Our REACH Curriculum

Science

Progression of Knowledge, Skills and Vocabulary

Enabling our pupils to understand the world around them, explain what is occurring, predict how things will behave and analyse causes.

Templars Academy - Inspires MAT

TEMPLARS ACADEMY

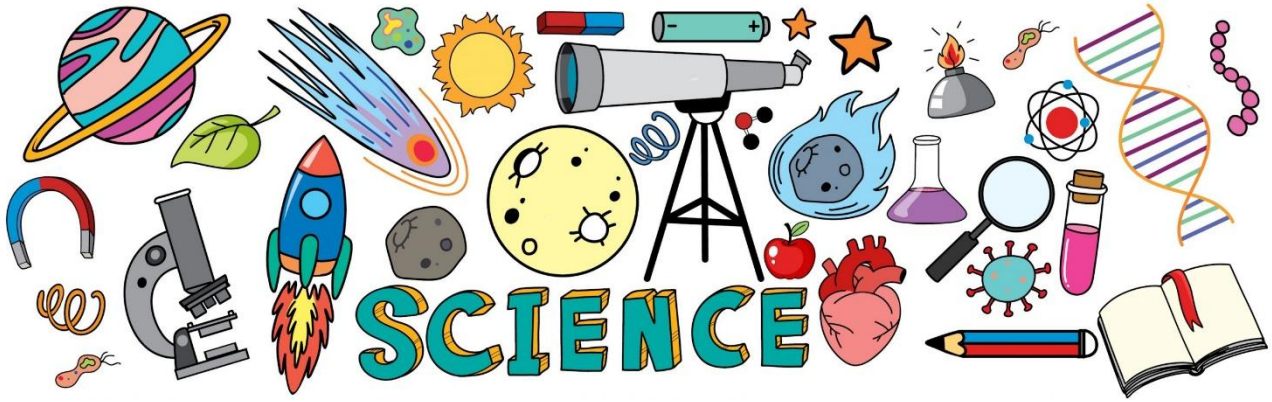
Raising our children's aspirations through the sciences.

At Templars Academy, our science curriculum is designed to inspire curiosity and develop a deep understanding of the natural world through the disciplines of biology, chemistry, and physics. We aim to equip children with essential scientific knowledge, skills, and vocabulary, enabling them to explain phenomena, predict outcomes, and engage in meaningful scientific enquiry.

Our curriculum:

- Builds progressively on key scientific knowledge and concepts, ensuring children develop a secure understanding at each stage.
- Integrates 'working scientifically' skills throughout, encouraging children to observe, classify, investigate, and analyse data using a variety of scientific methods.
- Emphasises the importance of spoken language to help children articulate scientific ideas clearly and confidently.
- Provides ample opportunities for practical, hands-on activities that connect theory with real-world applications.
- Ensures continuity from early years through Key Stage 2, allowing children to build connected and lasting scientific knowledge.
- Supports children to understand the relevance of science in everyday life and its impact on future innovation and society.

We are committed to providing a high-quality science education that fosters excitement, critical thinking, and a lifelong love of learning about the world around us.



TEMPLARS ACADEMY

The Science Curriculum

Early Years

- Understand changing states of matter
- Match objects with different and similar features
- Recognise distinctive features of objects
- Beginning to use vocabulary such as before, after, grow, eat
- Comments on what is heard, and responds with questions, comments and actions

Year 1

- Plants and their Growth
- Animals and their Needs
- Human Body: Senses
- Introduction to Forces: Magnetism
- Seasons and Weather
- Taking Care of Earth

Year 2

- Plants and Pollination
- Plants and their Growth
- Forces and Magnets
- Geology (Rocks and Soils)
- Light
- Animals Including Humans
- Introduction to Astronomy
- Introduction to Electricity
- Plants and their Growth
- Everyday Materials
- Living Things and their Habitats
- Animals Including Humans

Year 3

- Electricity
- States of Matter
- Sound
- Living Things
- Animals, inc Humans
- Living Things and their Habitats
- Earth and Space
- Forces
- Properties and Changes of Materials
- Living Things and their Environments
- Human Biology
- Revision Unit

Year 4

- Electricity
- Light
- Evolution and Inheritance
- Classification of Living Things
- Electricity
- Light

Year 5

- Transition Unit
- The Human Body & Circulation

Year 6

- Where could Science take me?
- University Study
- A-Level Study / Apprenticeship - in College
- GCSE Science - in Secondary Education
- Next Phase of Education

SEND/ Inclusion in Science

At Templars, our intention for children with Special Educational Needs and/or disabilities (SEND) is to ensure that all children receive a high-quality and ambitious education regardless of need or disability. We believe that it is vital that our children are equipped with the tools needed to become independent, inquisitive learners both in and out of the classroom. (See also Appendix 1)

Our Templars ***REACH*** curriculum in science provides knowledge-rich, progressive learning from Early Years to the end of Key Stage 2. For children with SEND, throughout the science curriculum, we look to overcome any barriers to participating and learning and make reasonable adjustments to include children with SEND in all aspects.

Inclusion is more than just giving children access to the curriculum; but responding to children's diverse learning needs and overcoming any potential cognitive or physical barriers to learning. The classroom environment is carefully considered to allow access for all children, supporting mobility issues and ensuring access to resources used in investigations.

Through our carefully planned science curriculum and series of lessons, we aim to minimise or reduce barriers so that all children can fully participate and learn. High Quality Teaching is broken into small manageable chunks. This avoids overloading working memory and allows children to understand key components to support their conceptual development.

Language development is strongly associated with achievement in science. Key vocabulary is taught explicitly. There is a recognition that the language of science may be challenging for many children. Knowledge organisers and pre teaching of vocabulary supports learning. Symbols and images support vocabulary being taught and mind maps help children visualise links.

When recording outcomes, alternatives to written recording are offered. This could be through drawing, using a scribe, word processing, creating a mind map or through using voice or video recording or using Teams dictate. All forms of outcomes are valued and celebrated for the learning involved.

Children build on investigations, using careful discussions that help children understand and use scientific vocabulary and help them analyse and understand what they have observed. Feedback is given in a variety of ways through in the moment personalised verbal feedback to whole class feedback and marking where appropriate. Assessment is regular and purposeful and used to inform next steps in learning.

Trips out and visitors into school are used to engage and support learning in the classroom. Trips are well planned with thought given to supporting individual SEND needs. Learning intentions are made clear and children are well prepared for trips out using visuals so that children are less worried about any unfamiliar situations or environments.

Science in the Early Years:

	The Natural World
N2	• Repeat actions that have an effect. • Explore materials with different properties. • Explore natural materials, indoors and outside. • Explore and respond to different natural phenomena in their setting and on trips.
N3-4	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and different properties. • Talk about what they see, using a wide vocabulary. • Explore how things work. • Plant seeds and care for growing plants. • Explore and talk about different forces they can feel. • Understand the key features of the life cycle of a plant and animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Talk about differences between materials and changes they notice.
Rec	• Explore the natural world around them. • Describe what they see, hear and feel whilst outside. • Understand the effect of changing seasons on the natural world around them.
ELG	Children at the expected level of development will: • Explore the natural world around them, making observations and drawing pictures of animals and plants; • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class/ • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Understanding the World Milestones – The Natural World

	Environmental Science	Forces and Motion
N2	• Experience different natural phenomena in own setting or on visits. • Uses senses to explore natural world around them. • Talk about changes in the weather. • Help to look after plants in a class garden. **NB:** At this age and stage, children's focus is primarily on their own development, rather than the wider world as they start to develop their own independence and make sense of the world around them.	• Use their senses to explore materials with different properties. • Enjoy exploring natural materials. • Repeat actions again and again. • Observe effects when actions are repeated.
N3-4	• Use their senses in hands on exploration of natural materials, including grass, mud, rock, water, and sand. • Sort clothing to wear and dress appropriately for a range of different types of weather, including sunny, rainy, windy and snowy. • Describe natural phenomena related to weather, including puddles when it rains, shadows in the daytime, and rainbows where there is sunshine and rain. • Observe and name processes of melting and freezing. • Identify that certain animals live in different habitats and environments. • Plant seeds and look after growing plants with support, recognising the fact that plants need (at least) water and light to grow. • Match animals to their young and name a range of farm animals. • Describe the simple life cycles of some animals.	• Use their senses in hands on exploration. • Describe and sort materials as artificial (man-made) or natural. • Explore and sort objects as to ones that float and sink in water. • Explore and talk about different forces they can feel, including pushes and pulls and magnetic attraction and repulsion. • Sort collections of materials – including plastic, wood and fabric – with similar and/or different properties. • Use vocabulary such as hard, soft, rough, smooth, shiny or dull to describe materials. • Explore what happens when materials and objects are placed in water, including materials that will dissolve in or absorb water.
Rec	• Identify the differences in wildlife that we see and the weather patterns in spring and winter. • Identify a range of animals, including insects and spiders that live in habitats around the school. **Explore, make observations, and ask questions about the natural world, gaining a developing understanding of important processes and changes they observe.**	• Describe what they see, hear and feel when exploring forces and materials. • Talk about changes they observe e.g. melting and freezing, cooking. **Use accurate vocabulary to describe the properties of materials and talk about forces they have experienced.**

Objectives for children working below the National Curriculum requirements for Year 1

The S-Scales provide a framework for learning that bridges the gap between the Government's new Engagement Model and the KS1 and KS2 curriculum for Science

S1	S2
Pupils take part in activities focused on the anticipation of and enquiry into specific environments [for example, finding a hamster under straw, or a CD or video in a pile]. • They match objects and materials in terms of single features or properties [for example, temperature or colour]. • They indicate the before and after of material changes. • They try out a range of equipment in familiar and relevant situations [for example, initiating the activation of a range of light sources]. • They respond to simple scientific questions [for example, 'Show me the flower' 'Is this wet/dry?'] 'Showing', 'demonstrating' 'trying out' 'responding' etc may be done by any means appropriate to the pupil's preferred mode of communication and physical abilities. • For some pupils this may mean directing an adult undertaking the task.	Pupils recognise distinctive features of objects [for example, the features of living things in their environment, and know where they belong, for example, feathers on a bird, leaves on a tree]. • They begin to make generalisations, connections and predictions from regular experience [for example, expecting that ice cream will melt, or making wheeled objects move faster by pushing on a smooth surface or releasing them down a slope]. • Pupils sort materials according to a single criterion when the contrast is obvious.
S3	**S4**
They closely observe the changes that occur [for example, when materials are heated, cooled or mixed]. • Pupils identify some appliances that use electricity. • They show that they know some sources of sound and light [for example, remembering their location]. Pupils understand the scientific use of some simple vocabulary, such as before, after, bumpy, grow, eat, move and can communicate related ideas and observations using simple phrases [for example, which food to give which animal] • Pupils can demonstrate simple properties of light, sound and movement [for example, bright, noisy/quiet, fast/slow]. • They make simple records of their findings [for example, by putting pictures of an activity in sequence]. • They begin to make suggestions for planning and evaluating their work [for example, responding to the question 'Was that right or wrong?']. 'Showing', 'demonstrating' 'trying out' 'responding' etc may be done by any means appropriate to the pupil's preferred mode of communication and physical abilities. • For some pupils this may mean directing an adult undertaking the task.	Pupils show that they have observed patterns or regular changes in features of objects, living things and events [for example, chrysalis/butterfly, day/night] • They make some contribution to planning and the evaluation and recording of their findings. • They identify a range of common materials and know about some of their properties. • They sort materials using simple criteria and communicate their observations of materials in terms of these properties. • Pupils make their own observations of changes of light, sound or movement that result from actions [for example, using a volume control or a dimmer switch] and can describe the changes when questioned directly.

Working Scientifically Progression

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Asking questions	Ask simple questions.	Ask simple questions that can be answered in different ways.	Ask relevant questions and choose enquiry types to answer them.	Ask relevant questions using different enquiries.	Plan enquiries recognizing and controlling variables.	Independently plan enquiries controlling variables.
Observing & measuring	Observe closely using simple equipment.	Observe closely using simple equipment.	Systematic observations and accurate measurements.	Accurate measurements using a range of equipment. Make systematic and careful observations.	Precise measurements; repeat readings. Use a range of scientific equipment.	High precision measurements; repeat readings for reliability.
Performing tests & enquiries	Perform simple tests.	Perform simple tests.	Set up simple practical enquiries, comparative and fair tests.	Set up practical enquiries, comparative and fair tests.	Plan and carry out different enquiry types.	Plan, refine and repeat complex enquiries.
Identifying & classifying	Identify and classify objects.	Identify and classify different things	Identify similarities, differences and changes.	Identify similarities, differences and changes.	Use classification keys.	Evaluate classification systems.
Recording data	Gather and record data.	Gather and record data to help answer questions.	Record, classify and present data in different ways.	Record, classify and present data in different ways.	Record complex data using graphs (scatter, bar and line) and tables.	Record and present complex data appropriately.
Using results & conclusions	Suggest answers using observations.	Suggest answers to questions using observations and ideas.	Draw conclusions and make predictions. Suggest improvements and raise further questions.	Draw conclusions and suggest improvements. Make predictions for new values and raise further questions.	Use results to predict and plan further comparative and fair tests. Make clear conclusions.	Explain causal relationships and evaluate conclusions. Make clear conclusions
Scientific communication	Talk about findings.	Describe findings simply.	Report findings orally and in writing.	Present findings using scientific language.	Present findings with explanations.	Present detailed findings with evaluation.
Using scientific evidence			Use scientific evidence to answer questions.	Use scientific evidence to support findings.	Identify evidence supporting or refuting ideas.	Critically evaluate scientific evidence.

Year 1: Units of Learning		
Autumn 1: Plants and their Growth	**Autumn 2: Animals and their Needs**	**Spring 1: Senses**
Core learning: • The functions of the different parts of a plant. • What plants need in order to grow (warmth, light and water). • The different ways that plants spread their seeds in order to reproduce. • How plants can be grown for food. • The different types of plants and trees and how they grow in our local area. **Vocabulary:** Roots, Stem, Leaves, Flower, Soil, Water, Observe, Record, Warmth, Light, Water, Grow, Travel, Disperse, Spread, Pod, Seed, Distance, Crops, Pest, Harvest, Weed, Vine Identify, Classify, Change, Fruit, Vegetables, Evergreen, Deciduous, Needle	**Core learning** • The characteristics of different groups of animals (reptiles, mammals, amphibians, birds and fish). • How different animals can be grouped according to their characteristics. • What animals need to survive. • How to classify animals based on what they eat (omnivore, carnivore, herbivore). • The different body parts of a range of animals and why they are important. • How to look after and care for animals. **Vocabulary:** Animals, Sorting, Features, Characteristics, Classify, Reptile, Amphibian, Similarity, Difference, Survive, Shelter, Air, Protect, Carnivore, Herbivore, Omnivore, Gill, Beak, Paw, Tail, Claw, Function, Exercise,	**Core learning:** • The different parts of the body which give us our senses. • The different parts of the eye and why it is important. • The different parts of the ear and how we hear. • The functions of skin and why it is important. • The different parts of the nose and why it is important. • How the tongue works and allows us to taste. **Vocabulary:** Mouth, Ears, Eyes, Nose, Smell, Hand, Ears, Feels, Sight, Pupil, Eyelid, Iris, Magnify, Observation, Eardrum, Soundwaves, Vibration, Detect, Record, Touch, Temperature, Sunlight, Skin, Texture, Scent, Nostrils, Septum, Saliva, Taste bud
Spring 2: Forces – pushes and pulls	**Summer 1: Seasons and Weather**	**Summer 2: Taking Care of the Earth**
Core learning: • The different types of force that can affect an object. • How force can change the shape or movement of different objects. • What friction is and how it can slow objects down. • How magnets can attract and repel. • Which materials are magnetic and non magnetic. **Vocabulary:** Force, Twist, Squeeze, Push, Pull, Prediction, Surface, Observe, Bend, Squash, Stretch, Weight, Speed, Direction, Factor, Ramp, Result, Skid. Opposite, Friction, Magnet, Repel, Attract, Pole, Magnetic, Non-magnetic,	**Core learning:** • The different types of weather. • The four seasons and their characteristics. • How the weather affects daily activities. • Weather forecasting and how to record it. • Extreme weathers of the world. **Vocabulary:** Weather, Atmosphere, Characteristic, Extreme weather, Stratus, Cumulus, Cirrus, Droplet, Season, Weather Forecast, Temperature, Degrees Celsius, Thermometer, Sunrise, Sunset, Daylight, Mild, Hurricane, Tornado, Drought, Lightning.	**Additional Unit.** **Core learning:** • The different natural resources and where they come from. • How to reduce waste. • Ways to save energy. • The effect of plastic on our planet. • The different types of pollution **Vocabulary:** Natural, Man-made, Population, Wind-Turbine, Material, Plastic, Reduce, Reuse, Recycle, Habitat, Earth, Waste, Bio-degradable, Non-biodegradable, Environment, Litter, Pollution

Year 2: Units of Learning		
Autumn 1: Animals Including Humans	**Autumn 2: Living Things and their Habitats**	**Spring 1: Everyday Materials**
Core learning: • What animals need to survive in different habitats. • The stages of development of a chick. • The offspring of different animals. • The human life cycle. • What humans need to be healthy (nutrition, exercise and hygiene) **Vocabulary:** Essential, Non-essential, Nutrient, Energy, Development, Nurture, Hatch, Offspring, Live young, Reproduce, Life Cycle, Milestone, Ageing, Balanced Diet, Calories, Function, Digestive System	**Core learning** • The difference between things that are living, dead or never been alive. • Food chains and their components (identifying producers, consumers, predators and prey). • Carnivores, Herbivore and Omnivores. • What animals need from their habitat. • The impact of humans on their environment **Vocabulary:** Living, Non-loving, Prodecure, Consumer, Predator, Prey, Living Thing, Organism, Habitat, Microhabitat, Minibeast, Ocean, Fish, Mammal, Plastic, Biodegradable	**Core learning:** • Whether materials are natural or man-made. • The different properties of materials. • The purpose of different materials. • What happens to materials when they are heated or cooled. **Vocabulary:** Durable, Property, Transparent, Translucent, Opaque, Absorb, Waterproof, Rigid, Flexible, Identity, Minerals, Suitable, Purpose, Melt, Freeze, States of Matter
Spring 2: Plants and their Growth	**Summer 1: Introduction to Electricity**	**Summer 2: Introduction to Astronomy**
Core learning: • The parts of plants and their functions. • The main parts of the flower and what they are used for. • What plants need to grow. • How seeds are dispersed. **Vocabulary:** Trunk, Anchor, Nutrient, Petal, Sepal, Stigma, Stamen, Germination, Oxygen, Carbon Dioxide, Dispersal, Explosion, Pollination, Bush, Shrub, Herb.	**Additional Unit:** **Core learning:** • How electricity helps us. • What a circuit is and how to build one. • Which materials are conductors and insulators. • How to keep ourselves safe around electricity. **Vocabulary:** Electricity, Appliance, Battery, Manually, Static Electricity, Friction, Electrical charge, Exchange, Component, Filament, Wire, Buzzer, Insulator, Conductor, Electrical current.	**Additional Unit.** **Core learning:** • The sun, the moon, the Earth and the stars. • How the different parts of the Solar System work together. • What space rocks (comets, meteors, shooting stars, meteorites and asteroids) are and what they are made of. **Vocabulary:** Solar System, Gravity, Orbit, Planet, Dwarf, Heliocentric, Axis, Orbit, Rotate, Tilt, Atmosphere, Satellite, Crater

Year 3: Units of Learning		
Autumn 1: Animals Including Humans	**Autumn 2: Light**	**Spring 1: Geology: Rocks and Soils**
Core learning: • The feeding relationships between animals (food chains and food webs). • The different food groups and function of each one to be able to maintain a balanced diet. • The importance of our skeleton. • What muscles are and how they work. **Vocabulary:** Vegetation, Foliage, Canines, Molars, Incisors, Consumers, Producers, Predators, Carbohydrate, Protein, Dairy, Nutrition, Calories, Skeleton, Joints, Muscles, Organs, Endoskeleton, Exoskeleton	**Core learning** • Light sources and reflectors. • What light is and how it travels to the eye. • What reflection is. • How shadows are formed and how they change. • Why the sun is dangerous to look at. **Vocabulary:** Light source, Light rays, Intra-red radiation, Ultraviolet light, Cornea, Retina, Reflect/ Reflective, Reflector, Natural, Artificial, Material, Surface, Absorb, Light beam, Emit, Transparent, Translucent, opaque, Shadow, Obstruct	**Core learning:** • How rocks are formed. • The properties of different rocks. • The difference between rocks and minerals. • What soil is and what it is made from. • What fossils are and how they are formed. **Vocabulary:** Composition, Igneous, Metamorphic, Sedimentary, Sediment, Permeable, Inorganic, Horizons, Drainage, Irrigation, Remnants, Decay, Palaeontologist, Excavate.
Spring 2:	**Summer 1: Plants and their Growth**	**Summer 2: Plants and Pollination**
Core learning: • The different forces that can act on an object. • How magnets attract and repel. • Which materials are magnetic and non magnetic. • What magnets can be used for. • What a magnetic field is and how these work at a distance. **Vocabulary:** Material, Surface, Friction, Lunrication, Magnetic, Non-magnetic, Attraction, Magnetic field, Levitation, Magnetic field lines, Magnetise, Intersect, Magnetism, Exert, Region.	**Core learning:** • The purpose of each part of the plant. • The roles of different parts of a plant for pollination. • The different ways that seeds can be dispersed. • How water is transported through a plant. • How plants grow in different conditions **Vocabulary:** Nutrients, Carbon Dioxide, Pollen, Nectar, Pollination, Fertilisation, Germination, Seed Dispersal, Shoot, Transpiration, Absorb, Evaporate, Variety, Enquiry, Compare, Observation, Periodic	**Core learning:** • Different methods of seeds dispersal. • How flowers attract their pollinators. • How pollinators are adapted to flowering plants. • The different ways flowers are pollinated. • The threats faced by pollinators **Vocabulary:** Germination, Germinate, Embryo, Dissection, Dormant, Dispersal, Burr, Buoyant, Attract, Scent, Ultraviolet, Pollinator, Fertilisation, Self-pollination, cross-pollination, Agriculture, Pesticides

Year 4: Units of Learning		
Autumn 1: Electricity	**Autumn 2: States of Matter**	**Spring 1: Sound**
Core learning: • Electricity pylons and how they help electricity to travel. • Appliances that use electricity. • Electrical hazards in the home and how to stay safe around them. • How to use a switch within a circuit. • Whether a material is a conductor or an insulator **Vocabulary:** Electricity, Generator, Renewable, Coal, Transmission, Pylon, Appliance, Mains power, Battery, Hazard, Dangers, Safety, Electrocution, Circuit, Wire, Bulb, Switch, Conductor, Insulator	**Core learning** • The 3 states of matter (solids, liquids and gases). • How particles move in the different states of matter. • How materials can change state as a result of heating or cooling. • The process of evaporation and condensation. • The stages of the Water Cycle **Vocabulary:** Solid, Liquid, Gas, Particles, Properties, Matter, State, Changing State, Solidify, Melting, Freezing, Compressed, Evaporation, Condensation, Vapour, Controlled Variable, Fair test.	**Core learning:** • How sound travels through our ears to our brain. • Pitch and volume. • How sound travels through the 3 states of matter. • How sounds change over distance. **Vocabulary:** Vibration, Sound waves, Electrical signal, Cochlea, Auditory nerve, Pitch, Vibration speed, Wavelength, Hertz, Decibel, Particle, Matter, Clarity, Source, Faint, Distance
Spring 2: Living Things	**Summer 1: Animals Including Humans**	**Summer 2: Living Things and their Habitats**
Core learning: • How to group animals in a variety of ways according to their characteristics. • How to use a classification key to further identify different species of living things. • The characteristics of insects and invertebrates. • Investigate how ecosystems **Vocabulary:** Species, Vertebrae, Limbs, Invertebrates, Arthropods, Annelids, Molluscs, Organism, Echinoderms, Crustacean, Metamorphosis, Abdomen, Thorax, Extinct, Tertiary Consumer, Tier, Ecosystem	**Core learning:** • The human digestive system; the organs involved and their functions. • How the human digestive system compares to that of other animals. • Different types of teeth and their functions. • The parts of the tooth and their functions. • How to keep our teeth healthy and why it is important. **Vocabulary:** Organ, Absorb, Digestive system, Oesophagus, Gastric Acid, Small intestine, Rectum, Stomach, Intestine, Pancreas, Annus, Filter, Vitamins and Minerals, Milk/ Adult teeth, Wisdom teeth, Calcium, Molar, Incisor, Canine, Function, Enamel, Dentine, Pulp, Root, Plague, Decay, Baceria.	**Core learning:** • Seasonal changes and how different animals adapt to survive. • Natural disasters and their impact on the environment. • Changes caused by humans and their impact on the environment. • Deforestation and how we can limit the damage it causes. • Different ways to protect our environment. **Vocabulary:** Adaptation, Dormancy, Hibernation, Migration, Greenhouse Effect, Carbon Dioxide, Meteorologist, Natural Disaster, Avalanche, Hurricance, Catastrophic, Volcano, Global Warming, Pollution, Sewage, Drought, Agricultre, Erosion, Deforestation, Renewable, Pollutant, Contaminate, Detergent.

Year 5: Units of Learning		
Autumn 1: Earth and Space	**Autumn 2: Forces**	**Spring 1: Properties and Changes of Materials**
Core learning: • How the universe was created. • The different features of the planets within our Solar System. • What people believed in the past about the Earth compared to what we now know. • What gravity is and how it works. • The moon and its lunar phases. **Vocabulary:** Universe, Celestial body, Star, Sun, Satellite, Terrain, Orbit, Spherical, Eclipse, Constellation, Circumference, Astronomer, Gravity, Lunar, Waning, Waxing	**Core learning** • The different forces that can act on objects. • The effect of gravity on different objects. • Air resistance and water resistance and their effect on movement. • The effect of friction on an object. • How different types of mechanisms work **Vocabulary:** Resistance, Force/ Newton meter, Gravity, Mass, Acceleration, Air resistance, Variable, Enquiry, Streamlined, Displacement, Friction, Fulcrum, Pulley	**Core learning:** • The hardness and strength of different materials (Mohs' hardness scale). • Thermal insulators and conductors. • Dissolving soluble and insoluble materials. • Which changes are reversible and which are irreversible **Vocabulary:** Brittle, Elasticity, Indentation, Thermal, Insulator, Conductor, Dissolve, Solution, Solute, Filter, Evaporate, Immiscible, Filtration, Chemical change, State of matter
Spring 2: Living things and their Environments	**Summer 1: Human Biology**	**Summer 2: Revision unit**
Core learning: • The similarities and difference between the life cycles of different animal groups. • The life cycle of mammals including humans. • The function of male and female parts of the plant and their role in reproduction. **Vocabulary:** Embryo, Incubation, Hatching, Nestling, Fertilise, Amphibian, Pupa, Mammary glands, Suckling, Life span/ expectancy, Reproduction, Offspring, Dissect	**Core learning:** • The stages involved in human development. • Significant discoveries in modern Science and the effect these have had on us. • Similarities and differences between human and animal development. • The effect of nutrition on the human body. • Advancements in Science and technology and their impact on athletes with disabilities **Vocabulary:** Elasticity, Dependent/ Independent, Chronic, Stethoscope, Radiology, Juvenile, Litter, Varty, Deficient, Advancement, Para-athlete, Prosthetic, Conventional, Sophisticated, able-bodied.	**Additional unit** **Core learning:** • What life is like for astronauts living in Space. • Sonar and how it is used in different contexts. • The impact of climate change on adaptations of plants. • The formation of fossils and what they can tell us about the past. • The impact of different forces on the world around us. **Vocabulary:** NASA, Free fall, Gravity, Atmosphere, Emit, Photosynthesis, Decompose, Adaptation, Friction, Resistance, Magnetism, Recyclable.

Year 6: Units of Learning		
Autumn 1: Light	**Autumn 2: Electricity**	**Spring 1: Classification of Living Things**
Core learning: • The parts of the human eye and their functions. • How light travels, enters the eye and allows us to see objects. • The law of reflection. • How shadows are formed and change depending on the seasons. • The different types of lenses and how these refract light. **Vocabulary:** Pupil, Iris, Cornea, Retina, Optometrist, Snellen Chart, Emitting, Light source, Optic nerve, Lux, Silhouette, Shadow, Opague, Transparent, Rotation, Refraction, Convex lens, Concave lens	**Core learning** • How electricity travels from its source to our homes. • How to represent different components using scientific symbols. • The difference between parallel and series circuits. • What voltage is and how it affects the components in the circuit. • Whether a material is a conductor or an insulator **Vocabulary:** Electricity, Renewable energy, Non-renewable energy, Climate change, Circuit, Bulb, Wire, Cell, Series circuit, Parallel circuit, Current, Voltage, Electrons, Conductor, Insulator, Atom, Electrons, Switch.	**Core learning:** • Micro-organisms and their functions. • How to use classification keys to sort and classify living things. • How photosynthesis is affected by the seasons. **Vocabulary:** Microorganism, Function, Unicellular, Transmit, Enquiry, Variable, Mould, Condition, Linnaeus, Genus, Taxonomy, Comparative, Dichotomous key, Organism, Branch
Spring 2: Evolution and Inheritance	**Summer 1: The Human Body: Circulation**	**Summer 2: Transition Unit**
Core learning: • The timeline of human evolution. • The process of natural selection. • How characteristics can be inherited from our parents. • How humans might evolve in the future. **Vocabulary:** Ancestor, Chimpanzee, Evolution, Charles Darwin, Origin, Anatomy, Primates, Brittle, Natural Selection, Breed, Variation, Offspring, Trait, Genes, Paleontology, Inherit, DNA	**Core learning:** • The components of blood and its function within the body. • The human heart and how it functions. • The Circulatory System. • The effects of smoking and alcohol on the human body. • Components of a healthy lifestyle and the effect of these on the body **Vocabulary:** Blood, Blood Vessel, Blood cells, Plasma, Oxygen, Nutrient, Deficient, Pulmonary, Arteries, Veins, Atrium, Ventricle, Aorta, Cardiovascular	**Additional Unit.** **Core learning:** • The structure of atoms, elements and molecules. • How molecules are formed from elements. • The range of molecules found in the human body and their functions. • How atoms interact with one another. • The work of Albert Einstein and why he is still significant today **Vocabulary:** Atom, Electron, Proton, Neutron, Static charge, Molecule, Bond, Protein, Hydrate, Lubricate, Interact, Transfer, Solute, Solvent

For every year group, there is a ‘Working Scientifically’ Assessment sheet

Working Scientifically Assessment
Year 3

This year, we have been learning about

Children rate their achievement against each strand at the end of each unit as part of the pupil conferencing.

Working scientifically strand	Au1	Au2	Sp1	Sp2	Su1	Su2
1. I can use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.						
2. I can identify differences, similarities or changes related to simple scientific ideas and processes.						
3. I am able to use straightforward scientific evidence to answer questions or to support my findings.						
4. I can report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.						
5. I am able to gather, record, classify and present data in a variety of ways to help in answering questions.						
6. I can record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.						
7. I am able to set up simple practical enquiries, comparative and fair tests.						
8. I can make systematic and careful observations and, where appropriate, take accurate measurements using standard units, a range of equipment, including thermometers and data loggers.						
9. I can ask relevant questions and use different types of scientific enquiries to answer them.						

For every unit of learning, there is an ‘End-of-Unit Assessment’ sheet and a Knowledge Organiser

End of Unit Assessment
Light

In this unit, we will learn about how light travels from a source to allow us to see, how it can be reflected or refracted and how the colour spectrum is created.

This half term, we will learn about

- The parts of the human eye and their functions.
- How light travels, enters the eye and allows us to see objects.
- The law of reflection.
- How shadows are formed and change depending on the seasons.
- The different types of lenses and how these refract light.

Ongoing self assessment Assessment of learning throughout the unit is based on a range of evidence.	I had some help with my learning	I was able to learn independently	I was able to explain the learning to others
I can explain the function of key parts of the human eye			
I can explain how light travels			
I can explain how light can be reflected			
I can explain how the shape and size of a shadow are determined			
I can explain how different lenses affect the refraction of light			
I can explain how a spectrum of different colours create white light			

Teacher Assessment	Towards the standard	At the standard	Above the standard
For this unit, you are working			

What does my learning make me think about?

TEMPLARS

Knowledge Organiser: AUTUMN 1 — **Year 6 Science: Light**

Vocabulary	Meaning
Pupil	Located in the centre of the iris, allows light into the eye
Iris	Coloured part of the eye that regulates the amount of light by controlling the size of the pupil
Cornea	Clear, dome-shaped surface that covers the front of the eye
Retina	Layer of nerve cells that sense light and sends signals to the brain
Optometrist	Eye doctor that can examine, diagnose and treat your eyes
Snellen Chart	An eye chart used to measure visual activity
Emitting	To give off e.g., to emit a bright light
Light source	Where light comes from – it can be natural or artificial
Optic nerve	Transmits information from the retina to the brain
Lux	The measure of light – how much light falls on a surface
Silhouette	the dark shape and outline of something visible in restricted light
Shadow	A dark area where light is blocked by an object
Opaque	Not able to see through
Transparent	Allowing light to pass through so that objects behind can be seen
Rotation	Movement of Earth on its axis counterclockwise
Refraction	The bending of light as it passes from one transparent substance to another
Convex lens	Curve outwards; bends light rays closer together
Concave lens	Curve inwards; spreads light rays further apart

Pupil	Optic nerve	Opaque	Transparent
			

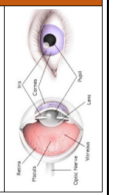
Key knowledge – Features of the Eye

Lens: changes the focal distance of the eye so it can focus on objects at various distances.

Vitreous: a clear, colourless fluid that fills the space between the lens and the retina of your eye.

Optic Nerve: transfers visual information from the retina to the vision centres of the brain via electrical impulses.

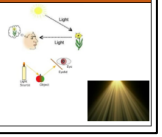
Macula: responsible for all our central vision and most of our colour vision.



Key knowledge – How does light travel?

Light enters your eye through the pupils and sends signals to the brain through the nerve. These signals tell us what we are seeing.

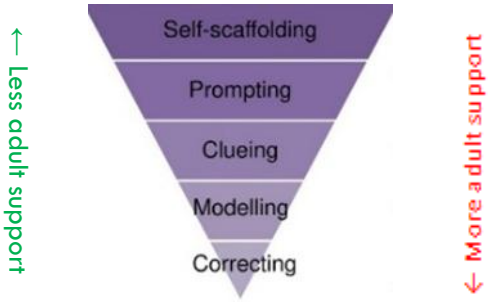
Light waves travel from a source in straight lines that spread out in all directions like rays. Light rays reflect off surfaces – different surfaces reflect differently.



Appendix 1: SEND in Science

Set out below are the areas we look at when maintaining an inclusive learning environment and the considerations and adaptations addressed to support children with SEND throughout our REACH curriculum in science. This list is by no means exhaustive and may be adapted in light of the SEND needs presented

Our inclusive science learning environment	**Considerations and adaptations made for science**
The curriculum 	• Sequenced - with time attributed to each of the components in the curriculum • Progressive - building knowledge and skills across the years • Revisited - opportunities are provided for children to repeat and reinforce previously learnt skills and processes regularly in similar and different contexts • Frequent opportunities for retrieval practice to prevent children from forgetting their learning and reinforce their conceptual understanding
The classroom Sound and light issues Seating Resources Displays Health and safety ICT 	• Access to hearing aids and vision aids where appropriate • Considered seating plans to allow access to demonstrations so that all children can view them. Teacher demonstration is a valuable tool and can support children's working memory capacity • Seating allows for peer or adult support • Height-adjustable tables to make activities more accessible • Mobility issues and movement around the room considered • All resources are accessible and labelled to encourage independent use • Advice sought from specialists to ensure the correct use of specialist SEND equipment where needed • Science displays are clear, informative and engaging. Vocabulary is carefully selected, explained and referred to • Health and safety - making sure children do not come into contact with any substances or materials they are allergic too • ICT is used to make science lessons more accessible to all • Font size and font type is considered in order to be clear to read for all • Off white (either light blue, green or yellow) backgrounds are used to support children with black on white contrast issues
Lesson structure Planning Delivery The role of the LSA One Plan targets 	• Good teaching for pupils with SEND is good teaching for all • Lessons are well planned and follow the sequenced, progressive curriculum. • Teaching is broken into small manageable chunks. This avoids overloading working memory and allows children to understand key components to support their conceptual development • Regular retrieval practice • Over learning to ensure content enters long term memory • Use of multi-sensory approaches and mind maps • Practical work is used purposefully in line with curricular goals

	• Flexible grouping is used so that children are grouped according to their needs in that lesson. Groups are not fixed • The role of the LSA within the classroom and learning is clear. The LSA can support groups or work with children one to one to help children understand the aims of the lesson and child know where they are in relation to the aims • Avoidance of copying lots of information- notes on interactive whiteboard printed off for children with SEN • One Plan targets are known by the teacher and applied throughout a science lesson where appropriate • Multi-sensory approaches support children's preferred learning styles – e.g. visual, tactile, auditory and kinesthetic approaches are used, such as supporting teacher talk with visual aids • The LSA will encourage pupils to develop their own strategies e.g. an agreed approach to asking for help, rehearsal, note-taking, place keeping and organisational strategies • The LSA will scaffold learning by providing the least help necessary for a child to achieve the task  • Children's understanding is checked by inviting children to reformulate key learning • Teachers identify opportunities to teach **disciplinary knowledge** alongside **substantive knowledge** of the curriculum. **Working scientifically** is considered **disciplinary knowledge**, explaining how scientists work and learn and containing the what, why, when, and when of working scientifically skills • Misconceptions are addressed- science is hard for pupils to learn because a lot of science contradicts our observations in everyday life. This means that misconceptions are common.
Vocabulary 	• Key scientific language is taught explicitly • There is a recognition that the language of science may be challenging for many pupils – for example, terms specific to science such as 'electrical circuit' or the specific scientific use of everyday words such as 'weight' • Pre-teaching of vocabulary is used to help those with speech and language/processing difficulties learn, understand and retain key vocabulary • Knowledge organisers are referred to regularly and sent home so parents can see and support the vocabulary/concepts being taught • Symbols and images are used to support the vocabulary being taught (dual coding) • Mind maps are used to help children see patterns and relationships • Recapping of 'key takeaways' of the previous lesson

	• Use of mnemonics to help children remember things like the order of the planets
Recording outcomes Alternatives to written recording 	• Adapted computer mouse where needed • Alternatives to written recording are offered, e.g. drawing, scribing, word processing, mind maps, digital images, voice or video recording, and the use of Teams dictate
Assessment and feedback 	• Children build on investigations, using careful discussions that help children understand and use scientific vocabulary and help them analyse and understand what they have observed
Trips out / Visitors in to school 	• Children are well prepared for trips out of school • The learning intentions for the trip are made known • Preparation for a trip out includes visuals so that children are less worried about unfamiliar situations/environment