

Stanley Grove Primary and Nursery School

Scheme of work for Science



We are trusted with Parents' most precious possessions...
... treasure them.

What our children say about Science.

- It's fun! It's great! (Year 1).
- We do lots of experiments, it's great! (Year 3).
- Science is fun and helps us to learn new things (Year 4).
- I really like working as a group. You have to communicate with each other. It can be difficult and I like a challenge (Year 5).

Essentials for this subject (Intent):

- To know and apply qualities of a good Scientist especially with regards to teamwork and perseverance.
- To provide a well-planned Science curriculum rooted in practical investigations which enables pupils to be curious, explore and propose explanations to questions about the world around us. Pupils should be competent in asking questions, planning, recording, taking accurate measurements and drawing conclusions, using appropriate scientific knowledge.
- To promote a love of Science and to raise the profile of Science in school. To explore and investigate how inspirational Science is and how it has and is being used in real life situations and to be able to give examples of this. To know and learn about both male and female inspirational Scientists from history and have the opportunity to work alongside real life modern day Scientists e.g. STEM ambassadors.

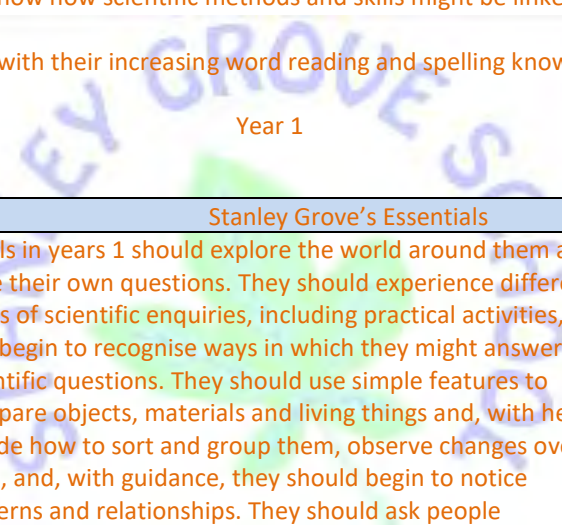
Science

\key Stage 1

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

'Working scientifically' is described separately in the programme of study, but must **always** be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.



Year 1

Statutory requirements (National curriculum)	Stanley Grove's Essentials	Suggested activities
<p style="text-align: center;"><u>WORKING SCIENTIFICALLY</u></p> <ul style="list-style-type: none"> • asking simple questions and recognising that they can be answered in different ways • observing closely by eye and beginning to use simple equipment • performing simple tests (with guidance) • identifying and classifying (with guidance). • using their observations and ideas to suggest answers to questions (with guidance). • gathering and recording data to help in answering questions. (Tally given and simple chart completed with guidance). • Orally use Scientific language with HA children using it in written methods. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><u>Key vocabulary:</u></p> <p>Question, Equipment, Identify, Group, Record, Compare, Contrast, Observe, Describe, Same, Different, Changes</p> </div>	<p>Pupils in years 1 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.</p>	<p>Use format for Science practical write up if necessary for HA children.</p>

PLANTS

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- Identify and describe the basic structure of a variety of common flowering plants, including trees.
- Y1 Tree focus to study in ODL: Horse Chestnut and Oak

Key vocabulary:

Wild plants, Garden plants, Deciduous, Evergreen, Root, Leaves, Bud, Blossoms, Stem, Petals, Trunk, Branches, Horse Chestnut, Oak

Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted. They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).

Pupils might work scientifically by: observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Pupils might keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.

Study Horse Chestnut and Oak trees changing throughout the seasons, look at their fruit, leaves, mythology surrounding them and historical medicinal properties.

- Visit and explore the Wildlife area, allotments and polytunnel within the school grounds.
- Environment leaders to lead gardening for class 'welly to belly' projects.

ANIMALS INCLUDING HUMANS.

- identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- identify and name a variety of common animals that are carnivores, herbivores and omnivores
- describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)

Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat. They should understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils should become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.

Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.

Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to what they eat; and using their senses to compare different textures, sounds and smells.

- Trip to Tropical World in Leeds, Butterfly House in Sheffield or other localities such as Fairburn Ings Nature Reserve.
- Blindfold activities – use senses for smells, tastes, touch.
- Consider a visit from a local farmer, vet or beekeeper.

- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Key vocabulary:

fish, amphibians, reptiles, birds and mammals, Senses – touch, smell, vision, taste, hearing. Omnivores – meat and plants (examples badger, human, bear, chicken). Carnovores – meat eating (examples, dog, cat, lion, tiger, snake). Herbivores – plant eating (examples, cows, horses, mice).

EVERYDAY MATERIALS.

- distinguish between an object and the material from which it is made
- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock
- describe the simple physical properties of a variety of everyday materials
- compare and group together a variety of everyday materials on the basis of their simple physical properties.

Key vocabulary:

Wood, Plastic, Glass, Metal, Water, Rock, Brick, Paper, Fabrics, Elastic, Foil,

Properties: Hard / soft, Stretchy / stiff, Shiny /dull, Rough / smooth, Bendy / not bendy, Waterproof / not waterproof, Absorbent / not absorbent

Pupils should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil. Pupils might work scientifically by: performing simple tests to explore questions, for example: ‘What is the best material for an umbrella? ...for lining a dog basket? ...for curtains? ...for a bookshelf? ...for a gymnast’s leotard?’

- Presented with different materials in a feely bag / cover and the children have to describe it to the class / partner using scientific language.
- Ask the children to find the best material for a given object – link to Science investigation.
- Literacy cross curricular links with traditional tale ‘The Three Little Pigs’.

SEASONAL CHANGES.

- observe changes across the four seasons
- observe and describe weather associated with the seasons and how day length varies.

Pupils should observe and talk about changes in the weather and the seasons.
Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils might work scientifically by: making tables and charts about the weather; and making displays of what happens in

- Present pictures from school during the seasons and ask the children to name them.
- Use a ‘weather display’ that is ongoing throughout the year (include for example photos of trees to observe how they change through the seasons).

Key vocabulary:

Summer, Autumn, Winter, Spring, Day, Daytime, Weather:
Wind, Rain, Snow, Hail, Sleet, Fog, Sun, Hot, Warm, cold

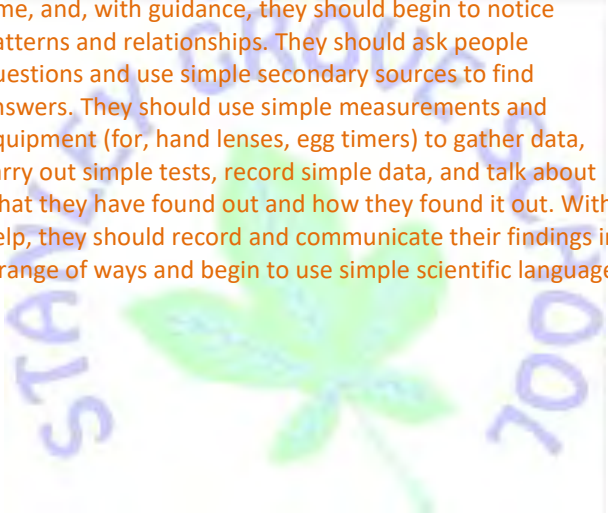
the world around them, including day length, as the seasons change.

- Take temperatures outside in the morning, lunch and before school ends to see difference in temp.
- Look at different places in the world and how their seasons are different.
- Simple charts about the weather.
- Simple graph / chart detailing given day length from four seasons.



Science

Year 2

Statutory requirements (National curriculum)	Stanley Grove's Essentials	Suggested Activities
<p>WORKING SCIENTIFICALLY</p> <ul style="list-style-type: none">• 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. (Tally given and simple chart completed)• Use Scientific language appropriate for Year 2 when conducting experiments and in written methods. <div data-bbox="107 794 750 1050" style="border: 1px solid black; padding: 5px;"><p>Key vocabulary:</p><p>Recap Y1 vocab plus:</p><p>Classify, Record – diagram, chart, Data, Fair test, predict</p></div>	<p>Pupils in years 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.</p> 	<p>Use format for Science practical write up for all children.</p>

LIVING THINGS AND THEIR HABITAT

- explore and compare the differences between things that are living, dead, and things that have never been alive
- identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other
- identify and name a variety of plants and animals in their habitats, including micro-habitats
- describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.

Key vocabulary:

Living, Dead, Never alive, Habitats, Micro-habitats, Food, Food chain, Sun, Grass, Cow, Human, Alive, Healthy

Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest.

Pupils might work scientifically by: sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. They should describe how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. They could construct a simple food chain that includes humans (e.g. grass, cow, human). They could describe the conditions in different habitats and micro-habitats (under log, on stony path, under bushes) and find out how the conditions affect the number and type(s) of plants and animals that live there.

- Visit and explore the Wildlife area, bog area and fields for investigating local habitats.

PLANTS

- observe and describe how seeds and bulbs grow into mature plants
- find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
- Y2 Tree focus to study in ODL: Ash and Willow

Key vocabulary:

Recap Y1 vocab plus:

Observe, Describe, Mature plants, Suitable temperature / light / water, Germination, Growth, Grow, healthy, Survival, Reproduction, Ash, Willow

Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants.

Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.

Pupils might work scientifically by: observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy.

Study Ash and Willow trees changing throughout the seasons, look at their fruit, leaves, mythology surrounding them and historical medicinal properties.

- Visit and explore the Wildlife area, allotments and polytunnel within the school grounds.
- Environment leaders to lead gardening for class 'welly to belly' projects.
- Grow plants in class e.g. daffodils. beans

ANIMALS INCLUDING HUMANS.

- notice that animals, including humans, have offspring which grow into adults
- find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
- describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Key vocabulary:

Recap Y1 vocab plus:

Offspring, Grow, Adults, Survival: Hygiene, Exercise, Food, Nutrition, Air / water, Reproduction and growth in animals, Process of growth examples: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult.

Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the processes of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs.

The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult.

Pupils might work scientifically by: observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.

- Use a butterfly garden / butterfly growing kit in class.
- RSPB Bird Watch

USE OF EVERYDAY MATERIALS

- identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses
- find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Key vocabulary:

Recap Y1 vocab plus:

Cardboard, Rubber, Squashing, Bending, Twisting, Stretching
Examples:

Wood – matches, telegraph poles

Metal – coins, cans, cars

Plastic – some spoons

John Dunlop, Charles Macintosh, John McAdam

Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam. Pupils might work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations. .

- Waste management (create and bury a time capsule which will be dug up when children get into Y6). Look at what has / hasn't degraded over time.

Science

Lower Key Stage 2

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out. 'Working scientifically' is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content. Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Year 3

Statutory requirements (National curriculum)	Stanley Grove's Essentials	Suggested Activities
<p style="text-align: center;"><u>WORKING SCIENTIFICALLY</u></p> <ul style="list-style-type: none"> • With support, asking relevant questions and using different types of scientific enquiries to answer them • With support, setting up simple practical enquiries, comparative and fair tests • With support, making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers • gathering, recording, classifying and presenting data using bar charts, tables and tally charts 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 and suggest improvements 	<p>Pupils in years 3 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used. They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.</p>	<p>Use format for Science practical write up for all children.</p>

- identifying differences and similarities related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

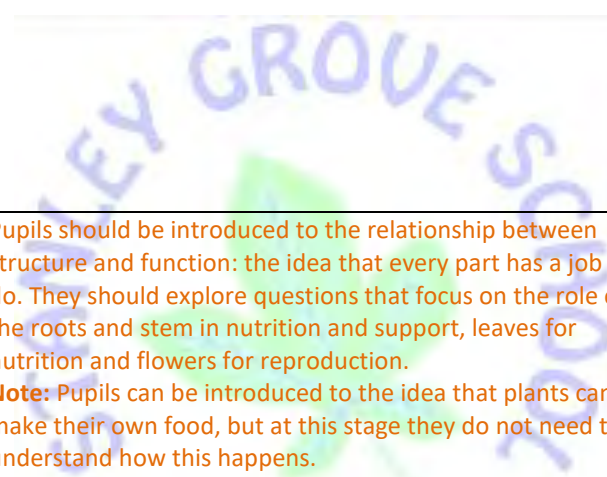
Key vocabulary:

Recap Y1 and Y2 vocab plus:

Research, Practical enquiries, Comparative test, Fair test, Careful observation, Accurate measurements, Thermometer, Data – gather, record, classify, present, Record – drawings, labelled diagrams, keys, bar charts, tables, Conclusions, Predictions, Differences, Similarities, Changes, Evidence, Improvements, Secondary sources, Interpret

They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.

These opportunities for working scientifically should be provided across years 3 so that the expectations in the programme of study can be met by the end of year 3.



PLANTS.

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
- Y3 Tree focus to study in ODL: Apple and Elder

Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.

Note: Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.

Pupils might work scientifically by: comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.

Study Apple and Elder trees changing throughout the seasons, look at their fruit, leaves, mythology surrounding them and historical medicinal properties.

- Dye in water to see how the colour of leaves / flowers can change.
- Experiment for growing plants in different places to see effect – cold, war, light, dark, water.
- Walk to Nature Reserve to look at seed dispersal.
- Environment leaders to lead gardening for class ‘welly to belly’ projects.

Key vocabulary:

Recap Y1 and Y2 vocab plus:

Nutrients / nutrition, Transport, Life cycle, Flowers, pollination, Seed formation, Seed dispersal, Structure, Function, Support, "Requirements for life and growth", Fertiliser, Apple, Elder

ANIMALS INCLUDING HUMANS (INCLUDE TEETH)

- 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
- identify that humans and some other animals have skeletons and muscles for support, protection and movement.
- Link to healthy lifestyles, health and hygiene, body clothes and teeth.
- identify the different types of teeth in humans and their simple functions

Key vocabulary:

Recap Y1 and Y2 vocab plus:

Nutrition, nutrients, carbohydrates, protein, fats, fibre, water, vitamins, minerals, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic, vertebrate, invertebrate, contract / relax, muscles, ball joint, socket joint, hinge joint, gliding joint, Teeth: incisors – cutting / slicing, canines – ripping / tearing, molars – chewing / grinding, floss, brush

Pupils should continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. Pupils might work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy and design meals based on what they find out. Discuss healthy lifestyle. How do we need to keep healthy as well as eating well. Discuss hygiene, changing clothes and brushing teeth. Pupils might work scientifically by: comparing the teeth of carnivores and herbivores, and suggesting reasons for differences; finding out what damages teeth and how to look after them.

- Talk from local nurse / dentist.
- Exercise and how it makes our bodies work differently

ROCKS

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

Key vocabulary:

Appearance, Physical, Properties, Fossils, Sedimentary, Rock, Soils, Organic matter, Buildings, Gravestones, Grains, crystals

Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment.
Pupils might work scientifically by: observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. They can raise and answer questions about the way soils are formed.

- Trip to Scarborough to look at different types of rocks and how certain types of rocks e.g. sandstone can be susceptible to landslides and coastal erosion. Look at sea defences and types of rocks used for these.
- Compare this to our local area...what rocks do we have here?
- Trip to Leeds City Museum to look at rocks and fossils area in ground floor.
- Rock sampling activities in class (classifications).

LIGHT

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

Key vocabulary:

Reflect, Surface, Natural, Star, Blocked, Solid, Artificial, Torch, Candle, Lamp, Sunlight, Dangerous, Protect eyes, Opaque, Transparent, Translucent, Shadows

Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change.
Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.
Pupils might work scientifically by: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.

- Shadow patterns on the floor at different times of the day.
- Mirror games to see how light beams can bend.

FORCES AND MAGNETS

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Key vocabulary:

Force, Surface, Magnet, Magnetic, Attract, Repel, Magnetic poles, North, South

Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe). Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

- Which materials are magnetic?
- Put an object on the table and move it along with a magnet underneath.
- How like poles repel each other and opposites attract.
- Investigations using ramps and cars for forces.

Famous Scientists

- Learn about a range of famous inspirational Scientists.

Key vocabulary:

Inspirational Scientists: Marie Curie, Joseph Bazalgette

Qualities of a good scientist: Curious, Perseverance, Patient, Creative, Open minded, Detail-orientated, Communicative, Problem-solving, Persistent, Able to work alone or in teams, teamwork.

Explore and investigate how inspirational Science is and how it has and is being used in real life situations and to be able to give examples of this. To know and learn about both male and female inspirational Scientists. To know and apply qualities of a good Scientist especially with regards to teamwork and perseverance.

- Visit from a real Scientist and / or visit from STEM
- Studies of famous Scientists to include both male and female e.g. Marie Curie, Joseph Bazalgette

Science

Year 4

In addition to the scheme of work for Y4 below, children will also (over the course of the academic year) complete the Junior Forester's Award. See separate documentation for this.

Statutory requirements (National curriculum)	Stanley Grove's Essentials	Suggested Activities
<p><u>WORKING SCIENTIFICALLY</u></p> <ul style="list-style-type: none"> Independently, asking relevant questions and using different types of scientific enquiries to answer them Independently, setting up simple practical enquiries, comparative and fair tests Independently, making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data logging gathering, recording, classifying and presenting data in a variety of ways including scatter graphs and line graphs 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 and suggest improvements and raise further questions identifying differences and similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings. 	<p>Pupils in year 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.</p> <p>They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences.</p> <p>These opportunities for working scientifically should be provided across years 4 so that the expectations in the programme of study can be met by the end of year 4.</p>	<p>Use format for Science practical write up for all children.</p>

Key vocabulary:

Recap Y1,2,3 vocab plus:

Data logger, Record – line charts / scatter graphs, Raise further questions

LIVING THINGS AND THEIR HABITATS.

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things.
- **Y4 Tree focus to study in ODL: Sycamore and Silver Birch**

Key vocabulary:

Recap Y2 vocab plus:

Environment, dangers, flowering plants – including grasses, non-flowering plants – including mosses and ferns, plants, animals, vertebrate – fish, amphibians, reptiles, birds, mammals (recapped from Y1), invertebrate – snails, slugs, worms, spiders, insects, Sycamore, Silver Birch

Human impact:

positive – nature reserves, garden ponds

Negative – population, developments, litter, deforestation

Pupils should 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. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants. Pupils could begin to put vertebrate animals into groups such as fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.

Note: Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses.

Pupils should 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. Pupils might work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.

Study Sycamore and Silver Birch trees changing throughout the seasons, look at their fruit, leaves, mythology surrounding them and historical medicinal properties.

- Trip to nature reserve (use ranger for knowledge and expertise)
- Invite an animal into class for a week (e.g. bearded dragon).
- Environment leaders to lead gardening for class 'welly to belly' projects.

ANIMALS INCLUDING HUMANS

- describe the simple functions of the basic parts of the digestive system in humans
- construct and interpret a variety of food chains, identifying producers, predators and prey.

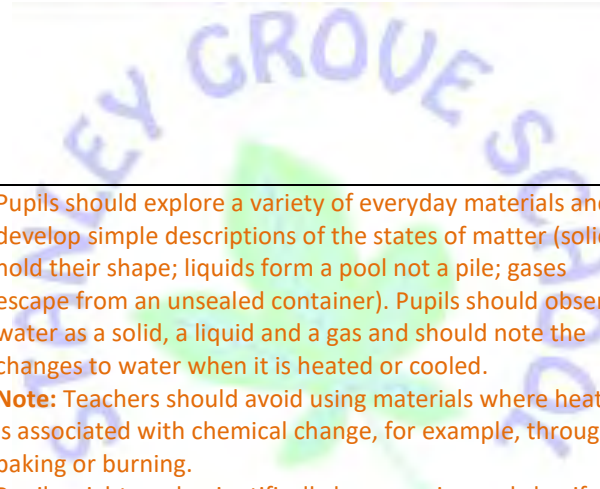
Key vocabulary:

Recap Y1, 2 and 3 vocab plus:

Digestion, mouth, tongue, saliva, oesophagus, transports, stomach, acid, enzymes, small intestine – absorbs water, vitamins, large intestine – compacts colon, Food chain: sun, producers, consumers, prey, predators

Pupils should be introduced to the main body parts associated with the digestive system, for example, mouth, tongue, teeth, oesophagus, stomach and small and large intestine and explore questions that help them to understand their special functions. They might draw and discuss their ideas about the digestive system and compare them with models or images.

- Use large model of digestive system.



STATES OF MATTER INCLUDING MATERIAL CHANGES.

- compare and group materials together, according to whether they are solids, liquids or gases
- observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)
- identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets

Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container). Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled.
Note: Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning.
Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.

- Use children squashed into a small hoop to demonstrate solids, take some out for liquid to show the movement and 1 / 2 children to show gases.
- Melting different types of chocolate over time to see which melts the fastest (understanding that different materials have different melting points). Compare melting chocolate to melting ice.
- Experiments with water e.g. freezing/melting/ evaporating.
- Experiments with carbon dioxide in fizzy drinks. Which fizzy drink has the most carbon dioxide in it? Practical investigations.
- Investigation to find out how temperature can affect the rate of evaporation.
- Make water cycles outside.

Key vocabulary:

Recap Y1 and 2 vocab plus:

Solid, solidify, ice, melt, freeze, liquid, evaporate, condense, gas, container, changing state, heated, heat, cooled, cool, degrees Celsius, thermometer, water cycle, evaporation, condensation, temperature, warm / cool, water vapour

SOUND

- identify how sounds are made, associating some of them with something vibrating
- recognise that vibrations from sounds travel through a medium to the ear
- find patterns between the pitch of a sound and features of the object that produced it
- find patterns between the volume of a sound and the strength of the vibrations that produced it
- recognise that sounds get fainter as the distance from the sound source increases.

Key vocabulary:

Vibrate, vibration, data logger, sound survey, air, medium, ear, hear, sound, volume, pitch, faint, fainter, distance, loud, louder, string, percussion, woodwind, brass, insulate, insulation

Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways.

Pupils might work scientifically by: finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.

- Link to music.
- Give the children a problem – make earmuffs from a variety of different materials to investigate which provides the best insulation against sound.
- Outside sound investigations

ELECTRICITY.

- identify common appliances that run on electricity
- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers
- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery
- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
- recognise some common conductors and insulators, and associate metals with being good conductors.

Key vocabulary:

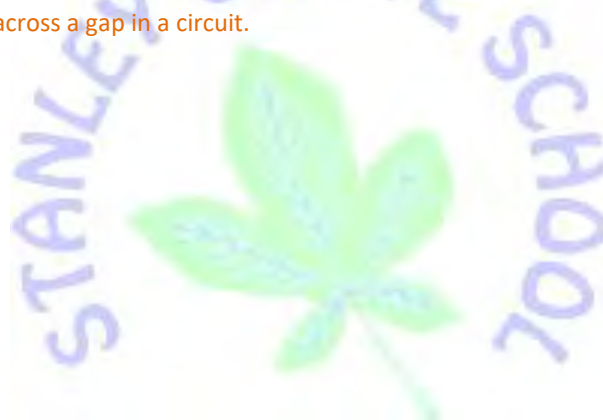
Appliances, electricity, electrical circuit, current, battery/cell, wire, bulb, buzzer, danger, electrical safety, sign, switch – open / closed, insulators – wood, rubber, plastic, glass, conductors – metal, water

Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6.

Note: Pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity.

Pupils might work scientifically by: observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.

- Link to Art /DT making a light up scene involving switches



Science

Upper Key Stage 2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

‘Working and thinking scientifically’ is described separately at the beginning of the programme of study, but must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Year 5

In addition to the scheme of work for Y5 below, children will also (over the course of the academic year) complete **Nature’s Climate Heroes work**. **See separate documentation for this.**

Statutory requirements (National curriculum)	Stanley Grove’s Essentials	Suggested Activities
<p style="text-align: center;">WORKING SCIENTIFICALLY</p> <ul style="list-style-type: none"> • 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, bar 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, 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. 	<p>Pupils in years 5 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their</p>	<p>Use format for Science practical write up for all children. Children to use format but write up independently in their books.</p> <p>Links to outdoor learning in most topics.</p>

Key vocabulary:

Recap Y1,2,3, 4 vocab plus:

Plan, Variables, Measurements, Accuracy, Precision, Report – scientific diagrams, tables. scatter graphs, bar charts, line charts, Further comparative and fair test, Repeat readings, Explanations, Evidence – support, refute ideas or arguments, Systematic

ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. These opportunities for working scientifically should be provided across years 5 so that the expectations in the programme of study can be met by the end of year 5. Pupils are not expected to cover each aspect for every area of study.

LIVING THINGS AND THEIR HABITATS.
ANIMALS INCLUDING HUMANS

- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
- describe the life process of reproduction in some plants and animals.
- describe the changes as humans develop to old age.
- Y5 Tree focus to study in ODL: Yew and Rowan

Key vocabulary:

Recap Y2 and Y4 vocab plus:

Life cycles, Life process of reproduction, Reproduction – plants: sexual, asexual and animals: sexual, Life cycles around the world – rainforest, oceans, desert, Prehistoric, David Attenborough, Jane Goodall, Yew, Rowan

Pupils should study and raise questions about their local environment throughout the year. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall. Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow. Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty. Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans;

- Talk by local farmer, vet or animal breeder.
- Environment leaders to lead gardening for class 'welly to belly' projects.
- Grow plants in class e.g. cress
- Work in groups to compare and contrast life cycles life-processes and reproduction.
- Create a timeline of the human life.

	<p>by finding out and recording the length and mass of a baby as it grows.</p> <p>Study Yew and Rowan trees changing throughout the seasons, look at their fruit, leaves, mythology surrounding them and historical medicinal properties.</p>	
<p><u>PROPERTIES AND CHNAGES OF MATERIALS.</u></p> <ul style="list-style-type: none"> • know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution • use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • demonstrate that dissolving, mixing and changes of state are reversible changes • 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. <div data-bbox="107 970 752 1378" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p><u>Key vocabulary:</u></p> <p><u>Recap Y1,2, 4 vocab plus:</u></p> <p>Properties, hardness, solubility, transparency, electrical conductor, thermal conductor, response to magnets, dissolve / dissolving, solution, mixing, separate, separating, reversible changes, filtering, sieving, irreversible, new material, burning, rusting, magnetism, chemists, quantitative measurements, conductivity, insulation, chemical, Spencer Silver, Ruth Benerito</p> </div>	<p>Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton.</p> <p>Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials. Pupils might work scientifically by: carrying out tests to answer questions, for example, ‘Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?’ They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.</p>	<ul style="list-style-type: none"> • Independent research projects • Experiment different substances in water to investigate which materials create a solution. Eg. Coffee, salt, pasta etc... • Link to reversible changes. Experiment evaporation – turning a solution into a substance (salt–water to salt and water) • Experiments with non-Newtonian fluids – Outdoor Learning session. Link to irreversible changes.

EARTH AND SPACE.

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth
- describe the Sun, Earth and Moon as approximately spherical bodies
- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Key vocabulary:

Earth, Sun, Moon, Moons, Planets, Stars, Asteroids, Solar system, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, Rotate, Day / night, Aristotle, Ptolemy, Galileo, Copernicus, Brahe, Alhazen, Orbit, Axis, Spherical, Heliocentric, Geocentric, Hemisphere, Season, tilt

Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones).

Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Pupils should find out about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus.

Pupils might work scientifically by: comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.

- Use large ball and the children to demonstrate movement of Earth in solar system. 1 in middle with large ball and others at distance away showing how they orbit. Sun large football, Earth small ball, moon a marble.
- Children to create their own model of the solar system and share with class. Projects displayed in classroom.
- Class debate on geocentric vs heliocentric models – English (speaking and listening) links.

FORCES.

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

Key vocabulary:

Recap Y3 vocab plus:

Gravity, Air resistance, Water resistance, Friction, Surface, Force, Effect, Move, Accelerate, Decelerate, Stop, Change direction, Brake, Mechanism, Pulley, Gear, Spring, Theory of gravitation, Galileo Galilei, Sir Isaac Newton

Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.

Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.

- possible link to DT
- make aeroplanes, parachutes, paper boats – use of FU water tanks.
- Outdoor learning with catapults (pulleys and levers).
- Experiments with air-resistance (parachutes) – Outdoor Learning session with large parachutes and smaller parachutes of varying surface area used in the classroom.
- Experiment using tin-foil boats of different surface areas to observe water resistance.
- Research project for Sir Isaac Newton and his theory of gravitation.

Science

Year 6

Statutory requirements (National curriculum)	Stanley Grove’s Essentials	Suggested Activities
<p>WORKING SCIENTIFICALLY</p> <ul style="list-style-type: none"> planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary taking measurements, choose their own 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 and line bar and graphs using test results to make predictions to set up further comparative and fair tests. Year 6 to be able to decide for themselves. 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. <div data-bbox="107 1027 750 1278" style="border: 1px solid black; padding: 5px;"> <p><u>Key vocabulary:</u></p> <p><u>Recap Y1,2, 3, 4, 5 vocab plus:</u></p> <p>Degree of trust (in results), Report – classification keys, pie charts</p> </div>	<p>Pupils in years 5 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. These opportunities for working scientifically should be provided across years 5 so that the expectations in the programme of study can be met by the end of year 5. Pupils are not expected to cover each aspect for every area of study.</p>	<p>Use format for Science practical write up for all children.</p>

LIVING THINGS AND THEIR HABITATS.

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics.
- Y6 Tree focus to study in ODL: Hawthorn and Hazel

Key vocabulary:

Recap Y2, 4, 5 vocab plus:

Classify, compare, Linnaean, Carl Linnaeus, Classification, Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species, Characteristics, Microorganism, Organism, Hawthorn, Hazel

Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another.

Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system. **Study Hawthorn and Hazel trees changing throughout the seasons, look at their fruit, leaves, mythology surrounding them and historical medicinal properties.**

- Charles Waterton – Wakefield Museum visits to class.
- RSPB Big Bird Watch.
- Environment leaders to lead gardening for class ‘welly to belly’ projects.

ANIMALS INCLUDING HUMANS.

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

Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function.

Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body.

Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

- School Nurse / Police visit to discuss use of drugs both ones used to help us and those that are illegal (drug liaison officer).
- Puberty talk
- Heart from butchers to dissect.
- Link to P.E. – function of the heart.

Key vocabulary:

Recap Y1,2,3, 4, 5 vocab plus:

internal organs, heart, lungs, liver, kidney, brain, skeletal, skeleton, muscle, muscular, digest, digestion, digestive, circulatory system, heart, blood vessels, blood, impact, diet, exercise, drugs, lifestyle, nutrients, water, damage, drugs, alcohol substances

EVOLUTION AND INHERITANCE

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

Key vocabulary:

Recap Y3 vocab plus:

Evolution, Adaptation, Inherited traits, Adaptive traits, Natural selection, Inheritance, Charles Darwin, DNA, Genes, Variation, Parent, Offspring, Fossil / Fossilisation, Environment, Habitat, Plants, Animals, Living things, Palaeontologists, Mary Anning, Alfred Wallace, Charles Darwin

Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution.

Note: At this stage, pupils are not expected to understand how genes and chromosomes work. Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.

- Link to studies of Charles Darwin and Mary Anning.
- Use fossils from Science cupboard.

LIGHT

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

Key vocabulary:

Recap Y3 vocab plus:

Light ,Travels, Straight lines, Reflect, Reflection, Refract, Refraction, Light source, Angle of incidence, Angle of reflection, Object, Mirrors, Periscope, Kaleidoscope, Rainbow, Prism, Filters

Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions.
Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

- Make periscopes
- Make kaleidoscopes
- Use prisms

ELECTRICITY.

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

Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols.

Note: Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity.

Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.

- Learn about Thomas Edison, Michael Faraday and Nikola Tesla.
- Kit-Kat challenge in circuits.
- LED lights in pictures (link to Art/DT)

Key vocabulary:

Recap Y4 vocab plus:

series circuit, parallel circuit (explain only to HA, not required), cell, motor, circuit diagram, recognised symbols, volume, voltage, brightness, switches, LED's, Alternating current, Thomas Edison, Michael Faraday, Nikola Tesla.

