic information; classifying, identifying and sorting; using simple equipment (e.g. thermometer, ruler)
YEAR 3	<b>Knowledge introduced</b>	<p><b>Animals including Humans</b> Muscle types; functions of a skeleton; naming bones; types of skeleton; types of nutrition Key Scientist: Dian Fossey</p> <p><b>Light</b> Light sources; how light is reflected from surfaces; sun safety and ways to protect; formation of shadows; how distance from the light source affects shadows Key Scientist: Thomas Young</p>	<p><b>Rocks and Soils</b> Give examples of and describe igneous, sedimentary and metamorphic rock; formation of fossils; formation of soil; structure of the earth Key Scientists: Charles Darwin; George Washington Carver</p> <p><b>Forces and Magnets</b> Describe forces including gravity, friction, magnetic forces; sort magnetic and non-magnetic materials; describe magnetic attraction; identify forces on different objects (pushing and pulling) Key Scientist: Galileo Galilei</p>	<p><b>Plants</b> Naming different parts of flowering plants; explore what plants need for life and growth; the importance flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal; how water is transported within plants Key Scientist: Agnes Arber</p> <p><b>How Science Works</b> Plan an investigation linked to student interest, display and analyse the results, revise key learning</p>
	<b>Skills introduced</b>	Set up experiments independently, according to a method; ask relevant questions and using different types of scientific enquiries to answer them	Identify differences, similarities or changes related to simple scientific ideas and processes; accurately read scales; use standard units	Dissect parts of a plant
	<b>Knowledge revisited</b>	Parts of the human body; five senses; skeleton; healthy lifestyles PSHCE – healthy eating (Y1 / Y2) PE – muscles	Basic properties of an object History – palaeontology and Mary Anning (Y2 C2) History – stone age tools (Y3 C1)	Flowering plants; elements required for growth; importance of water
	<b>Skills revisited</b>	Labelling; observing changes	Compare and classify by properties	Identify differences and similarities; record findings using scientific language



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
YEAR 4	<b>Knowledge introduced</b>	<p><b>Electricity</b> Common appliances that use electricity; mains and battery; construct a simple series circuit; identify and use cells, bulbs, switches and buzzers; different ways of generating electricity; common conductors and insulators; potential electrical safety hazards in the home Key Scientist: Thomas Edison</p> <p><b>States of Matter</b> Identify everyday solids, liquids and gases by their properties; changes of state via melting and freezing; measuring temperature in degrees Celsius; water cycle; evaporation and condensation Key Scientist: Humphry Davy</p>	<p><b>Sound</b> How sounds are made through vibration; explore how sounds travel in solids, liquids and gases; differences between pitch and volume; relationship between sounds and distance; anatomy of the ear Key Scientist: Alexander Graham Bell; James West</p> <p><b>Living Things and Their Habitats: Animals</b> Classification keys to sort, group, identify and name a variety of living things in the local and wider environment; climate change, environmental activism; changes to environments and possible effects: deforestation, invasive species, pollution; endangered animals Key Scientist: Stuart Pimm; Greta Thunberg</p>	<p><b>Animals including Humans</b> Functions of the human digestive system; different types of teeth in humans and their functions; construct and interpret food chains, identifying producers, predators and prey Key Scientist: Marie Maynard Daly</p> <p><b>Living Things and Their Habitats: Plants</b> Sort plants into the categories: flowering plants (including grasses) and non-flowering plants (ferns, algae and mosses); describe the functions of parts of a flowering plant Key Scientist: Rachel Carson</p>
	<b>Skills introduced</b>	Using scientific evidence to answer questions and support findings; using simple electrical equipment; how to use a data logger; scaled scientific drawing	Accurate annotations; suggest improvements to an investigation, using evidence; make predictions for new values	Use and create classification keys; present information using labelled graphs
	<b>Knowledge revisited</b>	Conductors and insulators; properties of materials; effect of temperature; light; why materials change state; importance of water Geography - the water cycle (Y4 C1) Maths – reading temperature scales PSHCE – eating Healthily (Y2 C1)	States of matter; parts of the human body; five senses; protection of hearing flowering plants and their life cycles; effect of the local environment Music and DT links	Parts of the human body; teeth; taste; impact of diet; food chains; carnivores, omnivores and herbivores; habitats; changing environments; living things in the local environment
	<b>Skills revisited</b>	Classifying and sorting; using standard units of measure	Set up practical enquiries; dissection of plants;	Report on findings, including oral and written explanations
YEAR 5	<b>Knowledge introduced</b>	<p><b>Earth and Space</b> Movement of the Earth and other planets, relative to the Sun; describe the movement of the Moon relative to the Earth, concept of the Earth, Sun and Moon as spherical bodies; explain day and night by describing the Earth's rotation around the Sun; name the 8 planets in our solar system; the acceptance of the heliocentric model Key Scientist: Mae Jemison</p> <p><b>Forces</b> Describe different forces acting on an object; gravity; air resistance; water resistance; friction; forces in mechanisms (levers, pulleys and gears) Key Scientists: Isaac Newton</p>	<p><b>Properties of Materials</b> Compare and group everyday materials based on their properties and response to magnets; thermal conductors and insulators; electrical conductors Key Scientist: Spencer Silver</p> <p><b>Changes of Materials</b> Dissolving and separating mixtures; filtration, sieving and evaporation; reversible and irreversible changes, including burning Key Scientist: John Dalton</p>	<p><b>Living Things and Their Habitats</b> Life process of asexual and sexual reproduction in plants; compare life cycle of plants in the local environment with other plants around the world; types of seed dispersal Key Scientist: Jane Goodall; Ernest Everett Just</p> <p><b>Animals including Humans</b> Life cycles of a mammal, an amphibian, an insect and a bird; human development stages; life process of reproduction in some animals; puberty; gestation periods of some mammals Key Scientist: David Attenborough</p>
	<b>Skills introduced</b>	Recognising and controlling variables	Set up comparative and fair tests; evaluate the consequences of an unfair test	Form evidenced-supported arguments; refute ideas using evidence



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
YEAR 5	<b>Knowledge revisited</b>	Magnetism; different forces on an object; friction; pushing and pulling PDS - Y3 C1 - Stephen Hawking study	Everyday materials and their impact on the quality of sound; uses of everyday materials; dissolving and mixing; reversible changes; properties of materials	Life cycles of plants and animals; impact of the local environment; human development; adaptation
	<b>Skills revisited</b>	Scaled drawing; using scientific equipment to take measurements, with increasing accuracy and precision	Using classification keys; comparing and exploring a broad range of materials; using data loggers	Dissection of plants; identify and classify common plants and animals
YEAR 6	<b>Knowledge introduced</b>	<b>Living Things and Their Habitats</b> The work of Carl Linnaeus and the Linnaeus system; describe how living things (plants, animals, microorganisms) are classified into broad groups using observable and common characteristics; understand that these broad groups can be further sub divided; identify similarities and differences between living things and use these to help to classify; explain why plants and animals have been classified into certain groups and sub-groups Key Scientists: Carl Linnaeus; Emmett Chappelle <b>Light</b> How light travels; reflection and refraction of light; prisms; spectrum of light; how the angle of the light source affects shadows; seeing colours including filters; the law of reflection; Key Scientist: Albert Einstein	<b>Evolution and Inheritance</b> Adaptation; inheritance; variation; theory of evolution; how fossils support the theory of evolution; human inherited and environmental characteristics Key Scientists: Charles Darwin; Alfred Wallace <b>Electricity</b> Relationship between the brightness of a bulb with the number and voltage of cells in a circuit; recognise electricity symbols; reasons for variations in how circuits function Key Scientist: Michael Faraday; Benjamin Franklin	<b>Animals including Humans</b> Main parts of the human circulatory system, including heart, blood vessels and blood; transportation of water and nutrients; healthy life styles; impact of diet; impact of exercise; impact of drugs and alcohol, including smoking Key Scientist: Charles Drew <b>How Science Works</b> Development of scientific theories; plan an investigation linked to student interest, display and analyse the results; revise key learning Key Scientist: the importance of BAME scientists, and why more are needed
	<b>Skills introduced</b>	Importance of the travel of light in everyday life (rear-view mirrors on cars, periscopes) Drawing light rays	Identify patterns in data; separate opinion from fact	Use secondary sources of information to support primary findings; evaluate the trustworthiness of sources
	<b>Knowledge revisited</b>	Light sources; reflection; shadows; electrical insulators; series circuits; switches, bulbs, buzzers and motors History – Electricity Isaac Newton (interleaving rather than knowledge revisited) Geography – Local area habitats (Y2 C1)	Classification systems; grouping living things; fossils; how living things have changed over time History – Palaeontology (Y2) Maths – Angles (Y4 / Y6)	Main body parts and internal organs (skeletal, muscular and digestive system) PSHCE – Tobacco (Y3) PSHCE – Making healthy choices, diet and exercise (Y4-6) PE – Exercise effects circulatory system (interleaving rather than knowledge revisited)
	<b>Skills revisited</b>	Scaled drawing, with labels; identify common electrical circuit components	Group and classify; use and create classification keys	Create graphs, with labelled scales, of increasing complexity
YEAR 7	<b>Knowledge introduced</b>	<b>Science skills</b> Development of scientific theories; planning an investigation and displaying and analysing results; bouncing balls investigation (these skills are embedded in all future topics from year 7 – 11) <b>Cells and life processes</b> Plant and animal cells; using a microscope to view cells; specialised cells; unicellular organisms; introduction to respiration, photosynthesis and diffusion	<b>Particles and solutions</b> Solids, liquids and gases; changes of state; dissolving; solubility; separating mixtures; rock salt investigation <b>Reproduction</b> Puberty; reproductive systems; pregnancy; parts of a flower and plant reproduction	<b>Elements</b> Atoms; elements, compounds and mixtures; the periodic table; chemical formulae; properties of metals and non-metals and introduction to chemical reactions <b>Ecology</b> Competition in ecosystems; adaptations of plants and animals; food chains and webs; pyramids of numbers and classification



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
YEAR 7	<b>Knowledge introduced</b>	<b>Forces and space</b> Force diagrams; resultant forces; balanced and unbalanced forces; air resistance investigation; the solar system; day/night and seasons	<b>Energy</b> Energy stores and transfer pathways; law of conservation of energy; efficiency; advantages and disadvantages of renewable and non-renewable energy resources and heat energy transfer investigation.	<b>Acids and alkalis</b> pH scale; indicators; neutralisation reactions; indigestion tablet investigation and making salts practical <b>Sound</b> Behaviour of sound waves; amplitude and frequency; oscilloscope traces; hearing and the ear
	<b>CEAIG</b>	Careers in aeronautical engineering (forces and space topic)	Careers in midwifery (reproduction topic)	Careers in veterinary medicine / nursing (ecology topic)
	<b>Knowledge &amp; Skills Revisited</b>	Science skills builds on how science works skills previously taught through investigations. Cells and life processes builds on previous knowledge from the Animals (including Humans) topics.	Specialised cells and life processes, forces causes an energy transfer, science skills applied to investigations.	States of matter applied to elements topics, life processes, space linked to sound waves, science skills applied to investigations.
YEAR 8	<b>Knowledge introduced</b>	<b>The Body</b> Skeletal system; muscular system; food groups; digestive system; respiratory system; circulatory system; the heart and exercise <b>Metals</b> Properties of metals; reactions of metals and reactivity series; extraction of metals from ores and recycling metals <b>Forces and motion</b> Weight, mass and gravity; Hooke's law theory and investigation; speed calculations and distance-time graphs	<b>Health and disease</b> Pathogens; immune system; discovery and use of antibiotics; discovery and use of vaccinations; healthy diets; smoking; drugs and alcohol <b>Chemical reactions</b> Chemical equations; rates of reaction theory and investigations; conservation of mass and exo/endothemic reactions <b>Electricity and magnetism</b> Circuit components and diagrams; series and parallel circuit theory and investigation; current, voltage and resistance; magnets; magnetic fields and electromagnets	<b>Inheritance and variation</b> DNA and genetics; environmental and inherited variation; natural selection and extinction <b>Plants</b> Photosynthesis; structure of leaves; plant roots and minerals; fertilisers; bioaccumulation and testing leaves for starch <b>Environmental chemistry</b> Burning fuels theory and investigation; Earth's changing atmosphere; global warming; acid rain and water cycle <b>Light</b> Behaviour of light waves; reflection, refraction and dispersion investigations; colours of light; seeing and the eye.
	<b>CEAIG</b>	Careers in medicine / nursing (the body topic)	Careers in chemical engineering (chemical reactions topic)	Careers in ophthalmology (light topic)
	<b>Knowledge &amp; Skills Revisited</b>	Cells and life processes, metal and non-metal properties, year 7 forces knowledge is further developed, science skills applied to investigations.	Specialised cell knowledge is developed, year 7 simple chemical reactions knowledge is further developed, science skills applied to investigations.	Cell structure, photosynthesis, ecology, chemical reactions, waves knowledge from year 7, science skills applied to investigations.
YEAR 9	<b>Knowledge introduced</b>	<b>AQA GCSE Combined Science Trilogy</b> <b>Cell biology</b> Structure of eukaryotic and prokaryotic cells; cell division; advantages and disadvantages of stem cells; microscopy and cell transport (diffusion; active transport and osmosis) <b>Atomic structure and periodic table</b> Development and current model of the atom; group 1; 7 and 0 elements; properties of metals and non-metals <b>Energy</b> Stores and pathways; law of conservation; efficiency; power; energy resources	<b>AQA GCSE Combined Science Trilogy</b> <b>Organisation</b> Organ systems in plants and animals <b>Bonding and structure</b> Ionic; covalent and metallic bonding; solids; liquids and gases and properties of substances <b>Particle model of matter</b> States of matter; changes of state; density; internal energy; energy transfers and gas pressure	<b>AQA GCSE Combined Science Trilogy</b> <b>Infection and response</b> Pathogens; spread and prevention of infection; immune response and treatment of infectious diseases <b>Chemistry of the atmosphere</b> Composition and evolution of the Earth's atmosphere; greenhouse gases and pollutants
	<b>CEAIG</b>	Careers in microbiology (cell biology topic)	Careers in plant science and horticulture (organisation topic)	Careers in pharmacology (infection and response topic)



		Knowledge, skills and understanding to be gained at each stage*		
		Cycle 1	Cycle 2	Cycle 3
YEAR 9	<b>Knowledge &amp; Skills Revisited</b>	Builds on year 7 and 8 knowledge of cells and life processes, energy, periodic table, elements, compounds, mixtures, chemical equations and separation techniques. Science skills continue to be embedded.	Builds on year 7 and 8 knowledge of body systems and life processes, properties of matter and states of matter. Science skills continue to be embedded.	Builds on year 7 and 8 knowledge of infectious diseases, the Earth's atmosphere and burning fossil fuels. Science skills continue to be embedded.
YEAR 10		<b>AQA GCSE Combined Science Trilogy</b> <b>Bioenergetics</b> Respiration and photosynthesis <b>Quantitative chemistry</b> Chemical measurement; conservation of mass; chemical calculations and concentration <b>Chemical changes</b> Reactivity of metals and acids; pH and electrolysis <b>Electricity</b> Circuit components; current; potential difference; resistance; I-V graphs; mains electricity and national grid <b>Atomic structure</b> Model of an atom; radioactive decay and nuclear radiation	<b>AQA GCSE Combined Science Trilogy</b> <b>Homeostasis and response</b> Regulation of internal conditions; nervous and endocrine systems and hormones and fertility <b>Energy changes in reactions</b> Exothermic and endothermic reactions <b>Rate and extent of chemical change</b> Rate of reaction; catalysts; reversible reactions and dynamic equilibrium <b>Forces</b> Scalars and vectors; types of forces; resultant forces; work done; Hooke's law; Newton's laws; speed; acceleration; motion graphs; stopping distances and momentum	<b>AQA GCSE Combined Science Trilogy</b> <b>Inheritance; variation and evolution</b> Reproduction; meiosis; genetics; selective breeding; genetic engineering; classification <b>Organic chemistry</b> Crude oil; hydrocarbons; fractional distillation and cracking <b>Chemical analysis</b> Purity; formulations; chromatography and gas tests <b>Waves</b> Transverse and longitudinal waves; properties of waves; uses and applications of electromagnetic waves
	CEAIG	Careers in electrical engineering (electricity topic)	Careers in mechanical engineering (forces topic)	Careers in forensic science (chemical analysis topic)
	<b>Knowledge &amp; Skills Revisited</b>	Builds on knowledge of life processes, chemical reactions, atomic structure from the chemistry topic and electricity. Science skills continue to be embedded.	Builds on previous knowledge of reproduction, chemical reactions and simple force and motion knowledge. Science skills continue to be embedded.	Builds on previous knowledge of genetics, separating techniques and waves.
YEAR 11		<b>AQA GCSE Combined Science Trilogy</b> <b>Ecology</b> Adaptation; interdependence; competition; biodiversity and human effects <b>Using Resources</b> Potable water; life cycle assessments and recycling <b>Magnetism and electromagnetism</b> Permanent and induced magnetism; magnetic fields; motor effect	<b>AQA GCSE Combined Science Trilogy</b> Review and revision of all GCSE topics	
	CEAIG	Careers in manufacturing engineering (using resources topic)		
	<b>Knowledge &amp; Skills Revisited</b>	Builds on previous knowledge of ecology, metal recycling, magnets and magnetic fields.	Revisits all topics.	

\*A powerful, knowledge-rich curriculum teaches both **substantive knowledge** (facts; knowing that something is the case; what we think about) and non-declarative or **procedural knowledge** (skills and processes; knowing how to do something; what we think with). There are no skills without bodies of knowledge to underpin them. In some subjects, a further distinction can be made between substantive knowledge (the domain specific knowledge accrued e.g. knowledge of the past) and disciplinary knowledge (how the knowledge is accrued e.g. historical reasoning). Please refer to the DAT Curriculum Principles, published on our website, for further information about how we have designed our all-through curriculum.



**Year 1 Long Term Plan**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 24/08	W/C 31/08	W/C 07/09	W/C 14/09	W/C 21/09	W/C 28/09	W/C 05/10	W/C 12/10	W/C 02/11	W/C 09/11	W/C 16/11	W/C 23/11	W/C 30/11
	Term 1				EUREKA WORKSHOP		Assessment	Assessment	Term 2	Data/Planning day 12/13			
	<b>Induction</b>	Baseline <b>Bodies and Senses</b> and Features of human body Continuous provision	Baseline <b>Bodies and Senses</b> and Features of human body Continuous provision	<b>Bodies and Senses</b> and senses Continuous provision	<b>Bodies and Senses</b> and Senses Eureka workshop Continuous provision	<b>Animals</b> vertebrates and invertebrates Continuous provision	<b>Animals</b> mammals Continuous provision	<b>Animals</b> reptiles and amphibians Continuous provision	<b>Reinduction Animals</b> fish and birds Continuous provision	Data and planning day	<b>Animals</b> herbivores, omnivores and carnivores Continuous provision	<b>Animals</b> To observe and classify animals	<b>Everyday Materials</b> Identifying Objects
Cycle 2	W/C 07/12	W/C 14/12	W/C 04/01	W/C 11/01	W/C 18/01	W/C 25/01	W/C 01/02	W/C 08/02	W/C 22/02	W/C 01/03	W/C 08/03	W/C 15/03	W/C 22/03
		BC/LP Pantomime	Term 3				Assessment	Assessment	Term 4 Data Input 1	Data/Planning Day 4/5		BC/LP Music For Youth expedition	
	<b>Everyday Materials</b> Exploring Materials	<b>Everyday Materials</b> Identifying Materials	<b>Reinduction</b> School closed 04.01	<b>Everyday Materials</b> Exploring Properties	<b>Everyday Materials</b> Identifying Properties	<b>Everyday Materials</b> Combining Objects, Materials and Properties	<b>Everyday Materials</b> Exploring Flexibility	<b>Everyday Materials</b> Slide Investigation Practical	<b>Reinduction Everyday Materials</b> Slide Investigation Write Up	Data and planning day	<b>Everyday Materials</b> Exploring See-through	Zoolab/animal man visit	<b>Everyday Materials</b> Investigating Waterproof
Cycle 3	W/C 29/03	W/C 19/04	W/C 26/04	W/C 03/05	W/C 10/05	W/C 17/05	W/C 24/05	W/C 07/06	W/C 14/06	W/C 21/06	W/C 28/06	W/C 05/07	W/C 12/07
		Term 5		School closed 3/05				Term 6 Assessment	Assessment	Data Input 2			Data Day 15/07
	<b>Gardening</b> Planting seeds	<b>Reinduction Gardening</b> Caring for plants	<b>Plants</b> Identifying and naming common garden plans	<b>Plants</b> Identifying and naming wild garden plans	<b>Plants</b> Identifying and naming deciduous and evergreen trees	<b>Gardening</b> Observing how plants grow over time	<b>Gardening</b> Extended Writing How to care for pants	<b>Reinduction Gardening</b> Extended Writing How to care for pants	<b>Plants</b> Identifying and naming structure of plants	<b>Plants</b> Identifying and naming fruits and vegetables	<b>Plants</b> Identifying fruits and vegetables as parts of plants (e.g. celery is stem)	<b>Gardening</b> Caring for plants	<b>End of Year Celebration</b>

**Year 2 Long Term Plan**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 24/08	W/C 31/08	W/C 07/09	W/C 14/09	W/C 21/09	W/C 28/09	W/C 05/10	W/C 12/10	W/C 02/11	W/C 09/11	W/C 16/11	W/C 23/11	W/C 30/11
	Term 1					Skeleton Grange Expedition			Term 2	Assessment Data/Planning day 12/13			
	<b>Induction</b>	<b>Local Habitats</b> Life processes: Movement, respiration and sensitivity	<b>Local Habitats</b> Living Processes: Growth, Reproduction, Excretion and Nutrition;	<b>Local Habitats</b> Living, dead, never alive	<b>Local Habitats</b> Habitats	<b>Local Habitats</b> microhabitats	<b>Local Habitats</b> How animals are best suited to their habitat	<b>Materials</b> Distinguish between object and its material	<b>Reinduction Materials</b> Describe properties of materials	<b>Materials</b> Manmade, natural, recyclable	<b>Materials</b> Suitability of materials	<b>Materials</b> Charles Macintosh	<b>Materials</b> Squashing, bending, twisting, stretching
Cycle 2	W/C 07/12	W/C 14/12	W/C 04/01	W/C 11/01	W/C 18/01	W/C 25/01	W/C 01/02	W/C 08/02	W/C 22/02	W/C 01/03	W/C 08/03	W/C 15/03	W/C 22/03
		BC/LP <i>Pantomime</i>	Term 3				Assessment	Assessment	Term 4 Data Input 1	Data/Planning Day 4/5 World Book Day		BC/LP <i>Music For Youth expedition</i>	
	<b>Keeping Healthy SUMMIT 7</b> How to cook a meal	<b>Food chains and keeping healthy</b> Importance of healthy diet	<b>Food chains and keeping healthy</b> Importance of exercise/ hygiene	<b>Food chains and keeping healthy</b> Sources of food	<b>Food chains and keeping healthy</b> Animals obtain food from other animals	<b>Food chains and keeping healthy</b> Simple food chains	<b>Food chains and keeping healthy</b> Simple food chains	<b>Animals including humans</b> Basic needs for survival	<b>Reinduction Animals including humans</b> Animals' offspring	<b>Animals including humans</b> Human lifecycle	<b>Animals including humans</b> Butterfly lifecycle	<b>Animals including humans</b> Observing butterflies	<b>Animals including humans</b> Other life cycles (if time)
Cycle 3	W/C 29/03	W/C 19/04	W/C 26/04	W/C 03/05	W/C 10/05	W/C 17/05	W/C 24/05	W/C 07/06	W/C 14/06	W/C 21/06	W/C 28/06	W/C 05/07	W/C 12/07
		Term 5		School closed 3/05				Term 6 Assessment	Assessment	Data Input 2			Data Day 15/07
	<b>Plants</b> Identify seeds & bulbs	<b>Reinduction Plants</b> Conditions for germination	<b>Plants</b> What plants need to grow	<b>Plants</b> What plants need to grow (experiment)	<b>Plants</b> Flowering plant lifecycle	<b>Plants</b> Flowering plant lifecycle	<b>Living things &amp; their habitats (worldwide)</b> Comparing habitats	<b>Reinduction Living things &amp; their habitats (worldwide)</b> Comparing habitats	<b>Living things &amp; their habitats (worldwide)</b> Global warming	<b>Living things &amp; their habitats (worldwide)</b> Global warming	<b>Living things &amp; their habitats (worldwide)</b> Human impact on habitats (plastic in ocean)	<b>Living things &amp; their habitats (worldwide)</b> Human impact on habitats (orangutans)	<b>End of Year Celebration</b>

## Year 3 Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 24/08	W/C 31/08	W/C 07/09	W/C 14/09	W/C 21/09	W/C 28/09	W/C 05/10	W/C 12/10	W/C 02/11	W/C 09/11	W/C 16/11	W/C 23/11	W/C 30/11
	Term 1					Skeleton Grange Expedition			Term 2	Assessment Data/Planning day 12/13			
		What is light?	How does light travel?	How do mirrors reflect light? How do our eyes see light?	Which materials block light and create shadows?	How can we stay safe in the sun?	Enrichment Kaleidoscopes	Skeleton Types	Naming Bones	<b>Data and Planning Day</b>	Bone function: skull	Bone function: ribs and spine	Muscles
Cycle 2	W/C 07/12	W/C 14/12	W/C 04/01	W/C 11/01	W/C 18/01	W/C 25/01	W/C 01/02	W/C 08/02	W/C 22/02	W/C 01/03	W/C 08/03	W/C 15/03	W/C 22/03
		BC/LP Pantomime	Term 3				Assessment	Assessment	Term 4 Data Input 1	Data/Planning Day 4/5 World Book Day		BC/LP Music For Youth expedition	
	Nutrition Food groups Summit – plan to cook a meal	Nutrition SUMMIT Cook a meal	Types of natural and man-made rocks.	Investigate properties of rocks	Fossilization process	Rocks and soils workshop 28.01.20 1:50 pm	Describe and explore soil	Everyday forces (pushing, pulling) and gravity	<b>Reinduction</b> Friction Plan and conduct extended Investigation	<b>Data and Planning Day</b>	Magnets and magnetic materials	Magnetic poles	Magnetic field
Cycle 3	W/C 29/03	W/C 19/04	W/C 26/04	W/C 03/05	W/C 10/05	W/C 17/05	W/C 24/05	W/C 07/06	W/C 14/06	W/C 21/06	W/C 28/06	W/C 05/07	W/C 12/07
		Term 5		School closed 3/05				Term 6 Assessment	Assessment	Data Input 2			Data Day 15/07
	What do plants need to grow?	<b>Reinduction</b> Pollination and fertilisation. Grow a tomato plant to observe	Plan life cycles – plant sunflowers to observe process	Investigation: what temperature travels through plants quickest?	Why are plants important?	Independent scientific enquiry	Independent scientific enquiry	<b>Reinduction</b> Independent scientific enquiry	Independent scientific enquiry	Independent scientific enquiry	Independent scientific enquiry	Independent scientific enquiry	Independent scientific enquiry



## Year 7 Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 24/08	W/C 31/08	W/C 07/09	W/C 14/09	W/C 21/09	W/C 28/09	W/C 05/10	W/C 12/10	W/C 02/11	W/C 09/11	W/C 16/11	W/C 23/11	W/C 30/11
	Term 1								Term 2	Data/Planning Day 12/13	Y8 Oxford Expedition		
	School Closed	Induction	Science Skills	Science Skills	Science Skills	Science Skills	Cells & Life Processes	Cells & Life Processes	Reinduction Cells & Life Processes	Cells & Life Processes	Forces & Space	Forces & Space	Forces & Space
Cycle 2	W/C 07/12	W/C 14/12	W/C 04/01	W/C 11/01	W/C 18/01	W/C 25/01	W/C 01/02	W/C 08/02	W/C 22/02	W/C 01/03	W/C 08/03	W/C 15/03	W/C 22/03
			Term 3				Assessment	Assessment	Term 4 Data Input 1	Data/Planning Day 4/5	Y7 Ullswater Expedition		
	Particles & Solutions	Particles & Solutions	Reinduction Particles & Solutions	Energy	Energy	Energy	Revision	Revision & Assessment	Reinduction Reproduction	Reproduction	Reproduction	Atoms & Elements	Atoms & Elements
Cycle 3	W/C 29/03	W/C 19/04	W/C 26/04	W/C 03/05	W/C 10/05	W/C 17/05	W/C 24/05	W/C 07/06	W/C 14/06	W/C 21/06	W/C 28/06	W/C 05/07	W/C 12/07
		Term 5		School closed 3/05				Term 6 Assessment	Assessment	Data Input 2	Y9 DoFE Expedition		Data Day 15/07
	Atoms & Elements	Reinduction Ecology	Ecology	Ecology	Acids & Alkalis	Acids & Alkalis	Revision	Reinduction Revision	Revision & Assessment	Waves	Waves	Waves	End of Year Celebration



## Year 8 Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 24/08	W/C 31/08	W/C 07/09	W/C 14/09	W/C 21/09	W/C 28/09	W/C 05/10	W/C 12/10	W/C 02/11	W/C 09/11	W/C 16/11	W/C 23/11	W/C 30/11
	Term 1								Term 2	Data/Planning Day 12/13	Y8 Oxford Expedition		
	School Closed	Induction	Baseline Atoms & Elements	Atoms Elements &	Atoms Elements &	Plants & Ecology	Plants & Ecology	Plants & Ecology	Plants & Ecology	Reinduction Plants & Ecology	Forces & Motion	Forces & Motion	Forces & Motion
Cycle 2	W/C 07/12	W/C 14/12	W/C 04/01	W/C 11/01	W/C 18/01	W/C 25/01	W/C 01/02	W/C 08/02	W/C 22/02	W/C 01/03	W/C 08/03	W/C 15/03	W/C 22/03
			Term 3				Assessment	Assessment	Term 4 Data Input 1	Data/Planning Day 4/5	Y7 Ullswater Expedition		
	Acids, Alkalis & Metal Reactions	Acids, Alkalis & Metal Reactions	Reinduction The Body	The Body	The Body	Electricity & Magnetism	Electricity & Magnetism	Revision & Assessment	Reinduction Electricity & Magnetism	Electricity & Magnetism	Chemical Reactions	Chemical Reactions	Chemical Reactions
Cycle 3	W/C 29/03	W/C 19/04	W/C 26/04	W/C 03/05	W/C 10/05	W/C 17/05	W/C 24/05	W/C 07/06	W/C 14/06	W/C 21/06	W/C 28/06	W/C 05/07	W/C 12/07
		Term 5		School closed 3/05				Term 6 Assessment	Assessment	Data Input 2	Y9 DofE Expedition		Data Day 15/07
	Health & Disease	Reinduction Health & Disease	Waves	Waves	Genetics	Genetics	Revision	Reinduction Revision	Revision & Assessment	Environmental Chemistry	Environmental Chemistry	Environmental Chemistry	End of Year Celebration



## Year 9 Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Cycle 1	W/C 24/08	W/C 31/08	W/C 07/09	W/C 14/09	W/C 21/09	W/C 28/09	W/C 05/10	W/C 12/10	W/C 02/11	W/C 09/11	W/C 16/11	W/C 23/11	W/C 30/11
	Term 1								Term 2	Data/Planning Day 12/13	Y8 Oxford Expedition		
	School Closed	Induction	Electricity & Magnetism	Electricity & Magnetism	Plants	Environmental Chemistry	Genetics	Genetics	Reinduction B1 Cell Biology	B1 Cell Biology	B1 Cell Biology	B1 Cell Biology	C1 Atomic Structure & Periodic Table
Cycle 2	W/C 07/12	W/C 14/12	W/C 04/01	W/C 11/01	W/C 18/01	W/C 25/01	W/C 01/02	W/C 08/02	W/C 22/02	W/C 01/03	W/C 08/03	W/C 15/03	W/C 22/03
			Term 3						Term 4	Data/Planning Day 4/5	Y7 Ullswater Expedition		
	C1 Atomic Structure & Periodic Table	C1 Atomic Structure & Periodic Table	Reinduction C1 Atomic Structure & Periodic Table	P1 Energy	P1 Energy	P1 Energy	P1 Energy	Revision Assessment &	Reinduction B2 Organisation	B2 Organisation	B2 Organisation	B2 Organisation	B2 Organisation
Cycle 3	W/C 29/03	W/C 19/04	W/C 26/04	W/C 03/05	W/C 10/05	W/C 17/05	W/C 24/05	W/C 07/06	W/C 14/06	W/C 21/06	W/C 28/06	W/C 05/07	W/C 12/07
		Term 5		School closed 3/05				Term 6 Assessment	Assessment	Data Input 2	Y9 DofE Expedition		Data Day 15/07
	C2 Bonding	Reinduction C2 Bonding	C2 Bonding	C2 Bonding	P3 Particle Model of Matter	P3 Particle Model of Matter	P3 Particle Model of Matter	Reinduction Revision	Revision Assessment &	Working Scientifically	Working Scientifically	Working Scientifically	End of Year Celebration

