Year 1 Subject Content from the Programme of Study	Suggested Learning Activities	Knowledge Skills and Understanding	Vocabulary	Highlighted Misconceptions	Scientists	Links with other subjects	Opportunities for investigation or demonstration	Links to next key stages, projects, community programmes.
<u>Plants</u> Pupils should be taught to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees	• Use the local environment to identify common plants and weeds (dandelion, daisy, grass, evergreen trees.) • Create a story board of growth for some plants and vegetables they have planted.	• Can they name the petals, stem, leaf and root of a plant? • Can they identify and name a range of common plants and trees? • Can they recognise deciduous and evergreen trees? • Can they describe the parts of a plant (roots, stem, leaves, flowers)? • **Can they name the main parts of a flowering plant?**	Wild plants Garden plants **Tree** deciduous evergreen trunk branches leaf/leaves root **plant** leaf/leaves petals root stem fruit vegetables bulb seed bud flower blossom	• Plants are not living. • Seedlings are plants or living, trees are not.	**Beatrix Potter -** children's author/illustrator who was curious about the world and had a particular interest in funghi **Joseph Banks –** travelled the world to discover plants nobody had seen before	• Maths • Oracy • Creative thinking • Enquiry • ICT	• Investigate what makes seeds grow: Cress in different growing conditions. Or <u>sunflowers</u> and pots	• Identifying plants in Y2 • <u>Rooted in Hull</u> • Read the story "<u>The Sunflower</u>"
Pupils should be taught to identify and describe the basic structure of a variety of common flowering plants, including trees.	• Plant dissection and diagram making. • Develop and display parts of a plant.			• Seeds are all inside, grass and trees don't have seeds, seeds won't grow if taken from a fruit. • Seeds are small objects (macaroni… macaroni will grow if planted)		• Creative thinking • Enquiry • Fine motor skills • Aesthetic display	• Compare and contrast different types of plants – Lily, Tulip, etc.	• Identifying plant tissues and organs Y3. • <u>Darwin's Lookouts</u>
<u>Animals, including humans.</u> Pupils should be taught to identify and name a variety of common animals including fish, amphibians, reptiles, birds, and mammals.	• Identifying local wildlife – "Find and Photograph" activity with parents/carers. • Rolling slide show, comparing and contrasting	• Can they point out some of the differences between different animals? • Can they sort photographs of living things and non-living things? • Can they classify common animals? (birds, fish, amphibians, reptiles, mammals, invertebrates) • Can they describe how an animal is suited to its environment? • Can they name the parts of the human body that they can see? • Can they identify the main parts of the human body and link them to their senses? • Can they name the parts of an animal's body? • Can they name a range of domestic animals? • Can they classify animals by what they eat? (carnivore, herbivore, omnivore) • Can they compare the bodies of different animals? • **Can they begin to classify animals according to a number of given criteria?** • **Can they point out differences between living things and non-living things?** • **Can they name some parts of the human body that cannot be seen?** • **Can they say why certain animals have certain characteristics?** • **Can they name a range of wild animals?**	**common animals** fish amphibians reptiles birds mammals **Carnivores –** Meat, cat, dog, lion, tiger, fox, shark, killer whale, eagle, hawk, snake, tyrannosaurus rex **Herbivores –** cow, hamster, guinea pig, tortoise, triceratops **Omnivores –** Badger, human, bear, chickens	• People are not animals. • All animals can move from place to place • Animals are four footed, or furry. • Sexual dimorphism is not a thing in animals.	**Key person – Carl Hagenbeck –** Inventor of the open enclosure zoo	• Creative thinking • Enquiry • Problem solving • Reasoning • ICT	• <u>Nocturnal animals</u> • Make a <u>wormery</u>	• Link to animal nutrition in Y2 • RSPCA visit or a <u>mobile farm</u>
Pupils should be taught to identify and name a variety of common animals that are carnivores, herbivores, and omnivores	• Compare the adaptations that carnivores, herbivores and omnivores have – eyes, ears, teeth, camouflage etc.			• Birds, fish, insects, worms are not animals. • Animals are wild, pets, or farm animals. • Animals are carnivores if they are big and ferocious. Herbivores are small and timid.		• Oracy • Enquiry • Reasoning	• Skull identification	• RSPCA talk • Pets at Home Visit • Foundation for food webs in Year 2
identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	• <u>Brilliant Bodies</u> activity pack • Main parts of the human body: <u>virtual tour</u> • The students can label each other with post its – arm, skull, foot etc.		**Human body parts** Head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth	• <u>Research paper – human body</u> • As we grow our cells get bigger. • We only have 5 senses	**Famous Scientist – Linda B Buck –** An American scientist who discovered how our sense of smell works	• Writing • Reading • Maths • Oracy • Enquiry • Social	• Producing a <u>tongue map</u> • Produce a survey of hand size, leg length etc. • <u>Two-point discrimination test</u>	• Link to radiography and X-Ray departments at local hospitals
<u>Everyday materials</u> Pupils should be taught to distinguish between an object and the material from which it is made	• <u>The materials song</u> to identify that reinforce that there are materials. • <u>Robot spot the difference</u> with opportunity to distinguish between materials and objects	• Can they describe materials using their senses? • Can they describe materials using their senses, using specific scientific words? • Can they explain what material objects are made from? • Can they explain why a material might be useful for a specific job? • Can they name some different materials? • Can they sort materials into groups by a given criteria? • Can they explain how solid shapes can be changed by squashing, bending, twisting and stretching? • **Can they describe things that are similar and different between materials?** • **Can they explain what happens to certain materials when they are heated, eg, bread, ice, chocolate?** • **Can they explain what happens to certain materials when they are cooled, e.g, jelly, heated chocolate?**	**Materials** Wood, plastic, glass, metal, water, rock, brick, paper, plastic, fabrics, elastic, foil **Properties** hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; Opaque/transparent.	• Material means fabric • Students can mistake the material an object is made from with the object itself.	**Inventor – Chester Greenwood –** Inventor of Earmuffs **Inventor Ole Kirk Christiansen** – inventor of Lego	• Writing • Reading • Maths • Oracy • Enquiry • Problem solving	• Building sandcastles investigating the proportion of sand to water <u>(page 15)</u>	• Construction worker / joiner, metal worker visits and display.
Pupils should be taught to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock	• Pupils should be given an opportunity to hold objects, name them and the material they are made of.			• Rocks must be heavy.		• Writing • Reading • Enquiry • Fine motor skills • Problem solving • Reasoning	• Matching physical objects with labels as a carousel activity	• Foundation for Year 2 D&T materials.
Pupils should be taught to describe the simple physical properties of a variety of everyday materials	• <u>BBC Schools interactive quiz</u> to show how properties match the uses. • Imaginative game linking materials to incorrect uses chocolate kettle, wooden coat etc.			• Physical properties do not change or are general e.g. wood is hard, metal is hard.		• Writing • Reading • Creative thinking • Enquiry • Reasoning • Social	• 20 questions – how to ask the right question to identify materials that a pupil has in mind.	• Foundation for Year 2 and Year 3
Pupils should be taught to compare and group together a variety of everyday materials based on their simple physical properties.	• <u>Let's build</u> includes opportunities for grouping objects, predicting properties and building homes for the Three Little Pigs			• Stronger materials are always the best materials for building.		• Creative thinking • Enquiry • Fine motor skills • Problem solving • Reasoning	• Sink or float activity and withstand the hair dryer building activity from <u>Let's Build</u>	• Foundation for materials in Year 2 • Construction worker visit – demonstrating health and safety materials and why they are used.
<u>Seasonal changes</u> Pupils should be taught to observe changes across the four seasons	• <u>Wonderful weather</u> investigation including opportunity for creating tables and charts.	• Can they identify and explain the movement of the Earth relative to the sun? • Can they explain how seasons and the associated weather is created? • Can they identify and explain the movement of the moon relative to the Earth? • **Can they compare the time of day at different places on the earth?** • **Can they create shadow clocks?** • **Can they begin to understand how older civilizations used the sun to create astronomical clocks?**	Days of the Week Months of the Year Seasons **Weather** Snow, rain, ice, sun, thunder, lightning,	• Grass, trees, and other plants die in the winter and are born in the spring. • Seasons are caused by the Earth's distance from the sun.	**Famous Scientist – George James Symons -** Invented his own version of the rain gauge **Key Person – Paul Hudson –** Look North weather presenter	• Writing • Reading • Maths • Enquiry	• <u>Seasonal chart</u> – disc template	• Foundation for Year 5 Space Change in seasons due to the changing relationship between the Earth & the sun.
Pupils should be taught to observe and describe weather associated with the seasons and how day length varies	• <u>BBC learning clips</u> – seasons and weather • <u>Seasons song</u> – fun activity and learning about changing temperatures			• It is winter because it is cold and summer because it is hot. • The amount of daylight increases each day of summer		• Oracy • Creative thinking • Enquiry • Social	• <u>Wonderful weather</u> or <u>Wild Weather</u> measuring skills, tracking skills, observation skills.	.

Working scientifically
During Years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

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

Can they talk about what they <see, touch, smell, hear or taste>?
Can they use simple equipment to help them make observations?
Can they perform a simple test?
Can they tell other people about what they have done?
Can they identify and classify things they observe?
Can they think of some questions to ask?
Can they answer some scientific questions?
Can they give a simple reason for their answers?
Can they explain what they have found out?
Can they show their work using pictures, labels and captions?
Can they record their finding using standard units?
Can they put some information in a chart or table?

Year 2 Subject Content from the Programme of Study	Suggested Learning Activities	Knowledge Skills and Understanding	Vocabulary	Highlighted Misconceptions	Scientists	Links with other subjects	Opportunities for investigation or demonstration	Links to next key stages, projects, community programmes.
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	• Grouping and classification Treasure Hunt •	• Can they match certain living things to the habitats they are found in? • Can they explain the differences between living and non-living things? • Can they describe some of the life processes common to plants and animals, including humans? • Can they decide whether something is living, dead or non-living? • Can they describe how a habitat provides for the basic needs of things living there? • Can they describe a range of different habitats? • Can they describe how plants and animals are suited to their habitat? • Can they sort living things into groups and say why they sorted them in that way? • Can they compare how plants grow in different conditions by making measurements? • Can they identify and compare a variety of plants and animals found in different habitats and microhabitats? • Can they collect weather data about a local habitat and use it to explain the plants and animals they will find there? • Can they explain how animals get their food and draw a simple food chain? • **Can they name some characteristics of an animal that help it to live in a particular habitat?** • **Can they describe what animals need to survive and link this to their habitats?** • **Can they classify living things into groups according to a range of criteria they have been given?**	alive, living, dead, never alive, habitats micro-habitats food food chain healthy logs, leaf, litter stony path under bushes shelter seashore woodland ocean rainforest conditions hot/warm/cold bright/shade/dark	• Anything that moves is living. (Machines, smoke, clouds, fire, moving water...) • Non-living is dead.	**Scientist – Rachel Carson** – Marine Pollution	• Writing • Reading • Enquiry • Problem solving	• Planting seeds, planting burned seeds, planting rocks. prove rocks aren't alive	• Develop a community garden as a "bee haven"
Pupils should be taught to 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	• Human and Animal habitats: this interactive activity asks children to identify which animals are suited to a particular habitat and choose the reasons from different options. • Video: how do animals adapt to their habitats			• Deserts are dead wastelands where nothing could live or thrive.		• Writing • Reading • Maths • Oracy • Enquiry • Reasoning	• Measure different abiotic and biotic conditions around the school – temperature, light levels, etc.	• Importance of habitat loss project – investigate, and display the importance of preserving habitats.
Pupils should be taught to identify and name a variety of plants and animals in their habitats, including micro-habitats	• Making masks and dioramas to show the type of habitat particular animals live in.			• The needs and roles of a species are the same as those of similar species. • Species live together in an ecosystem because they have compatible needs and behaviours.		• Maths • Enquiry • Creative thinking • Fine motor skills	• Worm Survey (link to Y1 wormery) • Observe habitats from Explore webcams from around the world.	• Join the Earthworm project
Pupils should be taught to 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.	• Education Pack: Food chains – rabbits and foxes game and drawing pictures.			• Don't add plants to the web only prey and predator. See the top of the web as having the most energy. Or energy accumulates at the top.		• Writing • Reading • Social	• Investigating foodwebs in the school grounds.	• Link to countryside classrooms and "Farmer Time"
Plants Pupils should be taught to observe and describe how seeds and bulbs grow into mature plants	• Ready Steady Grow – six lessons on germination. • Time lapse videos of growth	• Can they describe what plants need to survive? • Can they describe how seeds and bulbs grow into plants? • Can they describe what a plant needs to grow and stay healthy? • Can they explain that plants grow and reproduce? • **Can they describe what plants need to survive and link it to where they are found?** • **Can they explain that plants grow and reproduce in different ways?**	***Following on from Year 1 Key words*** water light suitable temperature grow healthy germination reproduction	• Trees, grass, vegetables, weeds are not plants.	**Jane Colden was a botanist**. She is thought to be America's first woman botanist.	• Writing • Reading • Maths • Enquiry • ICT	• Growing seeds and bulbs indoors:1 and 2	• Link to countryside classrooms and "Farmer Time"
Pupils should be taught to find out and describe how plants need water, light, and a suitable temperature to grow and stay healthy	• Living processes and what plants need to grow activity pack			• Plants get their energy from the soil through roots. • Fertilizer or humus provides plants with food or energy.		• Enquiry • Fine motor skills • Reasoning	• Investigating the reaction of cress to light levels.	• Opportunity to develop herb garden or vegetable patch.
Animals, including humans. Pupils should be taught to notice that animals, including humans, have offspring which grow into adults	• Discussion prompt video •	• Can they describe what animals need to survive? • Can they explain that animals grow and reproduce? • Can they explain why animals have offspring? • Can they describe the life cycle of some living things? (e.g. egg, chick, chicken) • Can they explain the basic needs of animals, including humans? • Can they describe why exercise and a balanced diet are important for humans? • **Can they explain that animals reproduce in different ways?**	offspring grow adults nutrition reproduce **Survival** Water, food, air, exercise, hygiene, egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. baby, toddler, child, teenager, adult.	• Young animals look like their parents but smaller. •	**Key People** **Florence Nightingale** – Pioneer of modern nursing **Elizabeth Garrett Anderson** - She was the first woman to qualify as a doctor. She qualified in 1865.	• Oracy • Enquiry • Social	• Investigate similarities and differences between offspring of a range of animals.	• Monitor the growth of children in the class on a door jam and turn it into a maths skills project.
Pupils should be taught to find out about and describe the basic needs of animals, including humans, for survival (water, food, and air)	• National Sea Life Centre pack with worksheets and aids focusing on classification, variation, caring for animals and their environments.			• Fish don't need air, fish sleep with their eyes closed.		• Maths • Oracy • Enquiry • Reasoning	• Raise Sea Monkeys, make a wormery, raise butterflies. Research the needs of all the animals.	• Opportunity to develop herb garden or vegetable patch.
Pupils should be taught to describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.	• The Eatwell Guide: 7 resources help children identify and explain the need for different food groups.			• Healthy food is more expensive than cheap food.		• Writing • Reading • Maths • Oracy • Enquiry	• Stupendous steppers: scientific investigations, reaction times, making tests	• Link to Sustain for healthy eating – possible visit / webinar
Uses of everyday materials. Pupils should be taught to identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper, and cardboard for particular uses.	• Resource Bank: identifying, discussing uses and grouping materials. • Unusual uses for everyday materials – helps with classification and thinking about properties.	• Can they distinguish between an object and the material from which it is made? • Can they identify and name a range of everyday materials? (wood, plastic, metal, water, rock) • Can they describe the simple physical properties of a variety of everyday materials? • Can they compare and classify a variety of materials based on their simple physical properties? • Can they explore how the shapes of solid objects can be changed? (squashing, bending, twisting, stretching) • Can they find out about people who developed useful new materials? (Dunlop, MacKintosh, MacAdam) • Can they identify and compare the uses of a range of everyday materials? (wood, metal, plastic, glass, brick/rock, paper/cardboard) • Can they explain how things move on different surfaces? • **Can they describe the properties of different materials using words like transparent or opaque, flexible, etc.?** • **Can they sort materials into groups and say why they have sorted them in that way?** • **Can they say which materials are natural and which are man made?** • **Can they explain how materials are changed by heating and cooling?** • **Can they tell which materials cannot be changed back after being heated, cooled, bent, stretched or twisted?** • **Can they explain how materials are changed by bending, twisting and stretching?**	Wood, metal, plastic, glass, brick, rock, paper, cardboard. Bending, squashing, twisting, stretching Waterproof Metal – coins, cans, cars, table, legs Wood – matches, floors, telegraph poles Spoons – plastic, wood, metal, glass	• Plastic is not breakable. • Hardness is the same as strength. • Biodegradable substances are not pollutants.	**Key People** **- John Dunlop** (tyres), **Charles Macintosh** (waterproof materials) **John McAdam** (tarmac)	• Writing • Reading • Maths • Oracy • Enquiry • Reasoning	• Building paper bridges and discussing the use of different materials.	• School assemblies with programmes like Steamco
Pupils should be taught to find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting, and stretching	• Ginn Science resource pack – pages 24-26researching the materials needed to make a hamster cage.			• Metals cannot be squashed, bent, twisted, or stretched.		• Writing • Reading • Maths • Problem solving • Reasoning • Social • ICT	• Testing everyday materials, squashing, bending, twisting, stretching.	• School assemblies with programmes like Steamco

Working scientifically During Years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • Asking simple questions and recognising that they can be answered in different ways • Observing closely, using simple equipment • Performing simple tests • Identifying and classifying • Using their observations and ideas to suggest answers to questions • Gathering and recording data to help in answering questions.	• **Can they use <see, touch, smell, hear or taste> to help them answer questions?** • **Can they use some science words to describe what they have seen and measured?** • **Can they compare several things?** • **Can they carry out a simple fair test?** • **Can they explain why it might not be fair to compare two things?** • **Can they say whether things happened as they expected?** • **Can they suggest how to find things out?** • **Can they use prompts to find things out?** • **Can they organise things into groups?** • **Can they find simple patterns (or associations)?** • **Can they identify animals and plants by a specific criteria, e.g, lay eggs or not; have feathers or not?** • **Can they use (text, diagrams, pictures, charts, tables)to record their observations?** • **Can they measure using <simple equipment>?**

Year 3 Subject Content from the Programme of Study	Suggested Learning Activities	Knowledge Skills and Understanding	Vocabulary	Highlighted Misconceptions	Scientists	Links with other subjects	Opportunities for investigation or demonstration	Links to next key stages, projects, community programmes.
Plants Pupils should be taught to identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.	• Hamilton Trust resource covering functions of roots and shoots and plant life.	• Can they identify and describe the functions of different parts of plants? (roots, stem, leaves and flowers) • Can they identify what a plants needs for life and growth? • Can they describe the ways in which nutrients, water and oxygen are transported within plants? • Can they explain how the needs and functions of plant parts vary from plant to plant e.g. insect and wind pollinated plants? • Can they investigate the way in which water is transported within plants? • **Can they classify a range of common according to many criteria (environment found, size, climate required, etc.)?** • **Can they explore the role of flowers in the life cycle of flowering plants. Including pollination, seed formation and speed dispersal?**	***Following on from Year 1 & 2 Key words*** **Structure** Flowering plants, roots, stem/trunk, leaves, flowers **Function** nutrition, support, reproduction **requirements for life** and growth air, light, water, nutrients from soil, room to grow needs, vary, fertiliser **life cycle** flowers, pollination, seed formation, seed dispersal	• Plants rely on carbon dioxide from animals. • Leaves take in water. • Plants get their energy from the soil through roots.	**David Douglas** - The Douglas fir tree is named after this botanist. He also introduced pines and the flowering currant to Britain. **Jeanne Baret** - Baret introduced 70 plants to Europe, including the bougainvillea.	• Writing • Reading • Enquiry • Problem solving	• Plant dissection and displaying using lilies, tulips, daffodils, alstroemerias.	• Darwin's Lookouts
Pupils should be taught to 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	• Drama activity with a humorous twist to plant growth.			• Fertilizer or humus provides plants with food or energy		• Writing • Reading • Maths • Oracy • Enquiry • Reasoning	• The great Plant Hunt – Activity 2 – growing plants	• Opportunity to develop herb garden or vegetable patch.
Pupils should be taught to investigate the way in which water is transported within plants	• Hamilton Trust resource covering functions of water transport in plants.			• Roots take "food" up through roots. • Water is taken into a plant by the leaves or flowers.		• Maths • Enquiry • Creative thinking • Fine motor skills	• Changing the colour of plant petals – shows water comes up through the roots and not in through the leaves.	• Develop a water conservation programme – make a rain butt for a class garden?
Pupils should be taught to explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	• Hamilton Trust resource covering functions of seeds and dispersal.			• Flowering plants are all colourful.		• Writing • Reading • Social	• Changing the colour of plant petals – shows water comes up through the roots and not in through the leaves	• Create a Bee Garden as part of a wider project on ecosystem protection.
Animals, including humans. 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.	• Lesson plan activities and lesson ideas, worksheets and teacher's notes for the full topic. • Nutrition on the International Space Station lesson plans.	• Can they explain the importance of a nutritious balanced diet? • Can they describe how nutrients, water and oxygen are transported within animals and humans? • Can they describe and explain the skeletal system of a human? • Can they describe and explain the muscular system of a human? • **Can they explain how the muscular and skeletal systems work together to create movement?** • **Can they classify living things and non-living things by a number of characteristics that they have thought of?** • **Can they explain how people, weather and the environment can affect living things?** • **Can they explain how certain living things depend on one another to survive?**	Nutrition, vitamins, minerals, fat, protein, carbohydrates, fibre, water, diet Skeletons Support, protection, Skull-brain Ribs – heart, lungs Movement, joint Muscles – pull, contract, relax	• An animal that is high on the food web preys on all populations below it. • A change in the prey population has no effect on the predator	**Important Scientists** **Andreas Vesalius –** founder of the modern anatomy **Antoine Lavoiser –** Discovered metabolism	• Writing • Reading • Maths • Enquiry • ICT	• Incredible Ingredients: Investigate the nutritional content of food • Boil some coke down in a pan over a heating disc.	• Link to Sustain for healthy eating – possible visit / webinar
Pupils should be taught to identify that humans and some other animals have skeletons and muscles for support, protection, and movement.	• Lesson plan activities and lesson ideas, worksheets and teacher's notes for the full topic.			• Bees: have bones for support; cannot fly fast or far; bees will sting you repeatedly; live only in hives.		• Enquiry • Fine motor skills • Reasoning	• Build a bionic hand – demonstrated the way hands move and why.	• Link to NHS radiography department or possible Bishop Burton animal physiotherapy department
Rocks Pupils should be taught to compare and group together different kinds of rocks based on their appearance and simple physical properties.	• Rocks and Fossils: lesson plans, practical activities, student materials. • Rocks – Anchor chart	• Can they compare and group together different rocks based on their simple physical properties? • Can they describe and explain how different rocks can be useful to us? • Can they describe and explain the differences between sedimentary and igneous rocks, considering the way they are formed? • Can they describe how fossils are formed within sedimentary rock? • **Can they classify igneous and sedimentary rocks?** • **Can they begin to relate the properties of rocks with their uses?**	**Appearance** **Physical properties** **Properties** Hard/soft Shiny/dull Rough/smooth Absorbent/ Not absorbent Fossils Sedimentary rock organic matter buildings grave stones grains crystals	• Rocks change colour when wet. • Coal is "dirty" and chalk is "dusty".	**William Smith** - he studied geology and would study the pattern of fossils. He realised that he could tell the age of a rock by looking at fossils. **James Hutton –** geologist who was the originator of explaining the Earth's crust in relation to natural processes	• Oracy • Enquiry • Social	• Edible rocks – how do rocks form made with sweet treats (check for allergies!!!) • Make a rock – cups, glue, sand etc.	• Possible links to Hull Geological Society
Pupils should be taught to describe in simple terms how fossils are formed when things that have lived are trapped within rock	• Rocks and Fossils: lesson plans, practical activities, student materials. • Materials on how fossils are formed in the Darwin and Natural Selection			• Fossils are bones		• Maths • Oracy • Enquiry • Reasoning	• Create dinosaur fossils • Corn Starch making fossils	• Possible links to Hull Geological Society
Pupils should be taught to recognise that soils are made from rocks and organic matter.	• Rocks and Fossils: lesson plans, practical activities, student materials. • Soil Profile in a bottle			• Soil must have always been in its present form.		• Writing • Maths • Oracy • Enquiry	• Compare soil investigation – which soil is best. • Jam Jar soil experiment	• Possible link the THYME at the University of Hull
Light Pupils should be taught to recognise that they need light to see things and that dark is the absence of light.	• Bitesize clips to show how and why we can see • Use of feely bags and torches to demonstrate that we need light to see.	• Can they explain the difference between transparent, translucent and opaque? • Can they compare the brightness and colour of lights? • Can they explain how bulbs work in an electrical circuit? • Can they explain how shadows are formed? • **Can they explain why lights need to be bright or dimmer according to need?** • **Can they make a bulb go on and off?** • **Can they say what happens to the electricity when more batteries are added?** • **Can they explain why their shadow changes when the light source is moved closer or further from the object?**	light see dark reflect surface natural star sun moon artificial torch candle lamp	• Light is not necessary for vision; it is possible to see in the dark.	**Justin Von Liebig** – mirrors	• Maths • Oracy • Enquiry • Reasoning	• Make a lightproof box / area of the room and ask the pupils to do a puzzle?	• Possible link to Sight Support Hull
Pupils should be taught to notice that light is reflected from surfaces	• Use of feely bags and torches to demonstrate that we need light to see. • Light bending simulation			• Only smooth, shiny objects like mirrors reflect light; dull and rough objects do not reflect light.		• Enquiry • Reasoning	• Investigate the types of material that are reflective and link it to uses (paint inside vs car paint etc.)	• Use a reflecting telescope to see the moon during the day
Pupils should be taught to recognise that light from the sun can be dangerous and that there are ways to protect their eyes	• Video showing the dangers of light for the eyes: link			• Looking at the sun with sunglasses on makes it safe.		• Reasoning • Enquiry • Social	• Using lenses to demonstrate how staring at the sun can cause damage to eyes.	• Will you be able to see a solar eclipse? Possible links to Hull Uni Astrology department
Pupils should be taught to recognise that shadows are formed when the light from a light source is blocked by a solid object	• How shadows are formed activity pack.			• The size of a shadow is the same as the object that casts it.		• Writing • Reading • Enquiry • Reasoning	• Brian Cox School experiments on shadows – some ideas for school adaptation.	• Maybe add a sundial to the school's garden?
Pupils should be taught to find patterns in the way that the size of shadows change.	• How shadows are formed activity pack.			• Patterns always have to be linear or based on size.		• Maths • Enquiry • Creative thinking	• Making shadow puppets	• Possible visit or assembly with a shadow theatre?
Forces and magnets Pupils should be taught to compare how things move on different surfaces.	• BBC Bitesize: Friction	• Can they observe that magnetic forces can be transmitted without direct contact? • Can they talk about how some magnets attract or repel each other? • Can they classify which materials are attracted to magnets? • Can they describe the speed and direction of moving objects? • Can they sort the same group of materials in different ways? • Can they sort materials by a number of different criteria? • Can they suggest materials which could be used for specific jobs? • Can they set up a simple test to explore the differences between materials? • Can they set up a test to explore whether or not materials are attracted to magnets? • Can they set up a test to explore whether or not a material will float or sink? • Can they compare the properties of materials in different situations e.g. floating in salty water, magnetism in water? • Can they describe what it means to reverse a change? • Can they describe which changes can be reversed? • Can they describe which changes cannot be reversed? • **Can they explain different ways that they can sort the same group of materials?** • **Can they sort materials by a number of different criteria and explain their reasons?** • **Can they explain why certain materials are used for specific jobs?** • **Can they investigate the strengths of different magnets and find fair ways to compare them?** • **Can they explain why an object will move faster if it is rolling down a hill or a slope?**	force push pull open surface magnet magnetic attract repel magnetic poles north south	• Friction is an unwanted force. • Force and energy are synonymous.	**Key Scientists** **Sir Isaac Newton –** developed the concept of gravity **Charles Augustin de Coulomb** – pioneered research into friction **Hans Christian Anderson –** A chemist who discovered the relationship between magnetism and electricity	• Enquiry • Reasoning	• Magnetic Fun and Games – Session 1 • Toy cars – experiment with cars moving over different surfaces.	• Bloodhound SSC makes rocket cars with Primary school students
Pupils should be taught to notice that some forces need contact between two objects, but magnetic forces can act at a distance	• BBC Bitesize: Friction • Magnet Simulation • Forces and Motion – range of lessons that can be adapted for Year 3 science.			• Big magnets are stronger than small magnets.		• Writing • Reading • Reasoning • Problem solving	• Magnetic Fun and Games – Session 3	• One Day is a paid workshop on forces and magnets.
Pupils should be taught to observe how magnets attract or repel each other and attract some materials and not others	• Forces and Magnets – Range of materials, lesson plans • Amazing Magnets – Session A			• All metals are magnetic		• Writing • Reading • Maths • Reasoning	• Magnetic Fun and Games – Session 3	• Link recycling programme to use of electromagnets to get high value metals from scrap.
Pupils should be taught to compare and group together a variety of everyday materials based on whether they are attracted to a magnet, and identify some magnetic materials	• Forces and Magnets – Range of materials, lesson plans			• All objects made of iron and steel are magnets. • Magnets are permanent and will not "lose" magnetism.		• Enquiry • Reasoning • Problem solving	• Magnetic Fun and Games – Session 4	• Link recycling programme to the fact the aluminium isn't magnetic.
Pupils should be taught to describe magnets as having two poles.	• Forces and Magnets – Range of materials, lesson plans • Amazing Magnets – Session A			• Poles of magnets are defined as the ends of magnets.		• Oracy • Enquiry • Reasoning • Creative thinking • Problem solving	• Magnetic Fun and Games – Session 5	• Arrange an online webinar with the British Antarctic Survey educational outreach programme.
Pupils should be taught to predict whether two magnets will attract or repel each other, depending on which poles are facing.	• Forces and Magnets – Range of materials, lesson plans • Amazing Magnets – Session B			• The North magnetic pole of the Earth is the same as Geographic North.		• Enquiry • Reasoning • Creative thinking • Problem solving	• Magnetic Fun and Games – Session 6	• Link with Northern Powerhouse Mag Lev proponents at TFTN.

Working scientifically

During Years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Asking relevant questions and using different types of scientific enquiries to answer them
- Setting up simple practical enquiries, comparative and fair tests
- Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- Identifying differences, similarities or changes related to simple scientific ideas and processes
- Using straightforward scientific evidence to answer questions or to support their findings.

- **Can they use different ideas and suggest how to find something out?**
- **Can they make and record a prediction before testing?**
- **Can they plan a fair test and explain why it was fair?**
- **Can they set up a simple fair test to make comparisons?**
- **Can they explain why they need to collect information to answer a question?**
- **Can they measure using different equipment and units of measure?**
- **Can they record their observations in different ways? (labelled diagrams, charts etc)**
- **Can they describe what they have found using scientific words?**
- **Can they make accurate measurements using standard units?**
- **Can they explain what they have found out and use their measurements to say whether it helps to answer their question?**
- **Can they use a range of equipment (including a data-logger) in a simple test?**

Year 4 Subject Content from the Programme of Study	Suggested Learning Activities	Knowledge Skills and Understanding	Vocabulary	Highlighted Misconceptions	Scientist	Links with other subjects	Opportunities for investigation or demonstration	Links to next key stages, projects, community programmes.
Animals, including humans. Pupils should be taught to describe the simple functions of the basic parts of the digestive system in humans.	• Digestive system series of activities and digestive diagrams. • Loop cards for modelling the human digestive system • Interactive simulation showing the different organs in the human body	• Can they identify and name the basic parts of the human digestive system? • Can they describe the function of the organs of the human digestive system? • Can they identify the simple function of different types of human teeth? • Can they compare the teeth of herbivores and carnivores? • Can they explain what a simple food chain shows? • Can they use a classification key to group a variety of living things? (plants, vertebrates, invertebrates) • Can they compare the classification of common plants and animals to living things found in other places? (under the sea, prehistoric) • Can they name and group a variety of living things based on feeding patterns? (producer, consumer, predator, prey, herbivore, carnivore, omnivore) • Do they recognise that environments can change and this can sometimes pose a danger to living things? • **Can they classify living things and non-living things by a number of characteristics that they have thought of?** • **Can they explain how people, weather and the environment can affect living things?** • **Can they explain how certain living things depend on one another to survive?** • **Can they give reasons for how they have classified animals and plants, using their characteristics and how they are suited to their environment?**	Human digestive system, mouth, oesophagus, small intestine, large intestine, transports, stomach, acid, enzymes, carnivore, herbivore, food chain, producers, prey, predators tongue mixes, moistens, saliva teeth incisors, canines, molars, floss, brush	• Digestion starts in the stomach. • Humans can't digest corn.	**Washington W Sheffield** – Toothpaste in a tube **Joseph Lister –** Discovered the first antiseptics	• Writing • Reading • Enquiry • Problem solving	• Making Poo!	• Link to Cystic Fibrosis Centre to raise awareness
Pupils should be taught to identify the different types of teeth in humans and their simple functions	• Simple diagrams and pictures of animal teeth • Animal teeth activity from the Online Dentist			• Humans are carnivores because we have canines. • Carnivores do not have molars. • Carnivores cannot ever eat vegetables.		• Writing • Reading • Maths • Oracy • Enquiry • Reasoning	• Teeth experiment – healthy drinks and tasty toothpaste	• Possible link to Scrimshaw at the Hull Maritime Museum
Pupils should be taught to construct and interpret a variety of food chains, identifying producers, predators, and prey	• Rabbit and Fox Chain game – group resource from OPAL • Web of Wildlife – range of resources for teaching food webs. • Dinner at the Reef – interactive game for making food webs			• Whilst teaching about food chains it may be confusing to say that energy is passed along food chains, as it is biomass (biological material). At each level most of the biomass is used by the animal as fuel, and some is used to build the cells of the animal. Food has to be respired (with oxygen) to transfer energy.		• Maths • Enquiry • Creative thinking • Fine motor skills	• Practical ideas for making food webs practical and interactive.	• IUCN Urban Ecosystems – could you assess the urban ecosystem around KPS?
Living things and their habitats Pupils should be taught to recognise that living things can be grouped in a variety of ways	• Use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. Identify how the habitat changes throughout the year. Explore possible ways of grouping a wide selection of living things that include animals, flowering plants and non-flowering plants. Children could begin to put vertebrate animals into groups, for example: fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.	• Can they sort living things into groups. • Can they generate questions about animals linked to their classification • Can they recognise similarities and differences between vertebrates. • Are they able to Identify vertebrate groups according to characteristics • Can they recognise, Identify and describe the characteristics of living things. • Can they suggest how to have a positive effect on the local environment. • Can they make careful observations and record them on a map • Can they identify some endangered species and describe their plight. • Can they develop their own criteria to use to sort living things. • Can they sort living things into a Venn diagram/Carroll diagram. • Can they use/answer questions to sort animals using a key. • Can they use a key to identify invertebrates by looking at their characteristics. • **Can they use the characteristics of living things to sort them using a classification key.** • **Can they show the characteristics of living things in a table.** • **Can they discuss ideas to create a classification key.** • **Can they explain, using evidence, how they have identified invertebrates.** • **Can they explain in more detail how changes to the environment have affected endangered species.**	***Following on from Year 2 Key words*** environment, flowering, non-flowering vertebrate/ invertebrate fish, amphibians, reptiles, birds, mammal snails, slugs, worms, spiders, insects **human impact** **positive** – nature reserves, ecologically planned parks, garden pond **negative** – population, development, litter, deforestation	• All ocean creatures are 'fish', e.g. whales, dolphins. • All fishes lay eggs. Some fishes give birth to live young, e.g. guppy, molly, swordtail, most types of sharks • Spiders are insects; any tiny creepy crawlie is an insect. Spiders are not insects. They are arachnids, belonging to the same group as scorpions. They have four pairs of legs and two body segments. Insects have three pairs of legs and three body segments. • Only large land mammals are animals. There are many different types of animals such as worms, spiders, sea anemone and corals.	**Jacques Cousteau –** Marine Biology	• Writing • Reading • Maths • Enquiry • ICT • Problem solving	Classification using sea life centre Name that living thing Session 1 Local living things - what are they? Session 2 How are living things classified? Session 3 Closer inspection Session 4 Enormous insects Session 5 I'm thinking of a living thing. Session 6	Foundation to Year 5 & 6 Living things and their habitats.
Pupils should be taught to explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment	• Work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; local living things. Classification • Newly discovered species							
Pupils should be taught to recognise that environments can change and that this can sometimes pose dangers to living things	• Explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. Learn about endangered and threatened species.							
States of matter Pupils should be taught to compare and group materials together, according to whether they are solids, liquids, or gases.	• Solids, Liquids and Gases – comprehensive activity ideas. • PhET Colorado – Solids, Liquids, Gases simulation	• Can they compare and group materials based on their states of matter, ie, liquid, solid or gas? • Can they explain what happens to materials when they are heated or cooled? • Can they measure the temperature at which different materials change state? • Can they use measurements to explain changes to the state of water? • Can they explain the part that evaporation and condensation has in the water cycle? • **Can they group and classify a variety of materials according to the impact of temperature on them?** • **Can they explain what happens over time to materials such as puddles on the playground or washing hanging on a line?** • **Can they relate temperature to change of state of materials?**	**Solid** iron, ice, melt, freeze, liquid, evaporate, condense, gas, container **changing state** heated, heat, cooled, cool, degrees Celsius, thermometer water cycle evaporate, evaporation, condense, condensation, temperature, melting, melt, ice, warm, cool, water vapour	• Gases are not matter because most are invisible. • Gases do not have mass. • Small objects like sand and rice take the shape of containers, therefore they are not solids. • Solids are hard, strong, and non-malleable. • All gases can explode and burn (or smell). • Air and oxygen are the same gas.	**Joseph Priestly** – gases **Lord Kelvin –** Discovered absolute zero (temperature)	• Writing • Reading • Social	• Class demonstration on solids being made of smaller solids to avoid misconception.	• Solid, Liquid, Gas classifying party for the Principal? TAs? Janitor? Solid – sweets, cake, liquid juice, etc., gas, balloons, jelly – hard to classify etc.
Pupils should be taught to observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)	• Solids, Liquids and Gases – comprehensive activity ideas. • Change of state activities and activity sheets.			• Melting/freezing and boiling/condensation are often understood only in terms of water. • Particles are viewed as mini-versions of the substances they comprise.		• Writing • Reading • Maths • Enquiry • ICT	• Melting chocolate – investigation into the effect of heat being added to a solid.	• Community project about melting ice in Antarctica. UNESCO and CCC
Pupils should be taught to identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	• Solids, Liquids and Gases – comprehensive activity ideas. • The Water Cycle – showing and demonstrating the evaporation and condensation of water			• Clouds have no mass. • Evaporation only happens at 100°C. • The bubbles in boiling water contain "air", "oxygen" or "nothing", rather than water vapour.		• Enquiry • Fine motor skills • Reasoning	• Cloud in a bottle – showing the change of state isn't just to do with heat (challenge extension) • Investigation looking at different liquids evaporating at different temperatures.	• Develop a water conservation programme – make a rain butt for a class garden?
Sound Pupils should be taught to identify how sounds are made, associating some of them with something vibrating.	• Diagnostic activity involving a carousel of activities and how sound is made.	• Can they describe a range of sounds and explain how they are made? • Can they compare sources of sound and explain how the sounds differ? • Can they explain how to change a sound (louder/softer)? • Can they describe and explain how a sound travels from a source to our ears? • Can they explain what happens to sound as it travels away from its source? • Can they explain how you could change the pitch of a sound? • Can they investigate how different materials can affect the pitch and volume of sounds? • **Can they explain why sound gets fainter or louder according to the distance?** • **Can they explain how pitch and volume can be changed in a variety of ways?** • **Can they work out which materials give the best insulation for sound?**	pitch, volume, vibrate, vibration, faint, loud, quiet, sound, travel, tension, sound, ear, hear, tuning	• Sound is a type of energy. • As waves move, matter moves along with them.	**Alexander Graham Bell -** invented the telephone	• Oracy • Enquiry • Social	• Sounds like science- range of activities to demonstrate the cause of sound.	• Possible access to Music Service for Schools
Pupils should be taught to recognise that vibrations from sounds travel through a medium to the ear	• Various activities, ideas, simulations from the Physics Classroom.			• Sound moves faster in air than in solids (air is "thinner" and forms less of a barrier). • Sound moves between particles of matter (in empty space) rather than matter		• Maths • Oracy • Enquiry • Reasoning	• Sounds like science- range of activities to demonstrate the cause of sound.	• Sounds of planets if we could hear them – good discussion for why there is no sound in space
Pupils should be taught to find patterns between the pitch of a sound and features of the object that produced it	• Slides 16-19 showing different sizes etc. making different sounds. • Sound and Music – range of activities for supporting science teaching.			• The pitch of whistles or sirens on moving vehicles is changed by the driver as the vehicle passes. • The pitch of a tuning fork will change as it "slows down", (i.e. "runs" out of energy)		• Writing • Maths • Oracy • Enquiry	• Sound circus – investigation overview • Sounds like science- range of activities to demonstrate the cause of sound.	• By making a range of instruments, students can explore both music and how music works.
Pupils should be taught to find patterns between the volume of a sound and the strength of the vibrations that produced it	• Sound and Music – range of activities for supporting science teaching.			• Loud sounds are made by more vibrations		• Maths • Oracy • Enquiry	• Sound circus – investigation overview • Sounds like science- range of activities demonstrating sound.	• Using a range of instruments, students can explore how music works
Pupils should be taught to recognise that sounds get fainter as the distance from the sound source increases.	• Sound and Music – range of activities for supporting science teaching.			• Sound has only one direction.		• Enquiry • Reasoning	• Sounds like science- range of activities demonstrating sound.	• Using a range of instruments,
Electricity Pupils should be taught to identify common appliances that run on electricity.	• Things that use electricity – dated video, but the one I use. Discussion prompt	• Can they explain how electricity is useful to us? • Can they construct a simple circuit? • Can they explain what a conductor is and test materials for conductivity? • Can they explain closed and open circuits? • Can they construct a circuit with a switch? • Can they recognise some common conductors and insulators?	appliances, electricity, electrical circuit, cell, wire, bulb, buzzer, danger, electrical safety, sign, switch, open, close	• Batteries have electricity inside them	**Michael Faraday** – Discovered the relationship between magnets and electricity	• Reasoning • Enquiry • Social	• Recreate the video in the classroom for discussion.	• Possible link with reuse / repair register.
Pupils should be taught to construct a simple series electrical circuit, identifying, and naming its basic parts, including cells, wires, bulbs, switches, and buzzers	• Wide range of activities covering the Y4 electricity topic. • PIPS – robots and electric eels – simple PPT			• Electricity is a physical thing • Electricity moves through wires.		• Writing • Reading • Enquiry	• The apprentice electrician: variety of tasks for earning a certificate from Teacher's TV.	• Career link to electricians – parents, carers, past pupils?

	with good teacher's notes.	• **Can they explain how a bulb might get dimmer?** • **Can they recognise if all metals are conductors of electricity?** • **Can they work out which metals can be used to connect across a gap in a circuit?**				• Reasoning		
Pupils should be taught to 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	• Wide range of activities covering the Y4 electricity topic. • PhET Colorado – DC circuit kit.		insulators wood, rubber, plastic, glass	• "Electricity" flows out of wires when the circuit is open.	**Maria Telkes** was a famous scientist who made a lot of discoveries around solar power	• Maths • Enquiry • Creative thinking	• Discussion and interactive questioning using the PhET Colorado – DC circuit kit.	• Design a school room for a pupil with sensory needs.
Pupils should be taught to recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit	• Wide range of activities covering the Y4 electricity topic. • PhET Colorado – DC circuit kit.			• Switches are only the things that are on the wall for lights.		• Enquiry • Reasoning	• The apprentice electrician: variety of tasks for earning a certificate from Teacher's TV.	• Learn Morse code send messages using lamps.
Pupils should be taught to recognise some common conductors and insulators, and associate metals with being good conductors.	• Wide range of activities covering the Y4 electricity topic. • PIPS – robots and electric eels – simple PPT with good teacher's notes. • PhET Colorado – DC circuit kit.		conductors metal, wate	• Insulators do not conduct heat or electricity at all.		• Writing • Reading • Reasoning • Problem solving	• The apprentice electrician: variety of tasks for earning a certificate from Teacher's TV.	• Do an energy insulation audit of the school – are we being eco friendly?

Working scientifically During Years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • Asking relevant questions and using different types of scientific enquiries to answer them • Setting up simple practical enquiries, comparative and fair tests • Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions • Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions • Identifying differences, similarities or changes related to simple scientific ideas and processes • Using straightforward scientific evidence to answer questions or to support their findings.	• **Can they use different ideas and suggest how to find something out?** • **Can they make and record a prediction before testing?** • **Can they plan a fair test and explain why it was fair?** • **Can they set up a simple fair test to make comparisons?** • **Can they explain why they need to collect information to answer a question?** • **Can they measure using different equipment and units of measure?** • **Can they record their observations in different ways? (labelled diagrams, charts etc)** • **Can they describe what they have found using scientific words?** • **Can they make accurate measurements using standard units?** • **Can they explain what they have found out and use their measurements to say whether it helps to answer their question?** • **Can they use a range of equipment (including a data-logger) in a simple test?**

Year 5 Subject Content from the Programme of Study	Suggested Learning Activities	Knowledge Skills and Understanding	Vocabulary	Highlighted Misconceptions	Scientists	Links with other subjects	Opportunities for investigation or demonstration	Links to next key stages, projects, community programs.
Living thing and their habitats Pupils should be taught to describe the differences in the life cycles of a mammal, an amphibian, an insect, and a bird.	• Life cycles in different animals in pictures • Life cycle wheel template	• Can they describe and compare the life cycles of a range of animals, including humans, amphibians, insects and birds? • Can they describe the life cycles of common plants? • Can they describe and explain the process of respiration in humans and plants? • Can they talk with knowledge about birth, reproduction and death of familiar animals or plants? • Can they explore the work of well know naturalists? (David Attenborough and Jane Goodall) • **Can they observe their local environment and draw conclusions about life-cycles? (for example, the vegetable garden or plants in a shrubbery)** • **Can they compare the life cycles of plants and animals in their local environment with the life cycles of those around the world, e.g. rainforests?**	life cycles mammal, amphibian, insect, bird, reproduction plants – sexual, asexual animals - sexual life cycles around the world rainforest, oceans, desert, prehistoric, similarities, differences	• Babies are conceived in the stomach. • Mating and reproduction are the same thing.	**Eva Crane –** reproduction in bees **naturalist David Attenborough** animal behaviourist **Jane Goodall.**	• Writing • Reading • Enquiry • Problem solving	• Raise butterflies	• Possible visit by Pets at Home / RSPCA / Local Pet Store to show various animals
Pupils should be taught to describe the life process of reproduction in some plants and animals.	• Reproduction and Life Cycles (Part 2 with dissection in part 1) • Hamilton Trust – series of lessons with excellent resources and visual aids.			• In human reproduction, a miniature baby is folded up inside the sperm or the egg and the other gamete (reproductive cell) triggers its development. • Plants do not or cannot reproduce sexually.		• Writing • Reading • Maths • Oracy • Enquiry • Reasoning	• Flower dissection – ste3p up from dissections in year 3 and year 4.	• Darwin's Lookouts
Animals, including humans. Pupils should be taught to describe the changes as humans develop to old age.	• Exploring life from gestation to old age • Human Species Linking animals including humans to puberty – giving scientific background to SRE	• Can they create a timeline to indicate stages of growth in humans? • Can they explain what puberty is? • **Can they create a timeline to indicate stages of growth in certain animals, such as frogs and butterflies?**	human development, baby – toddler- child- teenager – adult puberty gestation, length, mass, grows, grow, growing	• Height doesn't change as you age.	**Louis Pasteur** – Discovered vaccination **Alexander Flemming** – Discovered penicillin	• Maths • Enquiry • Creative thinking • Fine motor skills	• Make a family siblings, parents and grandparents collage to show how people change. • Ask for pupils to bring in "then and now" photos of grandparents.	• Possible links with AGEUK or visit / playdate with local retirement community.
Forces 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.	• May the forces be with you: A series of lesson plans about forces • Forces and gravity – including the video from the RSC anti-gravity bottle.	• Can they explain what gravity is and its impact on our lives? • Can they explain why a wheeled object that is initially pushed will slow down and stop? • Can they explain the impact of friction on a moving object? • Can they explain the effect of drag force on moving objects? • Can they explain how force and motion can be transferred through gears, pulleys, levers and springs? • **Can they describe and explain how motion is affected by forces? (including gravitational attractions, magnetic attraction and friction)** • **Can they design very effective parachutes?** • **Can they work out how water can cause resistance to floating objects**?	magnetism (Y3) electricity (Y4) conductivity, insulation, chemists, chemical properties hardness, solubility, transparency, conductive dissolve liquid, solution, separate, separating solids, liquids, gases filtering, sieving, evaporating reversible changes dissolving, mixing, evaporation, filtering, sieving, melting irreversible new material, burning, rusting	• Weight is the same as mass. • Gravity is the same everywhere.	Famous Scientist – **Spencer Silver** – glue for sticky notes **Ruth Benerito** – wrinkle free cotton **Jamie Garcia** (look on BP website) – Invention of a new plastic **Sir Humphrey Davy –** separating gases	• Writing • Reading • Social	• Classic Egg Drop experiment demonstrating and the Eggnaut	• Fun day to Gravity Trampoline parks
Pupils should be taught to identify the effects of air resistance, water resistance and friction, that act between moving surfaces	• May the forces be with you: A series of lesson plans about forces			• Friction always hinders motion. Thus, you always want to eliminate friction. • Frictional forces are due to irregularities in surfaces moving past each other		• Writing • Reading • Maths • Enquiry • ICT	• Make a Balloon Buggy showing the effects of forces.	• Keep an eye out for events like this link – talk to an astronaut and learn about gravity in space
Pupils should be taught to recognise that some mechanisms, including levers, pulleys, and gears, allow a smaller force to have a greater effect.	• May the forces be with you: A series of lesson plans about forces			• The best place to put the fulcrum is in the centre of a lever.		• Enquiry • Fine motor skills • Reasoning	• Become a designer of Machines: D&T project with forces applications. • Investigating levers: learning a lever is a simple machine.	• Learning to Ride with First Step Cycle – link to gears and ratios.
Properties and changes of materials Pupils should be taught to compare and group together everyday materials based on their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets	• Grouping and classifying materials resource with teacher notes and activities. • Range of activities and worksheets	• Can they test and group materials based on scientific evidence? (hardness, solubility, transparency, conductivity, insulation, magnetism) • Can they explain the process of dissolving? • Can they recover a substance from a solution? • Can they decide how a mixture would best be separated? (filtering, sieving, evaporating) • Can they give reasons for the uses of everyday materials based on scientific evidence? • Can they show what they know about the properties of different materials? • Can they use their knowledge of materials to suggest ways to classify? (solids, liquids, gasses) • Can they describe changes using scientific words? (evaporation, condensation) • Can they use the terms 'reversible' and 'irreversible' • **Can they describe methods for separating mixtures? (filtration, distillation)** • **Can they work out which materials are most effective for keeping us warm or for keeping something cold?**	magnetic attraction, gravitational attraction, gravity , direction, force, motion, weight, friction, upthrust, newton, forcemeter, stationary, reliability, force applied, surface area	• Failure to perceive that individual substances and properties correspond to certain types of particles	**Galileo –** gravity Re-cap **Isaac Newton**	• Oracy • Enquiry • Social	• Circus activity for separating materials for stations of each property of materials.	• Possible career visit by materials engineer or parent / carer in construction industry.
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	• Dissolving, teacher notes and animations. • Teacher notes and critical teaching ideas			• Dissolved substances disappear in liquids.		• Maths • Oracy • Enquiry • Reasoning	• Growing Crystals: showing that dissolved substances can come back out of solution.	• Possible visit to Saltend Wastewater Treatment Work
Pupils should be taught to use knowledge of solids, liquids, and gases to decide how mixtures might be separated, including through filtering, sieving, and evaporating	• Range of activities and worksheets • Separating materials activities, keywords and worksheets.			• Measuring jugs are used in science.		• Writing • Maths • Oracy • Enquiry	• RSC resource on separating materials. • Separating materials demonstrations.	• Teaching water management through taking care of a freshwater fish tanks.
Pupils should be taught to give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood, and plastic	• Range of activities and worksheets • Mission Starlight Activities from the RSC			• Fair test is a descriptor used in science.		• Maths • Oracy • Enquiry	• Mission Starlight Activities from the RSC including comparative testing activities.	• Possible project involving Upcycling and Reusing with Emmaus as supporters.
Pupils should be taught to demonstrate that dissolving, mixing and changes of state are reversible changes	• Range of activities and worksheets • Nice range of pictures for slotting into lessons.			• Dissolving substances is a chemical reaction. • Chemical reactions always have colour changes.		• Enquiry • Reasoning	• Dissolving salt in hot water until saturation allowing to cool then evaporating all water – demo.	• Make ice cream in a bag and sell to raise funds for supporting projects: garden, fish, etc.
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.	• Range of activities and worksheets • Nice range of pictures for slotting into lessons.			• Burning materials makes matter disappear. • Burning rubbish or radioactive materials makes it disappear. • Only black smoke is dangerous.		• Reasoning • Enquiry • Social	• Irreversible changes: focusing on rusting and introducing the terminology.	• Bread making competition based on the irreversible reaction of cooking.
Earth and space Pupils should be taught to describe the movement of the Earth, and other planets, relative to the Sun in the solar system.	• Our solar system: group research project and presentation by the ESA.	• Can they identify and explain the movement of the Earth relative to the sun? • Can they explain how seasons and the associated weather is created? • Can they identify and explain the movement of the moon relative to the Earth? • Can they explain the size, shape and position of the earth, sun and moon? • Can they explain how night and day are created and use diagrams to show this? • Can they explain how planets are linked to stars? • **Can they compare the time of day at different places on the earth?** • **Can they create shadow clocks?** • **Can they begin to understand how older civilizations used the sun to create astronomical clocks?** • **Can they explore the work of some space pioneers? (Galileo, Copernicus, Neil Armstrong)**	Solar system astronomy Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune, Pluto, moon, meteorite, comet, sun orbit clockwise anti-clockwise rotate shadow sundial	• The sun moves around the Earth. • Stars and constellations appear in the same place in the sky every night. • The Sun is not a star. • The Sun disappears at night. • The Sun will never burn out.	Scientist – **Ptolemy & Copernicus** – Heliocentric vs geocentric **Stephen Hawking –** Black holes	• Writing • Reading • Enquiry • Reasoning	• A series of space projects and lesson ideas funded by the UK Space Agency and developed by ESERO-UK and CIEC Promoting Science	• Hull and East Riding Astronomical Society –Go Stargazing link.
Pupils should be taught to describe the movement of the Moon relative to the Earth	• Presentation explaining the movement of the moon relative to the Earth and dealing with misconceptions.			• The moon can only be seen during the night. • The moon does not rotate on its axis as it revolves around the earth. • The phases of the moon are caused by the moon moving into the sun's shadow.		• Maths • Enquiry • Creative thinking	• Daytime Moon Viewing: creating a moon diary and viewing the moon during the day	• Art project looking at the impact of the moon. Moon in mythology project.
Pupils should be taught to describe the Sun, Earth, and Moon as approximately spherical bodies	• Close up of the Moon and moon facts.			• There is some doubt that the Earth is not flat.		• Enquiry • Reasoning	• View the moon through a telescope during the day	• This is risky, but possible opportunity to reinforce the Earth is not flat.
Pupils should be taught to use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.	• Day and Night real time map (map and satellite image)			• The Earth is not spinning at 460m/s and moving through space at 30km/s because we can't feel it.		• Writing • Reading • Reasoning • Problem solving	• Proving the Heliocentric model of the Solar System	• Make your own sundial for timing break times or as a timer for in class activities.

Working scientifically

During Years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Using test results to make predictions to set up further comparative and fair tests
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations
- Identifying scientific evidence that has been used to support or refute ideas or arguments.

- **Can they plan and carry out an investigation by controlling variables fairly and accurately?**
- **Can they make a prediction with reasons?**
- **Can they use test results to make further predictions and set up further comparative tests?**
- **Can they present a report of their findings through writing, display and presentation?**
- **Can they take measurements using a range of scientific equipment with increasing accuracy and precision?**
- **Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models?**
- **Can they report findings from investigations through written explanations and conclusions?**
- **Can they use a graph to answer scientific questions?**
- **Can they explore different ways to test an idea and choose the best way, and give reasons?**
- **Can they vary one factor whilst keeping the others the same in an experiment?**
- **Can they use information to help make a prediction?**

	• **Can they explain (in simple terms) a scientific idea and what evidence supports it?** • **Can they decide which units of measurement they need to use?** • **Can they explain why a measurement needs to be repeated?** • **Can they find a pattern from their data and explain what it shows?** • **Can they link what they have found out to other science**

Year 6 Subject Content from the Programme of Study	Suggested Learning Activities	Knowledge Skills and Understanding	Vocabulary	Highlighted Misconceptions	Scientists	Links with other subjects	Opportunities for investigation or demonstration	Links to next key stages, projects, community programs.
Living things and their habitats 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.	• Starters for Science: vocab sheets for all of Y6 Topics. • Linnean Learning: bumper pack of classification activities and famous scientists information pack.	• Can they explain the classification of living things into broad groups based on common observable characteristics? (five kingdoms of all living things, vertebrates, mammals, marsupials) • Can they sub divide their original groupings and explain their divisions? • Can they group animals into vertebrates and invertebrates? • **Can they explain why classification is important?** • **Can they readily group animals into reptiles, fish, amphibians, birds and mammals?**	invertebrates insects, spiders, snails, worms vertebrates fish, amphibians, reptiles, birds and mammals	• -Viruses are micro-organisms • -All bacteria are bad. • -All micro-organisms are germs. • Micro-organisms are the same as germs. •	**Carl linnaeus** – classification **Libby Hyman** – classification	• Writing • Reading • Enquiry • Problem solving	• Air Quality Survey – Lichen and air pollution.	• Develop a project to teach Y5s about the importance of classification.
Pupils should be taught to give reasons for classifying plants and animals based on specific characteristics.	• Random animal generator: get the learners to classify some random animals. • Try the Explore Live-cams to classify animals in their natural habitat live.		Microbes, mico-organisms, plants, animals. classification,	• Plants look the same at all points of the life-cycle.		• Writing • Reading • Maths • Oracy • Enquiry • Reasoning	• Bugs Count – invertebrate hunting and identification	• Set up a wildlife camera to pick up any night-time visitors to the school, hedgehog, fox etc. then classify them.
Animals, including humans. 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	• Interactive simulation and scheme of work including the circulatory system • A full body anatomy sim • Series of lessons about the human body.	• Can they identify and explain the function of the organs of the human circulatory system? (heart, blood vessels, blood, blood pressure, clotting) • Can they identify and explain the function of the organs of the human gaseous exchange system? (lungs, nose, throat, bronchi, bronchial tubes, diaphragm, ribs, breathing) • Can they name the major organs in the human body? • Can they locate the major human organs? • Can they make a diagram that outlines the main parts of a body? • **Can they explore the work of medical pioneers, for example, William Harvey and Galen and recognise how much we have learned about our bodies?** • **Can they compare the organ systems of humans to other animals?** • **Can they make a diagram of the human body and explain how different parts work and depend on one another?**	**Human internal organs** heart, lungs, liver, kidney, brain, skeletal, skeleton, muscle, muscular, digest, digestion, digestive **Human circulatory system** blood vessels diet, lifestyle, exercise, drugs, nutrients, water	• Deoxygenated blood is blue. • We breathe in oxygen only and breathe our carbon dioxide only. • Respiration is the same as breathing. • The heart is on the left-hand side of the chest.	**Claudius Galen** – Anatomy **Rosalind Franklin** – DNA **Leonardo Da Vinci –** Anatomy discoveries	• Maths • Enquiry • Creative thinking • Fine motor skills	• Heart Beaters Experiment on heart rate and recovery rate.	• Buy a morph suit and draw on the circulatory system with sharpie paint pens – add labels as a lesson for younger year groups.
Pupils should be taught to recognise the impact of diet, exercise, drugs, and lifestyle on the way their body's function	• Snack Bar: fictional debate about a bar being suitable or not for healthy eaters – including lesson plan.			• People who are skinny are always healthier.		• Writing • Reading • Social	• What affects your heart rate? Looking at a healthy heart.	• Create pupil leaders in Y6 as healthy eating ambassadors.
Pupils should be taught to describe the ways in which nutrients and water are transported within animals, including humans.	• The Circulation Game: circulation of the human body including lesson plans and a diagram to fill in.			• Camels store water in their humps.		• Writing • Reading • Maths • Enquiry • ICT	• D&T Making a working model of the circulatory system.	• Virtual primary outreach about water conservation etc. • Eco-schools – using math to calculate the amount of water used.
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	• Wellcome Trust: collection of resources for teaching Evolution. • Human Evolution in pictures.	• Can they give reasons for why living things produce offspring of the same kind? • Can they give reasons for why offspring are not identical with each other or with their parents? • Can they explain the process of evolution and describe the evidence for this? • Can they begin to appreciate that variation in offspring over time can make animals more or less able to survive in particular environments? • Can they talk about the life of Charles Darwin? • **Can they explain how some living things adapt to survive in extreme conditions?** • **Can they analyse the advantages and disadvantages of specific adaptations, such as being on two rather than four feet?** • **Can they begin to understand what is meant by DNA?**	evolution natural selection extinct fossils sedimentary palaeontologist environment habitat adaptation maladaptation animal appearance diet defence predator prey protection habitat	• Fossils are preserved bones. • Humans killed the dinosaurs. • Dinosaurs didn't exist and were invented for money.	**Charles Darwin and Alfred Wallace** – Evolution **Mary Anning** - palaeontologist	• Enquiry • Fine motor skills • Reasoning	• Making fossils making layers of rocks.	• Find some fossils in the East Riding
Pupils should be taught to recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents	• Wellcome Trust: collection of resources for teaching Evolution.			• Babies are copies of parents. • Identical twins are the same in every way.		• Oracy • Enquiry • Social	• Collage of parents and learners if appropriate to show similarities and differences.	• Possible link with a mobile farm to investigate differences between parents and offspring.
Pupils should be taught to identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.	• Wellcome Trust: collection of resources for teaching Evolution. • Darwin's Finches: adaptation worksheet.			• Humans evolved from monkeys. • Evolution is a "theory", so may not be right. • Evolution is a Goal orientated process.		• Maths • Oracy • Enquiry • Reasoning	• Hunting Banded Snails – researching adaptation and making surveys. • Seeds and Fruits: adaptation in bird's beaks.	• Opportunity to educate about the impact of climate change on animals that have specialised in particular habitats.
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	• PhET Colorado – DC circuit kit. • Extensive list of electricity resources	• Can they identify and name the basic parts of a simple electric series circuit? (cells, wires, bulbs, switches, buzzers) • Can they compare and give reasons for variation in how components function, including bulb brightness, buzzer volume and on/off position of switches? • Can they explain how to make changes in a circuit? • Can they explain the impact of changes in a circuit? • Can they explain the effect of changing the voltage of a battery? • **Can they make their own traffic light system or something similar?** • **Can they explain the danger of short circuits?** • **Can they explain what a fuse is?**	voltage, brightness, volume, switches, danger, series circuit, diagram, bulb, buzzer, motor, symbols,	• Electric current is 'used up' by an electric bulb in a circuit, so there is less current 'going back' to the battery in the wire after the electric bulb in a series circuit.	**Nikola Telsa** – Founder of AC electric system	• Writing • Maths • Oracy • Enquiry	• Fruit Batteries: using fruits and different metals to light an LED.	• Build a paper speaker (and this) and hold a concert!
Pupils should be taught to 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	• PhET Colorado – DC circuit kit. • Electricity components from OS			• Components "use" electricity to make things happen.		• Maths • Oracy • Enquiry	• Super Sucker: designing a machine to clean up litter applying circuits.	• Project on the adaptations in Chernobyl area after the nuclear reactor explosion.
Pupils should be taught to use recognised symbols when representing a simple circuit in a diagram.	• PhET Colorado – DC circuit kit. • Drawing circuits that can be made.			• Drawing means a lifelike picture not a diagrammatic representation.		• Enquiry • Reasoning	• Making circuits that have been drawn.	• Make circuit type symbols for other subjects (dual coding for memory) symbols for major events, people etc.
Light Pupils should be taught to recognise that light appears to travel in straight lines	• Modelling light with ribbons, torches and teddies.	• Can they explain how light travels? • Can they explain how the human eye sees objects? • Can they explain how different colours of light can be created? • Can they use and explain how simple optical instruments work? (periscope, telescope, binoculars, mirror, magnifying glass, Newton's first reflecting telescope) • Can they explain changes linked to light (and sound)? • **Can they use the ray model to explain the size of shadows?**	light, travels, straight, light source, object, shadows, rainbow, filters, mirror, reflect, reflection, periscope	• A white light source produces light made up of only one colour. • Sunlight is different from other sources of light because it contains no colour	**Thomas Edison** – Invented electric light bulbs **DR Patricia Bath** (look on BP website) - invented the Laserphaco Probe for the treatment of cataracts	• Reasoning • Enquiry • Social	• 2 experiments to prove light travels in straight lines. • 3 ways to prove light travels in a straight path.	• A link like this to a laser lab or company.
Pupils should be taught to 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	• A series of resources teaching about light, reflection and vision			• Light from a bulb only extends outward a certain distance, and then stops. How far it extends depends on the brightness of the bulb.		• Writing • Reading • Enquiry • Reasoning	• Learn to write like DaVinci in a mirror. • Some fun activities with mirrors	• Make a reflective telescope (D&T project challenge)
Pupils should be taught to explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes	• A series of resources teaching about light, reflection and vision			• Light from a bulb only extends outward a certain distance, and then stops. How far it extends depends on the brightness of the bulb.		• Maths • Enquiry • Creative thinking	• Making a periscope to demonstrate that light travels in straight lines and is reflected.	• Try painting with Blk3.0 and learn about Semple vs Kapoor.
Pupils should be taught to use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	• Crime Lab investigation: shadows and colours explored with a possible practical activity.			• Lines drawn outward from a light bulb represent the "glow" surrounding the bulb. • Light pushes the shadow away from the object to the wall or the ground and is thought of as a "dark " reflection of the object.		• Enquiry • Reasoning	• Making Shadows through investigation and prediction.	• Put on a science shadow show for Y1 pupils.

Working scientifically

During Years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- **Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.**
- **Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate**
- **Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs**
- **Using test results to make predictions to set up further comparative and fair tests.**
- **Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.**
- **Identifying scientific evidence that has been used to support or refute ideas or arguments.**

•Can they explore different ways to test an idea and choose the best way, and give reasons?
•Can they vary one factor whilst keeping the others the same in an experiment? Can they explain why they do this?
•Can they plan and carry out an investigation by controlling variables fairly and accurately?
•Can they make a prediction with reasons?
•Can they use information to help make a prediction?
•Can they use test results to make further predictions and set up further comparative tests?
•Can they explain (in simple terms) a scientific idea and what evidence supports it?
•Can they present a report of their findings through writing, display and presentation?
•Can they explain why they have chosen specific equipment? (incl ICT based equipment)
•Can they decide which units of measurement they need to use?
•Can they explain why a measurement needs to be repeated?
•Can they record their measurements in different ways? (incl bar charts, tables and line graphs)
•Can they take measurements using a range of scientific equipment with increasing accuracy and precision?
•Can they find a pattern from their data and explain what it shows?
•Can they use a graph to answer scientific questions?
•Can they link what they have found out to other science?

•Can they suggest how to improve their work and say why they think this?
•Can they record more complex data and results using scientific diagrams, classification keys, tables, bar charts, line graphs and models?
•Can they report findings from investigations through written explanations and conclusions?
•Can they choose the best way to answer a question?
•Can they use information from different sources to answer a question and plan an investigation?
•Can they make a prediction which links with other scientific knowledge?
•Can they identify the key factors when planning a fair test?
•Can they explain how a scientist has used their scientific understanding plus good ideas to have a breakthrough?
•Can they plan in advance which equipment they will need and use it well?
•Can they make precise measurements?
•Can they collect information in different ways?
•Can they record their measurements and observations systematically?
•Can they explain qualitative and quantitative data?
•Can they draw conclusions from their work?
•Can they link their conclusions to other scientific knowledge?
•Can they explain how they could improve their way of working?