Withnell Fold Primary School

SCIENCE KEY LEARNING AND KNOWLEDGE



YEAR A

	AUTUMN 1 (CULTURE VULTURES!)	SPRING 1 (SLAVERY)	SUMMER 1 (ZUES; KINGS OF GODS AND HUMANS)
YEAR 5 & 6	**Light and Astronomy – Earth and Space** Pupils should be taught to: ▪ Describe the movement of the Earth, and other planets, relative to the Sun and each other in the solar system. ▪ Describe the movement of the Moon relative to the Earth. ▪ Describe Sun/Earth/Moon as approximately spherical bodies. ▪ Use the idea of the Earth's rotation to explain day and night. ▫ The Earth spins once around its own axis in 24 hours, giving day and night. ▫ The Earth orbits the Sun in one year. ▫ We can see the Moon because the Sun's light reflects off it. ▫ The Moon orbits the Earth in approximately 28 days and changes to the appearance of the moon are evidence of this. ▫ Use the Earth's movement in space to explain the apparent movement of the sun across the sky. ▫ The Sun appears to move across the sky from East to West and this causes shadows to change during the day. ▫ Changes to shadow length over a day or changes to sunrise and sunset times over a year are evidence supporting the movement of the Earth. **Pupils might work scientifically by:** • **Comparing** the time of day at different places on the Earth through internet links and direct communication. • **Creating simple models** of the solar system.	**Living things and their habitats – Evolution and inheritance** Pupils should be taught to: ▫ Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. ▫ Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. ▫ Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. **Pupils might work scientifically by:** • **Observing** and **raising questions** about local animals and how they are adapted to the environment. • **Comparing** how some living things adapt to survive in extreme conditions, e.g. cactuses, penguins and camels. • **Analysing the advantages and disadvantages** of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.	**Environment – Observing Life Cycles** Pupils should be taught to: ▪ Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. ▪ Describe the life process of reproduction in some plants and animals. ▫ Name, locate and describe the functions of the main parts of reproductive system of plants (stigma, stamen, petal, sepal, pollen, ovary) **Pupils might work scientifically by:** • **Observing** and **comparing** the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times). • **Asking** pertinent **questions**. • **Suggesting reasons** for similarities and differences **[grouping and classifying]**. • They might **try to [explore]** grow new plants from different parts of the parent plant, for e.g., seeds, stem and root cuttings, tubers, bulbs. • **Observe changes** in an animal **over a period of time** (e.g. by hatching and rearing chicks). • **Comparing** how different animals reproduce and grow.

	• **Constructing** simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day. • **Finding out** why some people think that structures such as Stonehenge might have been used as astronomical clocks.		
	Key vocabulary Sun, Earth, Moon, rotate, planets, dwarf planet, spherical bodies, day / night, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, Solar System, celestial body, Moon phases, time zones, orbit, shadow, asteroids, comets, galaxy.	**Key vocabulary** life cycles, mammal, amphibian, insect, bird, sexual and asexual reproduction in plants reproduction, local environment, naturalists, offspring, inheritance, fossil, variations, characteristics, adaptations, habitat, natural selection, evolution, adaptive traits, inherited traits, competition, dominance, recessive, survival of the fittest, DNA.	**Key vocabulary** Birth, death, reproduction, fertilise, gestation, life cycle, metamorphosis, pollination, sexual and asexual reproduction, male, female, plants, animals - mammal, amphibian, insect, bird, changes, puberty. stigma, stamen, petal, sepal, pollen, ovary
	AUTUMN 2 **(VIKINGS: WE DIDN'T WEAR HORNED HELMETS!)**	**SPRING 2** **(TADING PLACES)**	**SUMMER 2** **(WALKING THE AMAZON)**
	Living things and their habitats – classification Pupils should be taught to: ▪ Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals. ▪ Give reasons for classifying plants and animals based on specific characteristics. ▫ Living things can be grouped into micro-organisms, plants and animals. ▫ Vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals. ▫ Invertebrates can be grouped as snails and slugs, worms, spiders and insects. ▫ Plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses). **Pupils might work scientifically by:** • **Using classification systems and keys.** • **Identifying [grouping and classifying]** some animals and plants in the immediate environment. • **Researching** unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the	**Animals / Health – Exercise, Health and The Circulatory System.** Pupils should be taught to: ▪ Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. ▪ Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function (in the long term and short term). ▪ Describe the ways in which nutrients and water are transported within animals, including humans. ▫ The heart is a major organ and is made of muscle. ▫ The heart pumps blood around the body through vessels and this can be felt as a pulse. ▫ The heart pumps blood through the lungs in order to obtain a supply of oxygen. ▫ Blood carries oxygen/essential materials to different parts of the body. ▫ During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase. ▫ Animals are alive; they move, feed, grow, use their	**Material Changes – Reversible Changes** Pupils should be taught to: ▪ Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. ▪ Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating. ▪ Demonstrate that dissolving, mixing and changes of state are reversible changes. ▫ Changes can occur when different materials are mixed. ▫ Some material changes can be reversed and some cannot. ▫ Recognise that dissolving is a reversible change and recognise everyday situations where dissolving occurs. ▫ Distinguish between melting and dissolving. ▫ Mixtures of solids (of different particle size) can be separated by sieving. ▫ Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (un-dissolved). ▫ Evaporation helps us separate soluble materials from water. ▫ Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind

	classification system **[grouping and classifying]**.	senses, reproduce, breathe/respire and excrete. ▫ An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals). ▫ Tobacco, alcohol and other 'drugs' can be harmful. ▫ All medicines are drugs, not all drugs are medicines. **Pupils might work scientifically by:** • **Exploring the work of scientists** and • Scientific **research** about the relationship between diet, exercise, drugs, lifestyle and health. *Additional suggestion beyond NC2014 to support pupils working scientifically and to provide an opportunity to use ICT to collect/interpret data **Observing/Measuring changes** to breathing, heart beat and or pulse rates after exercise.	speed, etc). ▫ Freezing, melting and boiling changes can be reversed (revision from YR4). **Material Changes – Irreversible Changes** Pupils should be taught to: ▪ Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning, and the action of acid on bicarbonate of soda (producing a gas / fizzing). **Pupils might work scientifically by:** • **Observing** and **comparing** the changes that take place, for example, when burning different materials or baking bread or cakes. • **Researching** and **discussing** how chemical changes have an impact on our lives, for example cooking. • **Discuss [research]** the creative use of new materials such as polymers, super-sticky and super-thin materials. • **Explain** how they know when a change is reversible or irreversible.
	Key vocabulary classification, classify, taxonomist, key, bacteria, microorganism, microscope, species, groups, life cycles, mammal, amphibian, insect, bird, reproduction, local environment, naturalists, sexual and asexual reproduction in plants, offspring, inheritance, variations, characteristics, habitat, fossil, vertebrate, invertebrate	**Key vocabulary** Circulatory system, functions of the heart, aorta, artery, blood - oxygenated blood / deoxygenated blood, atrium, chamber, blood vessels, veins, red blood cells, white blood cells, carbon dioxide, lungs, ventricles, wind pipe, diaphragm, lifestyle, diet, drugs, alcohol, hearth rate, exercise, sleep, rest, nutrients.	**Key vocabulary** Material, reversible, irreversible, compare, group, properties, hardness, solubility, transparency, conductivity (electrical and thermal), response to magnets, dissolve, liquid, solution, substance, solid, liquid, gases, mixtures, separated, filtering, sieving, evidence, comparative, fair test, everyday materials, metals, woods, plastics, changes of state, melting, freezing, evaporating, condensing, insulator, conductor, transparency.
YEAR 3 & 4	**AUTUMN 1** **(THERE'S NO PLACE LIKE HOME)**	**SPRING 1** **(PANDEMIC)**	**SUMMER 1** **(ROMANS ON THE RAMPAGE)** **SUMMER 2** **(THE IRON MAN)**

Forces & magnets

Pupils should be taught to:

- Compare how some things move on different surfaces.
- Notice that some forces need contact between two objects but magnetic forces can act at a distance.
- Observe how magnets attract or repel each other and attract some materials and not others.
- Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.
- Describe magnets as having two poles (like and unlike poles).
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Pupils might work scientifically by:

- **Comparing** how different things move and grouping them.
- **Raising questions** and **carrying out tests** to find out how far things move on different surfaces.
- **Gathering and recording data** to find answers to their questions.
- **Exploring** the strengths of different magnets and **finding a fair way to compare them**.
- **Sorting materials** into those that are magnetic and those that are not.
- **Looking for patterns** in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another.
- **Identifying** how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

Key vocabulary

Compare, surfaces, forces, contact, objects, magnetic / magnet / magnetic field, repel, attract, materials, poles – north / south, push, pull, strength(s), properties, everyday items / uses, creative uses.

AUTUMN 2
(WE ARE EXPLORERS!)

Light & astronomy - light, reflection & shadows

Pupils should be taught to:

- Recognise that they need light in order to see things and that dark is the absence of light.
- Notice that light is reflected from surfaces.
- Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
- Recognise that shadows are formed when the light from a light source is blocked by a solid object.
- Find patterns in the way that the size of shadows can change.

Pupils might work scientifically by:

- **Looking for patterns** in what happens to shadows when the light source moves or the distance between the light source and the object changes.

Key vocabulary

Light, dark, absence of light, light source, reflection / reflect / reflective, ray, pupil, retina, shadow, opaque, translucent, transparent, surfaces, sun, protection, dangerous, blocked, shadows, change, directly at sun.

SPRING 2
(FROM CHEWING TO POOING)

Animals – skeleton and movement

Pupils should be taught to:

- Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- Identify animals (vertebrates) which have a skeleton which supports their body, aids movement & protects vital organs (e.g. name and locate skull, backbone, ribs, bones for movement/limbs, pelvis and be able to name some of the vital organs protected).
- Identify animals without internal skeletons/backbones (invertebrates) and describe how they have adapted other ways to support themselves, move & protect their vital organs.
  - Know how the skeletons of birds, mammals, fish, amphibians or reptiles are similar (backbone, ribs, skull, bones used for movement) and the differences in their skeletons.
  - Know that muscles, which are attached to the skeleton, help animals move parts of their body.
  - Explore how humans grow bigger as they reach maturity by making comparisons linked to body proportions and skeleton growth – e.g. do people with longer legs have longer arm spans?
  - Recognise that animals are alive; they move, feed, grow, use their senses and reproduce.

Pupils might work scientifically by:

- **Identifying and grouping** animals with and without skeletons.
- **Observing** and **comparing** their movement.
- **Exploring** ideas about what would happen if humans did not have skeletons.

	Environment – living things and their habitats Pupils should be taught to: ▪ Recognise that living things can be grouped in a variety of ways. ▪ Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. ▪ Recognise that environments can change and that this can sometimes pose dangers to living things. ▫ Use and make identification keys for plants and animals. **Pupils might work scientifically by:** • **Using and making simple guides or keys [grouping & classifying]** to explore and identify local plants and animals. • **Making a guide [grouping & classifying]** to local living things. • **Raising and answering questions** based on their **observations** of animals and • What they have found out about other animals that they have **researched**.	**Animals – Teeth, eating & digestion** Pupils should be taught to: ▪ Describe the simple functions of the basic parts of the digestive system in humans. ▪ Identify the different types of teeth in humans and their simple functions. ▪ Construct and interpret a variety of food chains, identifying producers, predators and prey *(NB Link with types of teeth and eating in this unit but this concept could be developed further in the yr4 Environment / habitats unit).* ▪ Describe how teeth and gums have to be cared for in order to keep them healthy. **Pupils might work scientifically by:** • **Comparing** the teeth of carnivores and herbivores. • **Suggesting reasons** for differences **[grouping & classifying]**. • **Finding out [testing and/or researching]** what damages teeth and how to look after them. • **Drawing and discussing their ideas** about the digestive system. • **Comparing** them with … • **… models** or images.	
	Key vocabulary Living things, grouped, variety, classification keys, explore, local and wider environment(s), change, danger, animals, plants, seasons, vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, snails and slugs, worms, spiders, insects, flowering plants, non-flowering plants, observations, research, nature reserves, ecologically planned parks, garden ponds, human population (impact), litter and deforestation.	**Key vocabulary** Teeth, incisor, canine, molar, premolar, tongue, mouth, humans, functions, food chain, producer, predators, prey, carnivores, herbivores, omnivore, digest / digestion, oesophagus, stomach, small intestine, large intestine, rectum, liver, bladder, pancreas, anus.	**Key vocabulary** Movement, vertebrate, invertebrate, muscles, tendons, joints, skeleton, skeletal, endoskeleton, exoskeleton, hydrostatic skeleton, backbone, soft tissue, contract, relax, cords, bones, organs, skull, clavicle, scapula, ribcage, vertebral column, humerus, ulna, pelvis, radius, femur, tibia, fibula.
YEAR 1 & 2	**AUTUMN 1** **(A WALK ON THE WILD SIDE)**	**SPRING 1** **(TO INFINITY AND BEYOND)**	**SUMMER 1** **(HAVE AN ICE DAY)**
	Animals: other animals Pupils should be taught to: ▪ Identify and name a variety of common animals including	**Light and Astronomy – Seasonal Change** Pupils should be taught to:	**Plants – plants growth** Pupils should be taught to: ▪ Observe and describe how seeds and bulbs grow

	some fish, some amphibians, some reptiles, some birds and some mammals. ▪ Identify and name a variety of common animals that are carnivores, herbivores and omnivores (i.e. according to what they eat). ▪ Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets). ▫ Find out and describe how animals look different to one another. ▫ Group together animals according to their different features. ▫ Recognise similarities between animals: Structure: head, body, way of moving, senses, body covering, tail. ▫ Animals have senses to explore the world around them and to help them to survive. ▫ Recognise that animals need to be treated with care and sensitivity to keep them alive and healthy. ▫ Animals are alive; they move, feed, grow, use their senses and reproduce. **Pupils might work scientifically by using their observations to:** • **Compare and contrast** animals at first hand or through videos and photographs. • **Describing** how they identify and group them. • **Grouping** animals according to what they eat. • **Using their senses**.	▪ To know there are 8 planets within our Solar System and there used to be 9. ▪ To know what a dwarf planet is. ▪ To know that the sun never moves and planets (including Earth) rotate around the sun.	into mature plants ▪ Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy (and how changing these affects the plant) ▪ Plants are living and eventually die **Pupils might work scientifically by:** • **Observing** and **recording**, with some accuracy, the growth of a variety of plants as they **change over time** from a seed or bulb, or • **Observing** similar plants **at different stages** of growth; • **Setting up a comparative test** to show that plants need light and water to stay healthy.
	Key vocabulary Amphibians, birds, fish, mammals, reptiles, carnivores, herbivores, omnivores, sight, hearing, touch, taste, smell, wild, domestic, differences, features, similarities, structure, head, body, movement, tail, survival, alive, dead, healthy, grow, feed, reproduce, old, young.	**Key vocabulary** Planets, Venus, Mercury, Pluto, Jupiter, Saturn, Neptune, Uranus, Earth, Mars, space, stars, gas, meteors, rings, cold, hot, life.	**Key vocabulary** leaves, flowers, blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem, nutrients, pollinate, pollination, absorb, germination, seed dispersal, grow, healthy, water, light, temperature, soil, nutrients, Name of plants e.g. grass, clover, daisy, buttercup, dandelion, oak, holly, daffodil, tulip etc. and plants we grow to eat such as lettuce, tomatoes, cucumber, radish, herb.
	AUTUMN 2 **(PUDDING LANE)**	**SPRING 2** **(FORMBY TREASURES)**	**SUMMER 2** **(THOSE WERE THE DAYS)**
	Light and Astronomy (repeated twice in 2 year	**Material Properties – Everyday**	**Health - How we grow and stay**

	cycle) Pupils should be taught to: ▪ Observe and describe changes across the four seasons. ▪ Observe and describe weather associated with the seasons and how day length and temperature varies **Pupils might work scientifically by:** • **Making tables and charts** about the weather and • **Making displays** of what happens in the world around them, including day length, as the seasons change.	**Materials** Pupils should be taught to: ▪ Distinguish between an object and the material from which it is made. ▪ Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, rock, brick, paper and cardboard. ▪ Describe the simple physical properties of a variety of everyday materials. Compare and group together a variety of everyday materials on the basis of their simple physical properties. **Pupils might work scientifically by:** • **performing simple tests** to **explore questions**, for example: – 'What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast's leotard?'	**healthy** Pupils should be taught to: ▪ Notice that humans have offspring which grow into adults. ▪ Find out about and describe the basic needs of humans, for survival (water, food and air). ▪ Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. ▫ Medicines can be useful when we are ill. ▫ Medicines can be harmful if not used properly. **Pupils might work scientifically by:** • **Observing, through video or first-hand observation** and **measurement**, how humans grow. • **Recording** their findings using charts. • **Asking questions** about what things animals [humans]. need for survival and what humans need to stay healthy and • **Suggesting ways to find answers to their questions**.
	Key vocabulary Spring, Summer, Autumn, Winter, day, night, light, dark, sunrise, sunset, Sun, rain, snow, hail, precipitation, wind, cloud, cloud cover, Deciduous, evergreen tree.	**Key vocabulary** hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent, brick, paper, fabrics, elastic, foil, wood, plastic, glass, metal, water, rock, card, rubber, fur, fleece cotton wool, polyester, cotton wool, translucent, squash, bend, twist, stretch, objects made from e.g. door, building block, window, pencil sharpener, teddy	**Key vocabulary** survival, water, food and air, Exercise, fit, healthy, food, fruit, vegetables, meat, fish, eggs, nuts, pulses, beans, milk, cheese, bread, pasta, rice, butter, vegetable oil, olive oil, Herbivore, carnivore, omnivore.
EYFS	Children within EYFS will complete most of their Science learning when meeting their 'Understanding the world' objectives. Learning involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension. Early Learning Goal: 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. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.

YEAR B

	AUTUMN 1 (RAIDING OR INVADING?)	SPRING 1 (MILLING AROUND WITHNELL FOLD)	SUMMER 1 (OUR CHANGING WORLD) / SUMMER 2 (HOT TOPIC!)
YEAR 5 & 6	**Material properties - comparative / fair tests of everyday materials.** Pupils should be taught to: ▪ Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. ▪ Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (advantages and disadvantages). ▫ Compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity). Temperature and Thermal Insulation ▫ Heat always moves from hot to cold. ▫ Some materials (insulators) are better at slowing down the movement of heat than others. ▫ Objects/liquids will warm up or cool down until they reach the temperature of their surroundings. **Pupils might work scientifically by:** • **Carry out tests** to answer questions such as 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' • **Compare** materials in order to make a switch in a circuit.	**Forces – effects on movement** Pupils should be taught to: ▪ Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. ▪ Identify the effects of air resistance, water resistance and friction that act between moving surfaces (causing things to slow down) ▪ Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. ▫ There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity) which have different effects on objects ▫ Gravity can act without direct contact between the Earth and an object. ▫ Friction, air resistance and water resistance can be useful or unwanted. ▫ The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect. ▫ More than one force can act on an object simultaneously (either reinforcing or opposing each other). **Pupils might work scientifically by:** • **Exploring** falling paper cones or cup-cake cases. • **Designing and making [exploring]** a variety of	**Electricity** Pupils should be taught to: ▪ Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. ▪ Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches. ▪ Use recognised symbols (at least: cells, wires, switches, bulbs, buzzers and motors) when representing a simple circuit in a diagram. ▫ Use/interpret circuit diagrams to construct a variety of more complex circuits predicting whether they will 'work'. **Pupils might work scientifically by:** • Systematically identifying **[testing]** the effect of changing one [thing] component at a time in a circuit. • **Designing and making [Create / Invent / Design]** a set of traffic lights, a burglar alarm or some other useful circuit.

		parachutes. • **Carrying out fair tests** to determine which designs are the most effective. • **Exploring** resistance in water by making and testing boats of different shapes. • **Design and make [create/invent/design]** artefacts that use simple levers, pulleys, gears and/or springs and explore their effects.	
	Key vocabulary Everyday materials, compare, group, hardness, solubility, transparency, conductivity (electrical and thermal), response to magnets, advantages and disadvantages, hardness, strength, flexibility, solubility, transparency, thermal conductivity, electrical conductivity, dissolving, mixing, changes of state, reversible changes.	**Key vocabulary** Gravity, falling object, air resistance, water resistance, friction, surfaces, mechanisms, pulley, levers, gears, push, pull, magnetism, wanted and unwanted forces.	
	AUTUMN 2 **(GB V'S UK)**	**SPRING 2** **(TEMPLES, PALACES AND PYRAMIDS)**	
	Light - exploring the way light behaves including light sources, reflection. Pupils should be taught to: ▫ Recognise that light appears to travel in straight lines. ▫ Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye. ▫ Explain that we see things because the light that travels from light sources to our eyes or from light sources to objects and then to our eyes (and represent this in simple diagrammatic form). ▫ Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. **Pupils might work scientifically by:** • Deciding **[observe/explore]** where to place rear-view mirrors on cars. • **Designing and making [Create / Invent / Design]** a periscope and using the idea that light appears to travel in	**Animals – Human Life Cycles** Pupils should be taught to: ▪ Describe the changes as humans develop to old age. ▫ Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete. **Pupils might work scientifically by:** • **Researching** the gestation periods other animals and **comparing** them with humans. • By **finding out** and **recording** the length and mass of a baby as it grows.	

	straight lines to explain how it works. • **Investigating** the relationship **[looking for patterns]** between light sources, objects and shadows by using shadow puppets. • Extend their experience **[explore and observe]** of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).		
	Key vocabulary Light, travel, straight lines, reflect, eye, shine, light source, reflection, filter, refraction, shadow, spectrum.	**Key vocabulary** Animals, alive, move, feed, grow, senses, reproduce, breathe / respire, excrete, growth and development, changes, puberty, reproduce, gestation, life cycle.	**Key vocabulary** Circuit, symbol, cell / battery, current, amps, voltage, motor, wire, lamp / bulb, buzzer, switch (open / close), brightness, loudness, position.
YEAR 3 & 4	**AUTUMN 1 (WALK LIKE AN EGYPTIAN)**	**SPRING 1 (RAGING RIVERS)**	**SUMMER 1 (VIVE LA FRANCE)**
	Electricity Pupils should be taught to: ▪ Identify common appliances that run on electricity. ▪ Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. ▪ Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. ▪ Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. ▪ Recognise some common conductors and insulators, and associate metals with being good conductors. ▫ Electricity can be dangerous. ▫ Electricity sources can be mains or battery. ▫ Batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work. ▫ Faults in circuits can be found by methodically testing connections. ▫ Drawings, photographs and diagrams can be used to represent circuits (although standard symbols need not be introduced until UKS2).	**Animals – health & nutrition** Pupils should be taught to: ▪ Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. ▪ An adequate and varied diet is beneficial to health (along with a good supply of air and clean water). ▪ Regular and varied exercise *from a variety of different activities* is beneficial to health (focus on *energy in versus energy out*. Include information on making informed choices). **Pupils might work scientifically by:** • **Comparing and contrasting** the diets of different animals (including their pets). • Decide ways of **grouping** them according to what they eat. • **Researching** different food groups and how they keep us healthy. • Designing meals based (**Create / Invent/ Design**) on what they find out.	**Sound** Pupils should be taught to: Vibrations ▪ Identify how sounds are made, associating some of them with something vibrating. ▪ Recognise that vibrations from sounds travel through a medium to the ear. ▪ Find patterns between the volume of a sound and the strength of the vibrations that produced it. ▪ Recognise that sounds get fainter as the distance from the sound source increases. ▫ Recognise that sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body). ▫ Sounds travel away from their source in all directions. ▫ Vibrations may not always be visible to the naked eye. **Pitch** ▪ Find patterns between the pitch of a sound and features of the object that produced it. ▫ Sounds can be high or low pitched. ▫ The pitch of a sound can be altered. ▫ Pitch can be altered either by changing the

	Pupils might work scientifically by: **Observing/noticing patterns**, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.		material, tension, thickness or length of vibrating objects or changing the length of a vibrating air column. Muffling/blocking sounds ▪ Recognise that vibrations from sounds travel through a medium to the ear. ▫ Sounds are heard when they enter our ears (although the structure of the ear is not important key learning at this age phase). ▫ Sounds can travel through solids, liquids and air/gas by making the materials vibrate. ▫ Sound travel can be reduced by changing the material that the vibrations travel through. ▫ Sound travel can be blocked. **Pupils might work scientifically by:** • **Finding patterns** in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. • They might make ear muffs from a variety of different materials **to investigate /test** which provides the best insulation against sound. • They could **make [create/invent/design]** and play their own instruments by **using what they have found out** about pitch and volume.
	Key vocabulary electricity, appliances, electrical circuit, cells, batteries, wires, bulbs, switches, buzzers, lamp, open, closed, common conductors and insulators, metals, good / bad conductors, symbols, safety.	**Key vocabulary** Healthy, nutrients, energy, saturated fats, unsaturated fats, carbohydrates, protein, fibre, fats, vitamins, minerals, water.	**Key vocabulary** Vibration, soundwave, volume, amplitude, pitch, ear, particles, distance, soundproof, absorb sound, vacuum, eardrum, movement, loud, quiet, high, low, instrument, note, gas, solid, ripples.
	AUTUMN 2 **(ERUPTION!)**	**SPRING 2** **(STONE AGE BRITAIN)**	**SUMMER 2** **(THE LANCASHIRE COTTON INDUSTRY)**
	Material properties - Rocks & Fossils Pupils should be taught to: ▪ Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. ▪ Describe in simple terms how fossils are formed when things that have lived are trapped within rock.	**Plants – functions of parts of a plant** Pupils should be taught to: ▪ Identify, locate and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.	**Material properties and changes - states of Matter** Pupils should be taught to: ▪ Compare and group materials together, according to whether they are solids, liquids or gases. ▪ Observe that some materials change state when

	▪ Recognise that soils are made from rocks and organic matter ▫ Recognise that rocks and soils can feel and look different. ▫ Recognise that rocks and soils can be different in different places/environments. **Pupils might work scientifically by:** • **Observing** rocks, including those used in buildings and gravestones. • **Exploring** how and why they might have changed over time. • **Using (equipment)** a hand lens or microscope to help them. • **Identify and classify** rocks according to whether they have grains or crystals, and whether they have fossils in them. • **Research** and discuss the different kinds of living things whose fossils are found in sedimentary rock. • **Explore** how fossils are formed. • **Explore** different soils and … • **Identify similarities and differences** between them and describe the composition of soil. • I**nvestigate** what happens when rocks are rubbed together (classify according to hardness) or what changes occur when they are in water. • **Raise and answer questions** about the way soils are formed.	▪ Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant. ▪ Investigate the way in which water is transported within plants. ▪ Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. ▫ Roots grow downwards and anchor the plant. ▫ Water, taken in by the roots, goes up the stem to the leaves, flowers and fruit. ▫ Nutrients (not food) are taken in through the roots. ▫ Stems provide support and enable the plant to grow towards the light. ▫ Plants make their own food in the leaves using energy from the sun. ▫ Flowers attract insects to aid pollination. ▫ Pollination is when pollen is transferred between plants by insects, birds, other animals and the wind. ▫ Seeds are formed after the flowers are pollinated. ▫ Many flowers produce fruits which protect the seed and/or aid seed dispersal. ▫ Seed dispersal, by a variety of methods, helps ensure that new plants survive. ▫ Plants need nutrients to grow healthily (either naturally from the soil or from fertiliser added to soil). ***Pupils might work scientifically by:*** • **Comparing** the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser; • Discovering (**research and modelling**) how seeds are formed by • **Observing** the different stages of plant cycles over a period of time; • **Looking for patterns** in the structure of fruits that relate to how the seeds are dispersed. • **Observing** how water is transported in plants, for example, by putting cut, white carnations into coloured water. • **Observing** how water travels up the stem to the flowers.	they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). ▪ Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. ▫ Solids, liquids and gases can be identified by their observable properties. ▫ Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action). ▫ Liquids can pour and take the shape of the container in which they are put. ▫ Liquids form a pool not a pile. ▫ Solids in the form of powders can pour as if they were liquids but make a pile not a pool. ▫ Gases fill the container in which they are put. ▫ Gases escape from an unsealed container. ▫ Gases can be made smaller by squeezing/pressure. ▫ Liquids and gases can flow. **Pupils might work scientifically by:** • **Grouping and classifying** a variety of different materials. • **Exploring** the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). • **Researching** the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. • **Observing** and **recording** evaporation over a period of time, such as a puddle in the playground or washing on a line. • **Investigating** the effect of temperature on washing drying or snowmen melting.

	Key vocabulary Igneous, sedimentary, metamorphic, magma, lava, sediment, permeable, permeates, impermeable, erode, natural, man-made, obsidian, granite, basalt, chalk, sandstone, limestone, marble, quartzite, slate, brick, concrete, coade stone, hard, soft, durable, high density, low density, molecules, fossilisation, palaeontology, erosion, minerals, soil, topsoil, subsoil, base-rock, fossil.	**Key vocabulary** Wild plants, garden plants, deciduous, evergreen, roots, bulb, seed, trunk, branch, stem, leaves, flowers (blossom), fruit, nutrients, evaporation, petals, pollinators, pollinate, pollination, transports, absorb, fertilisation, stamen, carpel (pistil), sepal, germination, seed dispersal, filament, stigma, ovary, anther.	**Key vocabulary** States of matter, solids, liquids, gases, water vapour, evaporate, melt, freeze, condense, condensation, precipitation, water cycle, particles, boiling.
YEAR 1 & 2	**AUTUMN 1** **(THE GREAT OUTDOORS)**	**SPRING 1** **(THE LOCAL CHAMPION)**	**SUMMER 1** **(OLD SCHOOL, NEW SCHOOL)**
	Animals - Humans Pupils should be taught to: ▪ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. ▫ Recognise that humans are animals. ▫ Compare and describe differences in their own features (eye, hair, skin colour, etc.). ▫ Recognise that humans have many similarities. **Pupils might work scientifically by using their observations to:** • **Compare and contrast** animals (humans) at first hand or through videos and photographs. • **Using their senses** to **compare** different textures, sounds and smells.	**Environment - Living things and their habitats** Pupils should be taught to: ▪ Explore and compare the differences between things that are living, dead, and things that have never been alive. ▪ Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. ▪ Identify and name a variety of plants and animals in their habitats, including micro-habitats. ▪ Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. ▫ Different kinds of plants and animals live in different kinds of places. ▫ There are different kinds of habitat near school which need to be cared for ▫ Habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples). ▫ Observe living things in their habitats during different seasonal changes **Pupils might work scientifically by:** • **Sorting and classifying** things as to whether they are living, dead or were never alive.	**Plants: Common Names and Basic Structure** Pupils should be taught to: ▪ Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. ▪ Identify and describe the basic structure of a variety of common flowering plants, including trees (at least: flower, leaf, root, stem, trunk, seed, branch and petal). **Pupils might work scientifically by:** • **Observing closely**, perhaps using magnifying glasses. • **Comparing and contrasting** familiar plants. • Describing how they were able to **identify and group** them, and • **Drawing diagrams** showing the parts of different plants including trees. • **Keeping records** of how plants have **changed over time**, for example the leaves falling off trees and buds opening. • **Comparing and contrasting** what they have found out about different plants.

		• **Recording** their findings using charts • **Describing** how they decided where to place things, • **Exploring questions** such as: 'Is a flame alive? Is a deciduous tree dead in winter?' • **Talking about ways of answering their questions.** • **Constructing a simple food chain** that includes humans (e.g. grass, cow, human); • **Describing** the conditions in different habitats and micro-habitats (under log, on stony path, under bushes); • **Finding out how** the conditions **affect** the number and type(s) of plants and animals that live there.	
	Key vocabulary head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth nose, cheek, chin, body, hands, fingers, paws, fins, wings, feet, toes, tail, skin, scales, fur, feathers, Herbivore, carnivore, omnivore, Fish, amphibian, reptile, bird, mammal.	**Key vocabulary** Habitat, microhabitat, Living, dead, non-living , Habitat, micro habitat, food chain, Field, hedgerow, pond, woodland, seashore, ocean, rainforest, Arctic, desert, Air, food, water, shelter, heat, warmth, sun, Fish, amphibian, reptile, bird, mammal.	**Key vocabulary** leaves, flowers, blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem, nutrients, pollinate, pollination, absorb, germination, seed dispersal, grow, healthy, water, light, temperature, soil, nutrients, Name of plats e.g. grass, clover, daisy, buttercup, dandelion, oak, holly, daffodil, tulip etc. and plants we grow to eat such as lettuce, tomatoes, cucumber, radish, herb.
	AUTUMN 2 **(WHO DO YOU THINK YOU ARE?)**	**SPRING 2** **(WONDERFUL WITHNELL)**	**SUMMER 2** **(CIRCLE OF LIFE)**
	Animals - Animal survival and growth Pupils should be taught to: ▪ Notice that animals have offspring which grow into adults. ▪ Find out about and describe the basic needs of animals for survival (water, food and air). **Pupils might work scientifically by:** • **Observing, through video or first-hand observation** and **measurement**, how different animals grow • **Asking questions** about what things animals need for survival **suggesting ways to find answers to their questions**. • **Describing** the main changes as young animal offspring grow into adults (at least: between egg and adult bird; between egg and adult insect; between baby and adult mammal).	**Material Properties – Uses of Materials** Pupils should be taught to: ▪ Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, water, rock, paper and cardboard for particular uses ▪ Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (applying a force) ▪ Some materials can be found naturally; others have to be made **Pupils might work scientifically by:** • **Comparing** the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs);	**Plants: Cooking and harvesting** Pupils should be taught to: ▪ Identify and explore the phases of growing vegetables from seeds. ▪ Understand that many vegetables need cooking before they can be enjoyed and digested by humans – steam, boil, roast. **Pupils might work scientifically by:** • **Observing closely**, perhaps using growth diaries. • **Comparing and contrasting** different plants that produce vegetables. • **Drawing diagrams** showing the parts of different plants including trees. • **Keeping records** of how plants have **changed over time**, for example the stages of how vegetables grow.

		• **Observing closely**, • **Identifying and classifying** the uses of different materials, and • **Recording their observations**. **Thinking about** unusual and creative uses for everyday materials.	• **Comparing and contrasting** what they have found out about different plants. • **Cook** harvested vegetables using more than one method such as boil, roast or steam.
	Key vocabulary Adult, develop, life cycle, offspring, young, live young, baby, toddler, child, teenager / young adult, adult, diet, exercise, germs, hygiene, nutrition, water, food, air.	**Key vocabulary** hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent, brick, paper, fabrics, elastic, foil, wood, plastic, glass, metal, water, rock, card, rubber, fur, fleece cotton wool, polyester, cotton wool, translucent, squash, bend, twist, stretch.	**Key vocabulary** leaves, flowers, blossom, petals, fruit, roots, bulb, seed, trunk, branches, stem, nutrients, pollinate, pollination, absorb, germination, seed dispersal, grow, healthy, water, light, temperature, soil, nutrients, Name of plats e.g. grass, clover, daisy, buttercup, dandelion, oak, holly, daffodil, tulip etc. and plants we grow to eat such as lettuce, tomatoes, cucumber, radish, herb, cook, steam, boil, roast.
EYFS	Children within EYFS will complete most of their Science learning when meeting their 'Understanding the world' objectives. Learning involves guiding children to make sense of their physical world and their community. The frequency and range of children's personal experiences increases their knowledge and sense of the world around them – from visiting parks, libraries and museums to meeting important members of society such as police officers, nurses and firefighters. In addition, listening to a broad selection of stories, non-fiction, rhymes and poems will foster their understanding of our culturally, socially, technologically and ecologically diverse world. As well as building important knowledge, this extends their familiarity with words that support understanding across domains. Enriching and widening children's vocabulary will support later reading comprehension. Early Learning Goal: 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. • Describe what they see, hear and feel whilst outside. • Recognise some environments that are different to the one in which they live. • Understand the effect of changing seasons on the natural world around them.		