Lugwardine Primary Academy

Bartestree

Learning and Growing Together

Science Curriculum Folder

Last updated Jan 2024

Contents

Core Curriculum intent

At Lugwardine Primary Academy we develop children as resilient learners who have the knowledge, understanding and skills to be responsible and effective members of their community.

The curriculum we teach will enable our learners to be confident members of both their local community and the wider world. The children will leave Lugwardine Primary passionate about their beliefs and equipped with the knowledge and skills they need to achieve their full potential.

Our curriculum is designed to inspire, support and include. We believe that by developing the whole child, pupils will learn to transfer the skills and knowledge across different settings and circumstances. We believe all children benefit from a range of learning opportunities and seek to develop their experiences both inside and outside the classroom.

Subject Intent

At Lugwardine Primary Academy it is our intention to recognise the importance of Science in every aspect of daily life. As one of the core subjects taught in primary education, we ensure we give the teaching and learning of Science the prominence it requires through a fun, practical and highly engaging curriculum that inspires, supports and includes all our pupils to succeed and excel in science. Our progressive science curriculum is concerned with increasing pupils' knowledge and understanding of our world, whilst developing skills associated with Science as a process of enquiry. Science will develop pupils' natural curiosity and encourage respect for living organisms and the physical environment, leading them to be equipped for life to ask and answer scientific questions about the world around them. We intend to build a Science curriculum which develops learning, acquisition and retention of knowledge, whilst developing an enthusiasm and enjoyment of scientific learning and enquiry.

Subject Implementation

At Lugwardine Primary Academy teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all children can achieve high standards In science. Our whole school approach to the teaching and learning of science involves the following:

- Science will be taught in planned topic blocks, in line with the National Curriculum, by the class teacher. Our strategy enables all pupils to be catered for through adapted planning suited to their abilities.
- Through our planning, we create opportunities that encourage pupils to find out for themselves, by asking their own questions and giving them time and opportunities to use their scientific skills to find out the answers. Planning involves teachers creating highly engaging lessons and practical investigations.
- The skills for working scientifically are embedded into lessons to ensure these skills are being developed throughout the pupils' school career. New vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in keeping with the topics.
- Teaching and learning builds upon the learning and skills developed during previous years. As the pupils' knowledge and understanding Increases, and they become more proficient In selecting, using scientific equipment, collating and Interpreting results, they become Increasingly confident In their growing ability to come to conclusions based on real evidence.
- Pupils will use a range of resources to develop their knowledge and understanding that is integral to their learning and develop their understanding of working scientifically.
- Pupils will be able to build on prior knowledge and link Ideas together, enabling them to question and become enquiry-based learners.
- Through enrichment days, such as 'Science Week', we promote the profile of Science and allow time for our pupils to freely explore scientific topics.

Subject Impact

At Lugwardine Primary Academy most pupils will achieve age related expectations in Science by the end of the cohort year. This will be evidenced through formative assessments made by teachers and summative assessments at the end of each topic. Pupils will have a richer vocabulary and will retain key learning which they can demonstrate as they move through the school. They will be able to question ideas, reflect on their knowledge and work collaboratively and practically to carry out investigations and experiments.

Our successful approach to the teaching and learning of Science results in a fun, engaging, high quality science education which provides pupils with the foundations for understanding the world. Our science and teaching will lead high aspirations in pupils, that will equip them for further study and work.

Golden threads

Children will develop scientific knowledge and conceptual understanding in biology, chemistry and physics	Scientific knowledge
Children will develop a clear understanding of carrying out scientific enquiries to answer questions about the world around them	Scientific enquiries
Children are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future	Uses and implications
Children will know about a range of important scientists	Scientists

Non-negotiables

•Science should be taught weekly with planning saved to SharePoint.

•Each science topic will need to have an overarching 'BIG Question' such as 'why do animals have skeletons?' used for the Year 3 Animals including Humans' topic. Suggestions for these 'BIG Questions' can be found on the curriculum map on SharePoint for each topic.

•Each topic should start with an elicitation activity to assess the children's prior knowledge. This assessment should then inform your planning for the new topic and help you identify any existing misconceptions the children might have. Your elicitation activity should also promote an opportunity for the children to raise their own scientific questions about the new topic. To achieve this, it is recommended the elicitation activity is completed at the end of the half term prior to starting your new science topic. Elicitation activities could include: a mind map with the big question in the middle and KWL grids. Examples of these activities can be found on SharePoint and in the assessment folder.

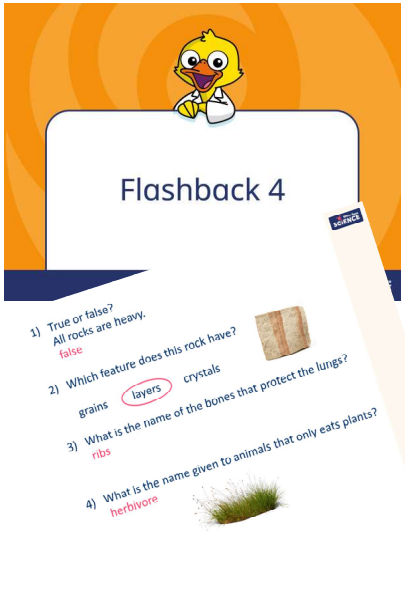
•To promote enquiry, each science lesson will need a 'key question' that the children will be exploring. The key question must be put in the book for each lesson. The key question replaces the traditional learning objective. Children should answer this question as a plenary in their books.

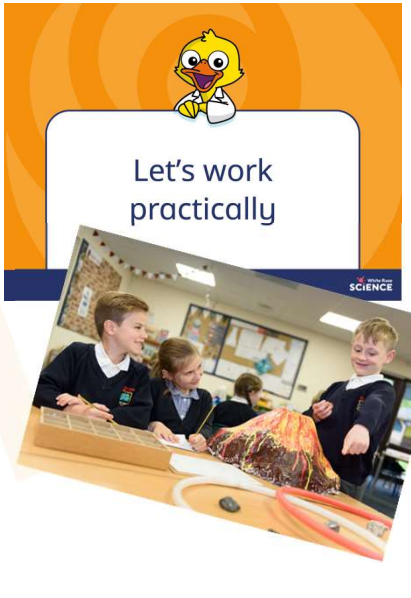
•At the end of a topic the children must complete an end of topic assessment which can be found on whiterose. Teachers should then complete an end of unit feedback sheet reporting which children are working below expected standard and above. The feedback sheet also provides the opportunity to make comment on any barriers identified to the children's learning as well as any support or resources which would have helped in the teaching of this unit.

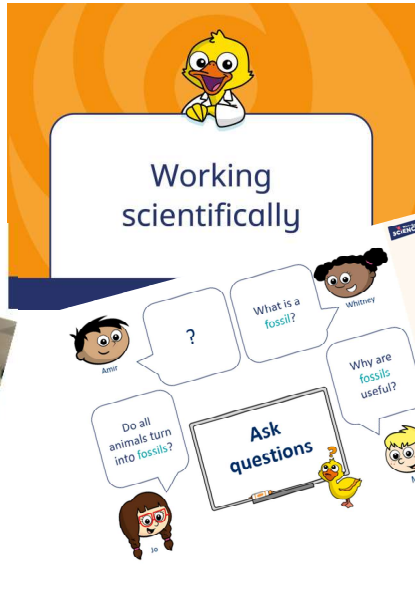
•Science displays – all classrooms have a science working wall. The working wall must include the 'BIG Question' and the key vocabulary. Teachers may also want to include the key questions from their current unit.

What a typical science lesson looks like?

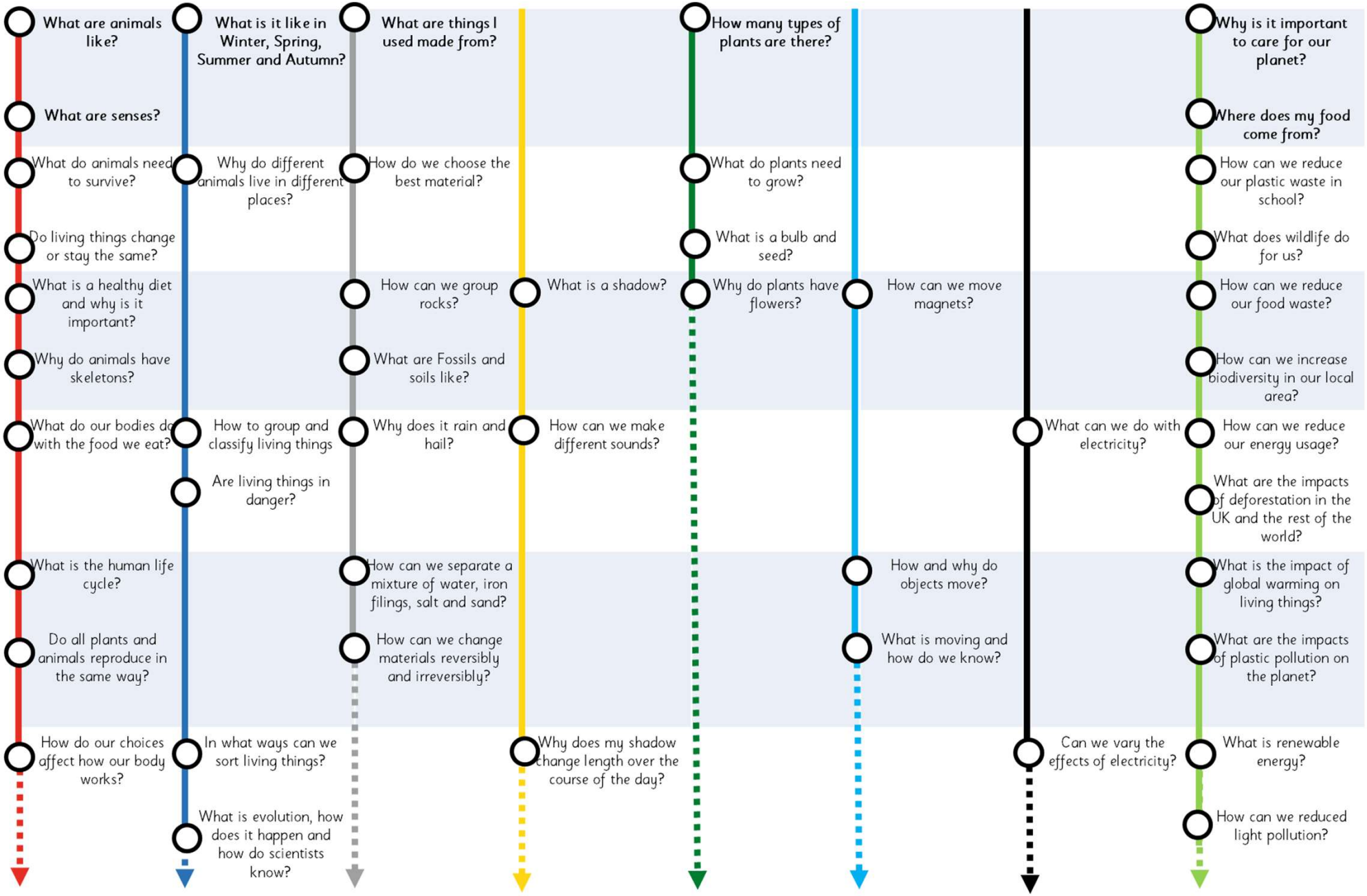
From Jan 2024



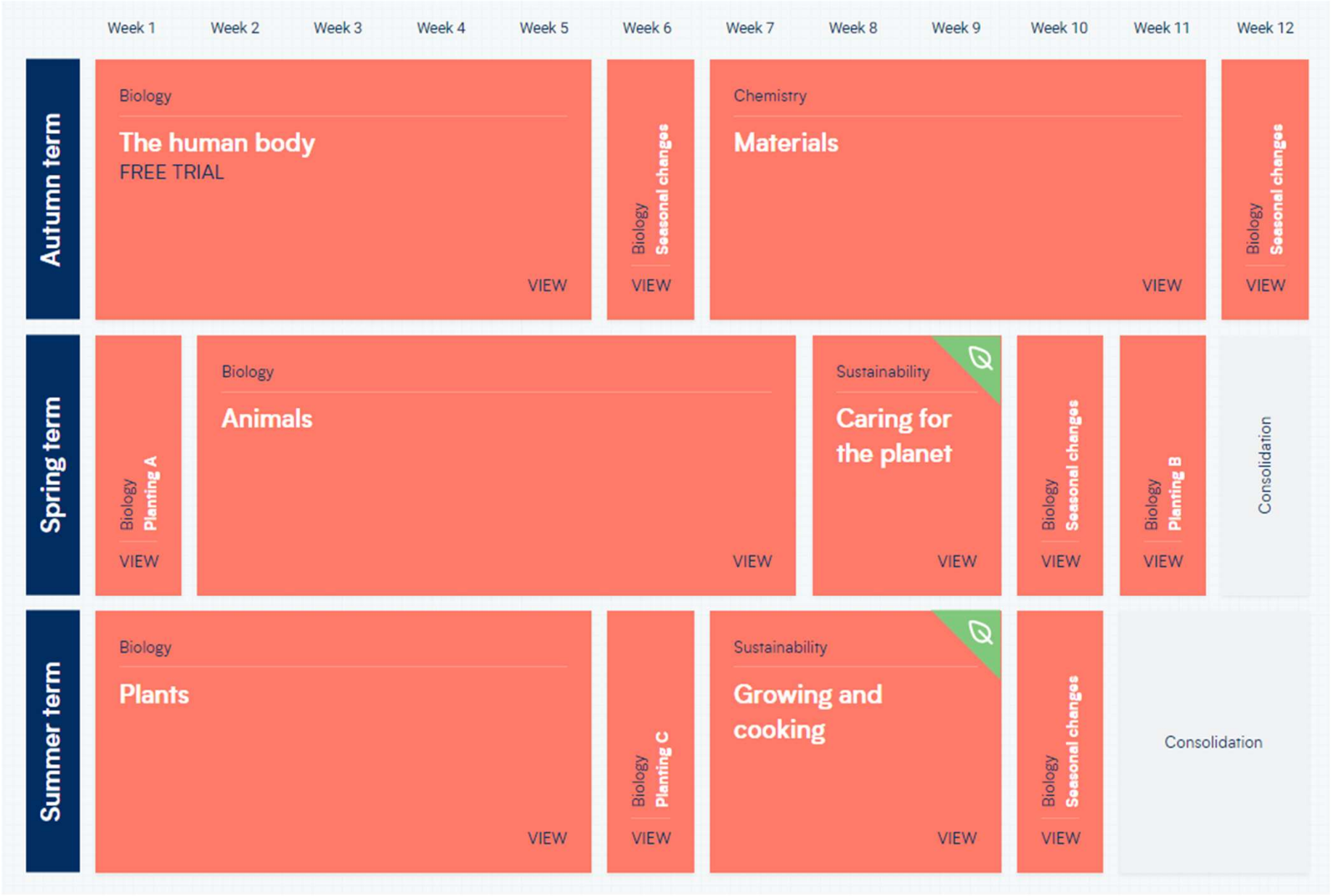




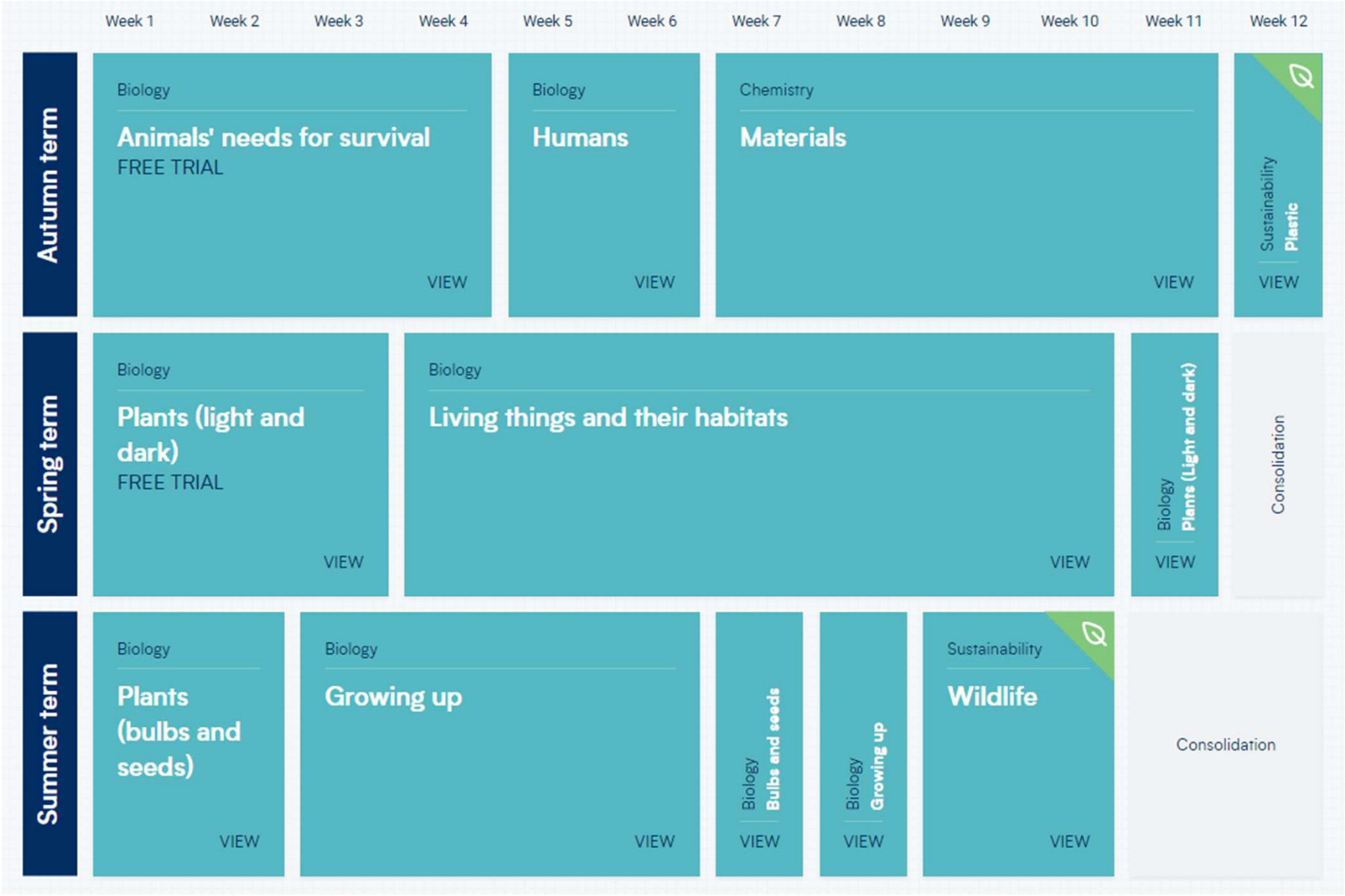
Substantive Knowledge



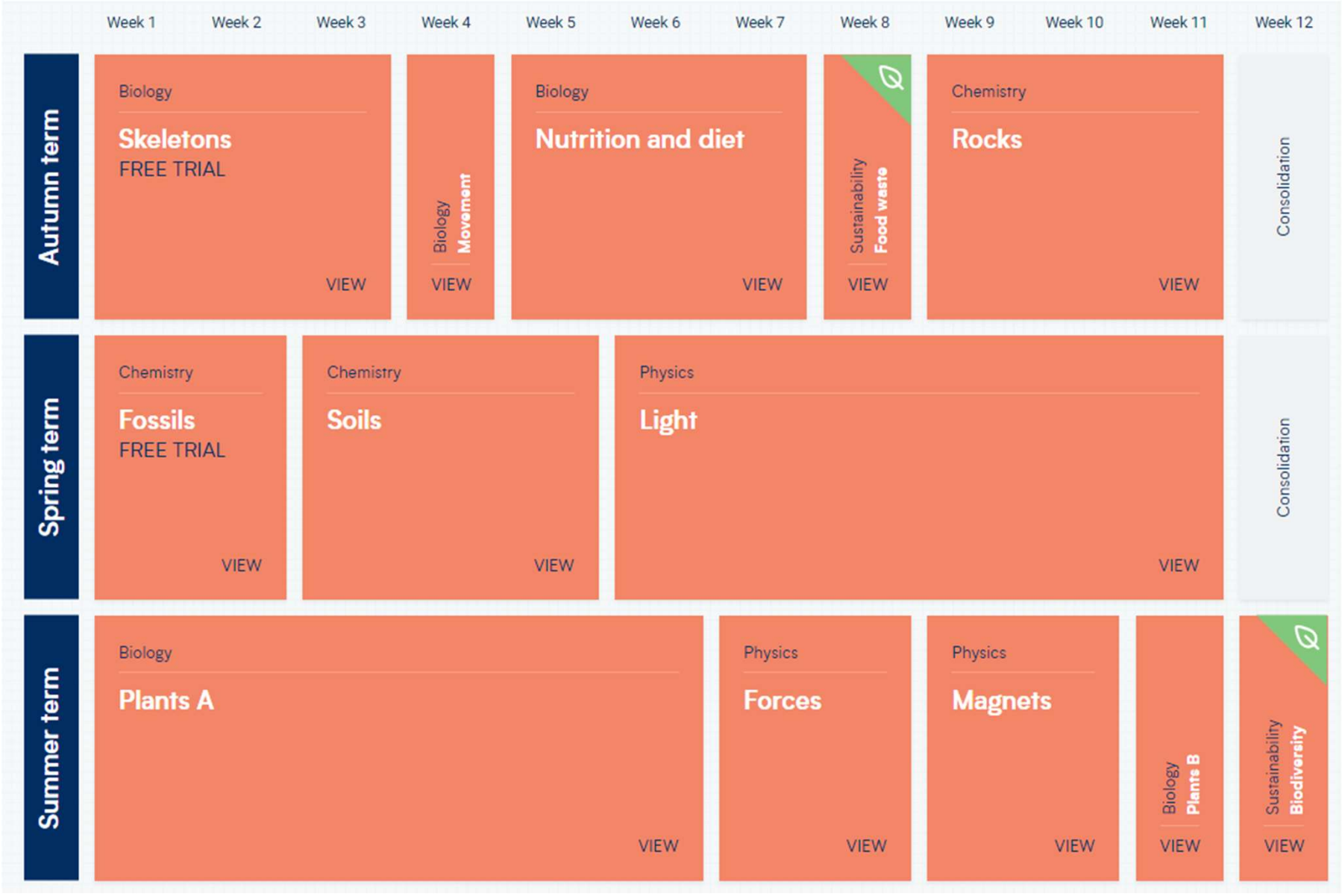
Year 1


Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Autumn term
Biology
The human body
FREE TRIAL
VIEW
Biology
Seasonal changes
VIEW
Chemistry
Materials
VIEW
Biology
Seasonal changes
VIEW
Spring term
Biology
Planting A
VIEW
Biology
Animals
VIEW
Sustainability
Caring for the planet
VIEW
Biology
Seasonal changes
VIEW
Biology
Planting B
VIEW
Consolidation
Summer term
Biology
Plants
VIEW
Biology
Planting C
VIEW
Sustainability
Growing and cooking
VIEW
Biology
Seasonal changes
VIEW
Consolidation

Year 2


Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Autumn term
Biology
Animals' needs for survival
FREE TRIAL
VIEW
Biology
Humans
VIEW
Chemistry
Materials
VIEW
Sustainability
Plastic
VIEW
Spring term
Biology
Plants (light and dark)
FREE TRIAL
VIEW
Biology
Living things and their habitats
VIEW
Biology
Plants (Light and dark)
VIEW
Consolidation
Summer term
Biology
Plants (bulbs and seeds)
VIEW
Biology
Growing up
VIEW
Biology
Bulbs and seeds
VIEW
Biology
Growing up
VIEW
Sustainability
Wildlife
VIEW
Consolidation

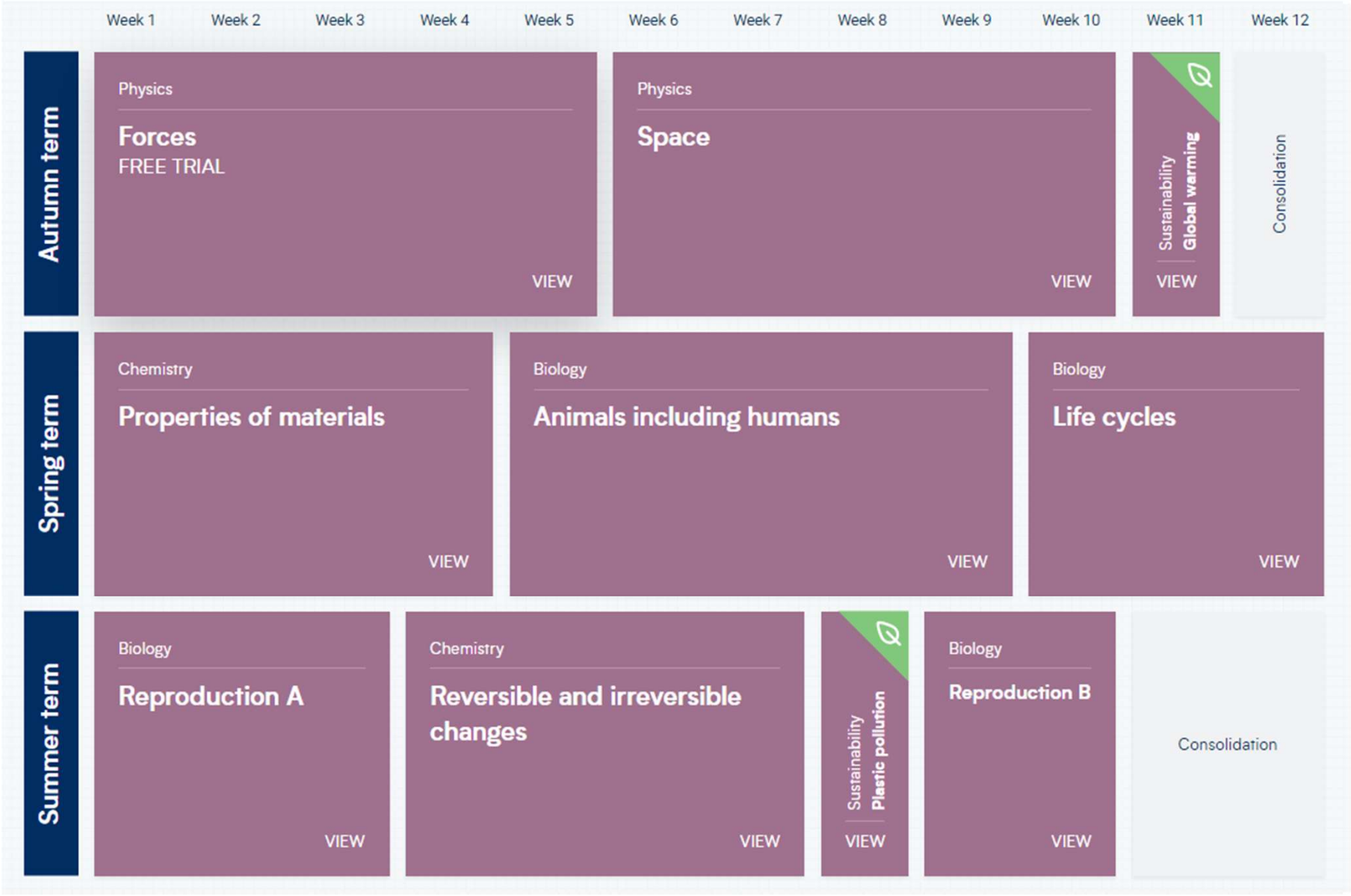
Year 3


Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Autumn term
Biology
Skeletons
FREE TRIAL
VIEW
Biology
Movement
VIEW
Biology
Nutrition and diet
VIEW
Sustainability
Food waste
VIEW
Chemistry
Rocks
VIEW
Consolidation
Spring term
Chemistry
Fossils
FREE TRIAL
VIEW
Chemistry
Soils
VIEW
Physics
Light
VIEW
Consolidation
Summer term
Biology
Plants A
VIEW
Physics
Forces
VIEW
Physics
Magnets
VIEW
Biology
Plants B
VIEW
Sustainability
Biodiversity
VIEW

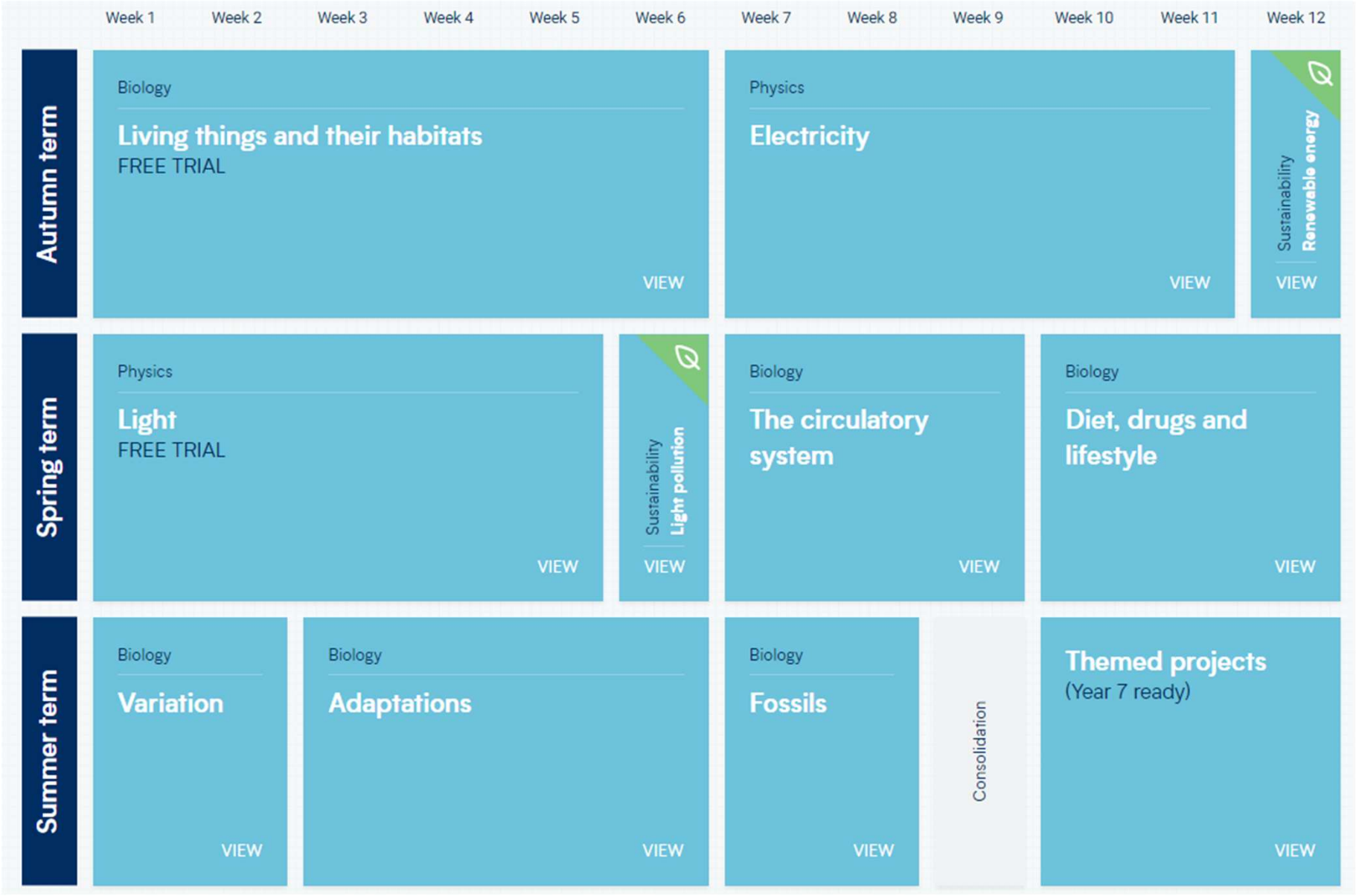
Year 4


Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Autumn term
Biology
Group and classify living things
FREE TRIAL
VIEW
Biology
Data collection A
VIEW
Chemistry
States of matter
VIEW
Consolidation
Spring term
Physics
Sound
FREE TRIAL
VIEW
Biology
Data collection B
VIEW
Physics
Electricity
VIEW
Sustainability
Energy
VIEW
Consolidation
Summer term
Biology
Data collection C
VIEW
Biology
Habitats
VIEW
Sustainability
Deforestation
VIEW
Biology
The digestive system
VIEW
Biology
Food chains
VIEW

Year 5


Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Autumn term
Physics
Forces
FREE TRIAL
VIEW
Physics
Space
VIEW
Sustainability
Global warming
VIEW
Consolidation
Spring term
Chemistry
Properties of materials
VIEW
Biology
Animals including humans
VIEW
Biology
Life cycles
VIEW
Summer term
Biology
Reproduction A
VIEW
Chemistry
Reversible and irreversible changes
VIEW
Sustainability
Plastic pollution
VIEW
Biology
Reproduction B
VIEW
Consolidation

Year 6


Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Autumn term
Biology
Living things and their habitats
FREE TRIAL
VIEW
Physics
Electricity
VIEW
Sustainability
Renewable energy
VIEW
Spring term
Physics
Light
FREE TRIAL
VIEW
Sustainability
Light pollution
VIEW
Biology
The circulatory system
VIEW
Biology
Diet, drugs and lifestyle
VIEW
Summer term
Biology
Variation
VIEW
Biology
Adaptations
VIEW
Biology
Fossils
VIEW
Consolidation
Themed projects
(Year 7 ready)
VIEW

Curriculum mapping

Animals, including humans

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• 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) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	• 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	• 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	• Describe the simple functions of the basic parts of the digestive system in humans • Identify the different types of teeth in humans and their simple functions • Construct and interpret a variety of food chains, identifying producers, predators and prey	• Describe the changes as humans develop to old age	• 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
Autumn 1 Spring 2	Autumn 1, Autumn 2 Spring 2 Summer 2, Summer 4	Autumn 1, Autumn 2, Autumn 3	Summer 4, Summer 5	Spring 2	Summer 3, Summer 4

Curriculum mapping

Animals, including humans

White Rose SCIENCE

Year 1

Sticky Knowledge:
- There are many different animals with different characteristics.
- Animals have senses to help individuals survive. When animals sense things they are able to respond.
- Animals need food to survive.
- Animals need a variety of food to help them grow, repair their bodies, be active and stay healthy.

Vocabulary:
Amphibians, birds, fish, mammals, reptiles, carnivores, herbivore, omnivore, sight, hearing, touch, taste, smell, head, neck, ear, mouth, shoulder, hand, fingers, leg, foot, thumb, eye, nose, knee, toes, teeth, elbow

Key Scientists:
Chris Packham (Animal Conservationist)

Suggested texts:
One Year with Kipper (Mick Inkpen)
Snail Trail (Ruth Brown)
Superworm (Julia Donaldson & Axel Scheffler)

Year 2

Sticky Knowledge:
- Animals move in order to survive.
- Different animals move in different ways to help them survive.
- Exercise keeps animal's bodies in good condition and increases survival chances.
- All animals eventually die.
- Animals reproduce new animals when they reach maturity.
- Animals grow until maturity and then don't grow any larger.

Vocabulary:
Living, dead, never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, sea shore, woodland, ocean, rainforest, conditions, desert, damp, shade,

Key Scientists:
Steve Irwin (Crocodile Hunter)
Robert Winston (Human Scientist)
Joe Wicks (Personal Trainer)



Suggested texts:

The Gruffalo (Julia Donaldson)
Meerkat Mail (Emily Gravett)
Tadpole's Promise (Jeanne Willis and Tony Ross)

Year 3

Sticky Knowledge:
- Different animals are adapted to eat different foods.
- Many animals have skeletons to support their bodies and protect vital organs.
- Muscles are connected to bones and move them when they contract.
- Movable joints connect bones.

Vocabulary:
Nutrients, nutrition, carbohydrates, protein, fats, vitamins, minerals, water, fibre, skeleton, bones, joints, endoskeleton, exoskeleton, hydrostatic skeleton, vertebrates, invertebrates, muscles, contract, relax,

Key Scientists:
Adelle Davis (20th Century Nutritionist)
Marie Curie (Radiation / X-Rays)


Suggested texts:

The Story of Frog Belly Rat Bone (Timothy Basil Ering)
Funnybones (Janet and Allan Ahlberg)
I Will Never Not Ever Eat a Tomato (Lauren Child)
Goldilocks and the Three Bears (Samantha Berger)

Curriculum mapping

Animals, including humans

White Rose SCIENCE

Year 4

Sticky Knowledge:
- Animals have teeth to help them eat.
- Different types of teeth do different jobs.
- Food is broken down by the teeth and further in the stomach and intestines where nutrients go into the blood.
- The blood takes nutrients around the body.
- Nutrients produced by plants move to primary consumers then to secondary consumers through food chains.

Vocabulary:
Herbivore, Carnivore, Digestive system, tongue, mouth, teeth, oesophagus, stomach, gall bladder, small intestine, pancreas, large intestine, liver, tooth, canine, incisor, molar, premolar, producer, consumer.

Key Scientists:
Ivan Pavlov (Digestive System Mechanisms)
Joseph Lister (Discovered Antiseptics)


Suggested texts:
Human Body Odyssey (Werner Holzwarth)
Crocodiles Don't Brush Their Teeth (Colin Fancy)
Wolves (Emily Gravett)

Year 5

Sticky Knowledge:
- Different animals mature at different rates and live to different ages.
- Puberty is something we all go through, a process which prepares our bodies for being adults, and reproduction
- Hormones control these changes; which can be physical and/or emotional.
- Some organisms reproduce sexually where offspring inherit information from both parents.
- Some organisms reproduce asexually by making a copy of a single parent.
- Environmental change can affect how well an organism is suited to its environment.
- Different types of organisms have different lifecycles

Vocabulary:
Foetus, Embryo, Womb, Gestation, Baby, Toddler, Teenager, Elderly, Growth, Development, Puberty, Hormone, Physical, Emotional, Sexual, Asexual, Pollination, Dispersal, reproduction, cell, fertilisation male, female, pregnancy, young, mammal, metamorphosis, amphibian, insect, egg, embryo, bird, plant

Key Scientists:
David Attenborough (Naturalist and Nature Documentary Broadcaster)
James Brodie of Brodie (Reproduction of Plants by Spores)

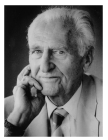

Suggested texts:
The Land of Neverbelieve (Norman Messenger)
Mummy Laid an Egg (Babette Cole)
Hair in Funny Places (Babette Cole)
Giant (Kate Scott)
You're Only Old Once! (Dr. Seuss)

Year 6

Sticky Knowledge:
- The heart pumps blood around the body.
- Oxygen is breathed into the lungs where it is absorbed by the blood.
- Muscles need oxygen to release energy from food to do work. (Oxygen is taken into the blood in the lungs; the heart pumps the blood through blood vessels to the muscles; the muscles take oxygen and nutrients from the blood.)

Vocabulary:
Oxygenated, Deoxygenated, Valve, Exercise, Respiration Circulatory system, heart, lungs, blood vessels, blood, artery, vein, pulmonary, alveoli, capillary, digestive, transport, gas exchange, villi, nutrients, water, oxygen, alcohol, drugs, tobacco.

Key Scientists:
Justus von Liebig (Theories of Nutrition and Metabolism)
Sir Richard Doll (Linking Smoking and Health Problems)
Leonardo Da Vinci (Anatomy)


Suggested texts:
Pig-Heart Boy (Malorie Blackman)
Skellig (David Almond)
A Heart Pumping Adventure (Heather Manley)

Curriculum mapping

Living things and their habitats

White Rose SCIENCE

Year 2	Year 4	Year 5	Year 6
• 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 microhabitats • 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	• 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	• 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 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
Spring 2 Summer 2, Summer 4	Autumn 1, Autumn 2 Spring 2 Summer 1, Summer 2	Spring 3 Summer 1, Summer 4	Autumn 1

Curriculum mapping

Living things and their habitats

White Rose SCIENCE

Year 2

Sticky Knowledge:
- Some things are living, some were once living but now dead and some things never lived.
- There is variation between living things.
- Different animals and plants live in different places. Living things are adapted to survive in different habitats.
- Environmental change can affect plants and animals that live there.

Vocabulary:
Living, dead, never alive, habitats, micro-habitats, food, food chain, leaf litter, shelter, sea shore, woodland, ocean, rainforest, conditions, desert, damp, shade,

Key Scientists:
Terry Nutkins (TV Presenter)
Liz Bonnin (Conservationist)

Suggested texts:
The Gruffalo (Julia Donaldson)
Meerkat Mail (Emily Gravett)
No Place Like Home (Jonathon Emmett)

Year 4

Sticky Knowledge:
- Living things can be divided into groups based upon their characteristics
- Environmental change affects different habitats differently
- Different organisms are affected differently by environmental change
- Different food chains occur in different habitats
- Human activity significantly affects the environment

Vocabulary:
Environment, flowering, nonflowering, plants, animals, vertebrates, fish, amphibians, reptiles, mammals, invertebrate, human impact, nature reserves, deforestation.

Key Scientists:
Cindy Looy (Environmental Change and Extinction)
Jaques Cousteau (Marine Biologist)

Suggested texts:
The Vanishing Rainforest (Richard Platt)
The Morning I Met a Whale (Michael Morpurgo)
Journey to the River Sea (Eva Ibbotson)

Curriculum mapping

Living things and their habitats

White Rose SCIENCE

Year 5	Year 6
Sticky Knowledge:	**Sticky Knowledge:** • Life cycles have evolved to help organisms survive to adulthood. • Over time the characteristics that are most suited to the environment become increasingly common. NB: The following could be duplicated in Year 6 Living things and their habitats. • Organisms best suited to their environment are more likely to survive long enough to reproduce. Organisms are best adapted to reproduce are more likely to do so. • Organisms reproduce and offspring have similar characteristic patterns. • Variation exists within a population (and between offspring of some plants) • Competition exists for resources and mates
Vocabulary:	**Vocabulary:** Fossils, Adaptation, Evolution, Characteristics, Reproduction, Genetics, Variation, Inherited, Environmental, Mutation, Competition, Survival of the Fittest, Evidence,
Key Scientists:	**Key Scientists:** Charles Darwin and Alfred Russel Wallace (Theory of Evolution by Natural Selection) Jane Goodall (Chimpanzees) 
Suggested texts:	**Suggested texts:** One Smart Fish (Christopher Wormell) The Molliebird (Jules Pottle) Our Family Tree (Lisa Westberg Peters)

Curriculum mapping

Plants

White Rose SCIENCE

Year 1	Year 2	Year 3
• 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	• 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	• 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
Spring 1, Spring 5 Summer 1, Summer 2	Spring 1, Spring 3 Summer 1, Summer 3	Summer 1, Summer 4

Curriculum mapping

Plants

White Rose SCIENCE

Year 1

Sticky Knowledge:

- Plants grow from seeds/bulbs
- Plants need light and water to grow and survive
- Plants are important
- We can eat lots of plants

Vocabulary:

Leaves, trunk, branch, root, seed, bulb, flower, stem, wild, garden, deciduous, evergreen

Key Scientists

Beatrix Potter (Author & Botanist)

Suggested texts:

Seasons Come, Seasons Go
(Patricia Hegarty and Britta Teckentrup)

A Little Guide to Wild Flowers
(Charlotte Voake)

The Things That I LOVE about TREES
(Chris Butterworth)

Harry's Hazelnut
(Ruth Parsons)

Year 2

Sticky Knowledge:

- Plants grow from seeds/bulbs
- Plants need light, water and warmth to grow and survive
- Flowers make seeds to make more plants (reproduce)
- Plants are important
- We need plants to survive (to clean air, to eat)
- We can eat different parts of the plants (leaves, stems, roots, seeds, fruit)

Vocabulary:

Leaves, trunk, branch, root, seed, bulb, flower, stem, wild, garden, deciduous, evergreen, observe, grow, compare, record, temperature, predict, measure, diagram, germinate, warmth, sunlight.

Key Scientists

Agnes Arber (Botanist)
Alan Titchmarsh (Botanist & Gardener

Suggested texts:

The Tin Forest *(Helen Ward)*
Jack and the Beanstalk *(Richard Walker)*
Ten Seeds *(Ruth Brown)*
A Seed Is Sleepy (Dianna Aston)

Year 3

Sticky Knowledge:

- Plants are producers, they make their own food.
- Their leaves absorb sunlight and carbon dioxide
- Plants have roots, which provide support and draw water from the soil
- Flowering plants have specific adaptations which help it to carry out pollination, fertilisation and seed production
- Seed dispersal improves a plants chances of successful reproduction
- Seeds/bulbs require the right conditions to germinate and grow.
- Seeds contain enough food for the plant's initial growth

Vocabulary:

Air, light, water, nutrients, soil, support, anchor, reproduction, pollination, dispersal, transportation, flower, energy, growth, seedling, carbon dioxide, oxygen, sugar, material, photosynthesis, chlorophyll

Key Scientists

Jan Ingenhousz (Photosynthesis)
Joseph Banks (Botanist)

Suggested texts:

The Hidden Forest (Jeannie Baker)
George and Flora's Secret Garden
(Jo Elworthy)

Curriculum mapping

Materials

White Rose SCIENCE

Year 1	Year 2	Year 5
• 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	• 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	• 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 • 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
Autumn 3	Autumn 3	Spring 1 Summer 2

Curriculum mapping

Materials

White Rose SCIENCE

Year 1

Sticky Knowledge:
- There are many different materials that have different describable and measurable properties.
- Materials that have similar properties are grouped into metals, rocks, fabrics, wood, plastic and ceramics (including glass).
- The properties of a material determine whether they are suitable for a purpose.

Vocabulary:

Hard, soft, stretchy, stiff, shiny, dull, rough, smooth, bendy/not bendy, waterproof/not waterproof, absorbent, opaque,

Key Scientists:
William Addis (Toothbrush Inventor)
Charles Mackintosh (Waterproof coat)
John MacAdam (roads)



Suggested texts:
The Great Paper Caper (Oliver Jeffers)
Who Sank the Boat (Pamela Allen)
The Story of Cinderella (Walt Disney)

Year 2

Sticky Knowledge:
- Materials can be changed by physical force (twisting, bending, squashing and stretching)

Vocabulary:
Waterproof, fabric, rubber, cars, rock, paper, cardboard, wood, metal, plastic, glass, brick, twisting, squashing, bending, matches, cans, spoons,

Key Scientists:
William Addis (Toothbrush Inventor)
Charles Mackintosh (Waterproof coat)
John MacAdam (roads)



Suggested texts:
The Tin Forest (Helen Ward)
Traction Man (Mini Grey)
Three Little Pigs (Lesley Sims)

Year 5

Sticky Knowledge:
- When two or more substances are mixed and remain present the mixture can be separated.
- Some changes can be reversed and some can't.
- Materials change state by heating and cooling.
- All matter (including gas) has mass.
- Sometimes mixed substances react to make a new substance. These changes are usually irreversible.
- Heating can sometimes cause materials to change permanently. When this happens, a new substance is made. These changes are not reversible.
- Indicators that something new has been made are: The properties of the material are different (colour, state, texture, hardness, smell, temperature)
- If it is not possible to get the material back easily it is likely that it is not there anymore and something new has been made (irreversible change)

Vocabulary:
Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature, process, condensation, evaporation, water vapour, energy, precipitation, collection, Hardness, Solubility, Transparency, Conductivity, Magnetic, Filter, Evaporation, Dissolving, Mixing Material, conductor, dissolve, insoluble, suspension, chemical, physical, irreversible, solution, reversable, separate, mixture, insulator, transparent, flexible, permeable, soluble, property, magnetic, hard.

Key Scientists:
Spencer Silver, Arthur Fry and Alan Amron (Post-It Notes)
Ruth Benerito (Wrinkle-Free Cotton)

Suggested texts:
Itch (Simon Mayo)
Kensuke's Kingdom (Michael Morpurgo)
The BFG (Roald Dahl)

Curriculum mapping

Rocks

White Rose SCIENCE

Year 3
• 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
Autumn 5 Spring 1, Spring 2

States of matter

Year 4
• 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
Autumn 3

Curriculum mapping

Rocks

White Rose SCIENCE

Year 3

Sticky Knowledge:

- There are different types of rock.
- There are different types of soil.
- Soils change over time.
- Different plants grow in different soils.
- Fossils tell us what has happened before.
- Fossils provide evidence.
- Paleontologists use Fossils to find out about the past.
- Fossils provide evidence that living things have changed over time

Vocabulary:

Rocks, igneous, metamorphic, sedimentary, anthropic, permeable, impermeable, chemical fossil, body fossil, trace fossil, Mary Anning, cast fossil, mould fossil, replacement fossil, extinct, organic matter, top soil, sub soil, base rock.

Key Scientists

Mary Anning (Discovery of Fossils)
Inge Lehmann (Earth's Mantle)

Suggested texts

The Pebble in My Pocket (Meredith Hooper)
Stone Girl, Bone Girl (Laurence Anholt)
The Street Beneath My Feet (Charlotte Guillain & Yuval Zommer)

States of matter

Year 4

Sticky Knowledge:

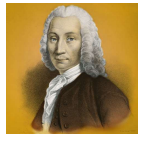
- Solids, liquids and gases are described by observable properties.
- Materials can be divided into solids, liquids and gases.
- Heating causes solids to melt into liquids and liquids evaporate into gases. d) Cooling causes gases to condense into liquids and liquids to freeze into solids.
- The temperature at which given substances change state are always the same.

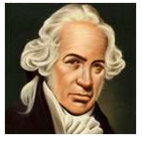
Vocabulary:

Solid, liquid, gas, particles, state, materials, properties, matter, melt, freeze, water, ice, temperature,process, condensation, evaporation, water vapour, energy, precipitation, collection,

Key Scientists

Anders Celsius (Celcius Temperature Scale)
Daniel Fahrenheit (Fahrenheit Temperature Scale / Invention of the Thermometer)





Suggested texts

Once Upon a Raindrop: The Story of Water (James Carter)
Sticks (Diane Alber)

Curriculum mapping

Electricity

White Rose SCIENCE

Year 4	Year 6
• 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	• 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
Spring 3	Autumn 2

Curriculum mapping

Electricity

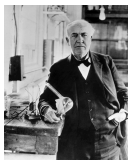
White Rose SCIENCE

Year 4

Sticky Knowledge:
- A source of electricity (mains of battery) is needed for electrical devices to work.
- Electricity sources push electricity round a circuit.
- More batteries will push the electricity round the circuit faster.
- Devices work harder when more electricity goes through them.
- A complete circuit is needed for electricity to flow and devices to work.
- Some materials allow electricity to flow easily and these are called conductors. Materials that don't allow electricity to flow easily are called insulators.

Vocabulary:
Electricity, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, component.

Key Scientists:
Thomas Edison (First Working Lightbulb)
Joseph Swan (Incadesecant Light Bulb)



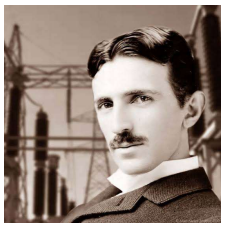
Suggested texts:
Until I Met Dudley (Roger McGough)
Oscar and the Bird: A Book about Electricity (Geoff Waring)
Electrical Wizard: How Nikola Tesla Lit Up the World (Elizabeth Rusch)

Year 6

Sticky Knowledge:
- Batteries are a store of energy. This energy pushes electricity round the circuit. When the battery's energy is gone it stops pushing. Voltage measures the 'push.'
- The greater the current flowing through a device the harder it works.
- Current is how much electricity is flowing round a circuit.
- When current flows through wires heat is released. The greater the current, the more heat is released.

Vocabulary:
Electricity, neutrons, protons, electrons, nucleus, atom, electric current, appliances, mains, crocodile clips, wires, bulb, battery cell, battery holder, motor, buzzer, switch, conductor, electrical insulator, conductor.

Key Scientists:
Alessandro Volta (Electrical Battery)
Nicola Tesla (Alternating Currents)



Suggested texts:
Goodnight Mister Tom (Michelle Magorian)
Blackout (John Rocco)
Hitler's Canary (Sandi Toksvig)

Curriculum mapping

Earth and space

White Rose SCIENCE

Year 5
• 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
Autumn 2

Seasonal changes

Year 1
• Observe changes across the 4 seasons • Observe and describe weather associated with the seasons and how day length varies
Autumn 2, Autumn 4 Spring 4 Summer 4

Curriculum mapping

Earth and space

White Rose SCIENCE

Year 5

Sticky Knowledge:

- Stars, planets and moons have so much mass they attract other things, including each other due to a force called gravity. Gravity works over distance.
- Objects with larger masses exert bigger gravitational forces.
- Objects like planets, moons and stars spin.
- Smaller mass objects like planets orbit large mass objects like stars.
- Stars produce vast amounts of heat and light.
- All other objects are lumps of rock, metal or ice and can be seen because they reflect the light of stars.

Vocabulary:
Earth, Sun, Moon, Axis, Rotation, Day, Night, Phases of the Moon, star, constellation, waxing, waning, crescent, gibbous. Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, planets, solar system, day, night, rotate, orbit, axis, spherical, geocentric, heliocentric.

Key Scientists
Claudius Ptolemy and Nicolaus Copernicus (Heliocentric vs Geocentric Universe)
Neil Armstrong (First man on the Moon)
Helen Sharman (First British astronaut)
Tim Peake (First British ESA astronaut)
Mae Jemison

Suggested texts
The Skies Above My Eyes (Charlotte Guillain & Yuval Zommer)
George's Secret Key to the Universe (Lucy and Stephen Hawking with Christophe Galfard)
The Way Back Home (Oliver Jeffers)

Seasonal changes

Year 1

Sticky Knowledge:

- Weather can change
- There are lots of different types of weather: Rain, Sun, Cloud, Wind, Snow, etc
- Days are longer and hotter in the summer
- Days are shorter and colder in the winter
- There are four seasons: Spring, Summer, Autumn, Winter

Vocabulary:
Seasons, spring, summer, autumn, winter, windy, sunny, overcast, snow, rain, temperature

Key Scientists:
Dr Steve Lyons (Extreme Weather)
Holly Green (Meteorologist)

Suggested texts:
Tree: Seasons Come, Seasons Go (Patricia Hegarty and Britta Teckentrup)
One Year with Kipper (Mick Inkpen)
After the Storm (Nick Butterworth)

Curriculum mapping

Forces and magnets

White Rose SCIENCE

Year 3	Year 5
• Compare how things move on different surfaces • Notice that some forces need contact between 2 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 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing	• 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
Summer 2, Summer 3	Autumn 1

Evolution and inheritance

Year 6
• 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
Summer 1, Summer 2, Summer 3

Curriculum mapping

Ask questions

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Ask simple questions.	• **Ask simple questions and recognise that they can be answered in different ways.**	• Ask questions and understand there are different enquiry types they could use to answer them.	• **Ask relevant questions and use different types of scientific enquiry to answer them.**	• Ask scientific questions and begin to understand which questions would be best suited to each enquiry type.	• Ask relevant scientific questions and choose which enquiry type would be best suited to answer them.

Plan

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Verbally state what they are going to investigate.	• Make simple predictions based on a question. • Identify what they will change and keep the same.	• Make relevant predictions. • Identify what they will change, observe and keep the same. • With support, set up simple practical enquiries.	• Make predictions based on simple scientific knowledge. • Identify what they will change, observe or measure and keep the same. • **Set up simple practical enquiries, comparative and fair tests.**	• Make predictions based on scientific knowledge. • With support, plan different types of scientific enquiry. Where appropriate, identify the dependent, independent and controlled variables.	• Make predictions based on scientific knowledge. • **Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.**

Curriculum mapping

Make observations

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Observe closely.	• **Observe closely, using simple equipment.**	• Begin to use scientific equipment to make observations.	• **Make systematic and careful observations.**	• Use a range of scientific equipment to make systematic and careful observations.	• Use a range of scientific equipment to make systematic and careful observations with increased complexity.

Take measurements

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Carry out simple tests using non-standard measurements when appropriate.	• **Perform simple tests** using standard units when appropriate.	• Carry out tests and simple experiments and take measurements using standard units.	• **Take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.**	• Take accurate measurements using a range of scientific equipment. Start to take repeat readings when appropriate.	• **Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.**

Curriculum mapping

Gather, record and classify data

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Gather and record simple data. • Sort objects and living things into groups based on simple properties.	• **Gather and record data to help in answering questions.** • **Identifying and classifying.**	• Gather and record data in different ways to help answer questions. • **Recording findings using simple scientific language, drawings, labelled diagrams, bar charts, and tables.**	• **Gather, record and classify data in a variety of ways to help in answering questions.** • **Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.**	• Gather, record and classify data with increasing complexity to help in answering questions. • **Record data using scientific diagrams and labels, classification keys, tables, bar and line graphs.**	• **Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.**

Present findings

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Explain what they found out to an adult or a partner.	• **Talk about what they have found out and how they found it out. (non-statutory)**	• Report on findings from enquiries, including oral and written explanations.	• **Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.**	• Report and present findings from enquiries, including conclusions. • Begin to identify causal relationships in oral and written forms such as displays and other presentations.	• **Report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.**

Curriculum mapping

Answer questions and make conclusions

White Rose SCIENCE

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
• Answer simple questions.	• **Use their observations and ideas to suggest answers to questions.**	• Make simple conclusions. • Use results, findings or observations to answer questions.	• **Use straight-forward scientific evidence to answer questions or to support their findings.** • **Use results to draw simple conclusions.** • **Begin to identify differences, similarities or changes related to simple ideas or processes.**	• Use scientific evidence to answer questions. • Make conclusions based on scientific evidence and from their own testing and findings. • **Identify differences, similarities or changes related to simple ideas or processes.**	• Use scientific evidence to answer questions. • Make conclusions based on scientific evidence and from their own testing and findings. • **Identify scientific evidence that has been used to support or refute ideas or arguments.**

Evaluate

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		• Suggest questions for further investigation.	• Begin to **make predictions for new values, suggest improvements and raise further questions.**	• **Make predictions for new values, suggest improvements and raise further questions.**	• **Use test results to make predictions to set up further comparative and fair tests.** • Suggest investigation improvements including accuracy of results. • Provide some simple examples of how to extend the investigation.

Subject Monitoring

Science at Lugwardine Primary Academy will be monitored in a variety of ways.

This will include

- Observations and learning walks (twice a year)
- Staff survey (Termly: November, March, July)
- Book checks (Termly: December, February, June)
- Pupil Voice (Termly: November, April and June)
- Assessment Evidence (End of each half term)
- Planning (Termly)

Assessment data

TBC

Action plan

Action	Success criteria	Action needed	Responsibility and cost	Timescale	Monitoring	Evaluation	RAG
Curriculum	To introduce white rose as a consistent scheme across the school. To promote working scientifically through practical ideas. To update non negotiables to reflect new curriculum.						
Assessment	To implement a whole school approach to formative assessment in science To introduce a new whole school summative assessment scheme for science (End of topic assessments) To introduce a consistent metacognition strategy (flashback 4)						
Diversity and wider opportunities	To review curriculum offer and suggested scientists and texts to promote diversity. To introduce a scientist of the year at a relatable age. To work towards an Eco Schools award.						

CPD available to staff

https://www.stem.org.uk/primary/cpd

https://www.reachoutcpd.com/

https://nationalcollege.com/webinars/primary-science-ofsteds-research-review

Link Governor information

Mrs C Long is the Science Link Governor

Risk Assessment

Topic: Alchohol, drugs and medicines Dangers associated with medicines, tablets, solvent, alcohol, tobacco and everyday substances Topic: Organs • Transfer of infections. • To pupils with medical conditions when carrying out pulse investigation.	(Low) (Low)	Discuss that pills can look like sweets and solvents like water or everyday drinks. • Discuss why it is important not to take other people's prescribed medicines. □ Never use any substance within school for these lessons unless using the sealed demonstration box. □ Children and adults advised never to taste or smell unknown substances as this can put health and danger. • Use posters, pictures or video clips rather than dissect organs. • Disinfect the ear pieces of stethoscopes using, for example, freshly diluted Milton. • Identify any pupils with medical conditions, including those with respiratory problems.	Involve children in process of agreeing potential dangers. Only use resources purchased from reputable companies which are for teaching and learning purposes only. Any children with allergies to cleaning fluids to watch the demonstration.
		Plants	
Topic: Plants & Living things. • Pupils and staff may experience an allergic reaction . • Poisonous berries and fungi. • Contaminated soil (see general information below).	(Medium)	Display common poisonous species and instruct pupils as to hazards. • Cover all cuts and grazes. • Use sterilised soil or potting compost for planting seeds. • Wash hands after touching plants and soil. • Wear plastic gloves. • Warn pupils of dangers of hand, eye and mouth contact.	Identify cause of an allergic reaction and remove from the pupil - seek medical advice in the event of a severe reaction. Involve pupils in the process of agreeing any precautions for the activity.

Topic: Microorganisms • Contamination with other food stuffs. • Allergic reactions. • Explosion caused by build up of gases when growing yeast.	(Medium)	• Symptoms of an allergic reaction include: wheezing, coughing, sneezing, skin rash, skin reddening, itching, sweating, runny noses, runny eyes. SYMPTOMS OF COUGHING SHOULD ALWAYS FOLLOW COVID 19 PROCEDURES • Some plants are known to be toxic and have poisonous seeds. Staff to point these plants out and warn of the potential dangers • Some species of plants are protected and should not be taken from their natural habitat. • Garden tools can be dangerous if not regularly checked, eg: for loose handles and broken parts Staff to model how to use tools appropriately and safely. . • Soils may be contaminated with pathogens such as toxocara and tetanus. • Most soils are contaminated with parasites and pathogens, particularly as a result of animal fouling. Animal fouling to be removed by an adult wearing appropriate clothing and dispose of appropriately. • Compost from garden centres is sterilised and should be used in preference to local soils if the risks are thought to be high or to minimise risks. • Wash hands with soap and water before and after.	If at any point a child wipes face, digests part of a plant, gets compost in eyes etc, medical assistants is required immediately. Digestion of plants - Call Ambulance. • Identify cause of an allergic reaction and remove from the pupil - seek medical advice in the event of a severe reaction . • In the event of a spillage, teachers must cover the

		• Cover cuts and grazes. • Keep cultures, such as mouldy bread and other foodstuffs, in sealed containers and dispose of with normal school waste without unsealing when finished. • Keep away from other foodstuffs (such as in a fridge) to avoid contamination . • Containers used for growing yeast should only be loosely plugged with cotton wool. • Wear plastic gloves. • Tell pupils they must not make hand, eye and mouth contact. • Symptoms of an allergic reaction include: wheezing, coughing, sneezing, skin rash, skin reddening, itching, sweating, runny noses, runny eyes. • There is a legal requirement under the Control of Substances Hazardous to Health (COSHH) Regulations (1999) to carry out an assessment of risks associated with microbiological hazards whenever pupils are involved with microbiology. See page 4 of CLEAPSS L190 for further guidance.	surface with a strong disinfectant for 30 minutes and then wipe up wearing gloves. • Spillages on skin or clothing should be washed immediately with soap and hot water.
		Electricity	
Use of batteries • Minor burns. • Damaged skin from leaking batteries (acid burn). • Short circuiting and fire.	(Low)	□ Teach children about battery safety, do not put in mouth for any reason. □ Do not cut open any battery. □ Never put them in an oven or microwave. □ Do not put them in the bin. □ Store batteries and equipment correctly. □ Rechargeable batteries should not be used for	• If a burn is sustained, including acid burns - submerge affected area in cold water for a minimum of 10 minutes. Seek medical attention immediately.

Topic: heating Materials using Electrical Source. • Burns or scalds • Tripping over wires and leads.	(Medium)	circuit work. □ Rechargeable batteries may explode if dropped in water. □ Do not use car batteries or accumulators with young children. □ All power supplies must meet UK regulations. □ Closed circuits must never be used. □ Leaking batteries should be discarded of safely by an adult. Use oven gloves to remove containers from heat sources. • Use adult supervision. • Turn handles inwards. • Indicate when cooker is switched on, such as large hot sign. • Turn off appliance immediately after use. • Teach pupils to pull clingfilm from the furthest edge of the container towards themselves so as to allow the steam to escape. • Avoid re-heating liquids that have already been boiled in microwave ovens. Let heated liquids stand in the microwave before use • Melt materials such as foods or wax indirectly, such as over a saucepan of hot water. • Teach pupils the procedure for dealing with burns. • Ensure leads are tucked out of the way to prevent accidents. • Consider the height of the cooker in relation to height of pupils when assessing whether a pupil can remove containers from cooker, etc. • Use low melting point wax, such as blocks sold	• Run the burn under cold water for a minimum of 10 minutes. Seek medical advice immediately.

Electrical safety • Electricity can kill . • Overloading. • Hot extension leads . • Burns from heating appliances . • Tripping over extension leads. Circuits • Minor burns . • Cuts from broken bulbs. • Batteries - as above	(Medium) (Low)	for the treatment of arthritis, or low melting point paraffin wax. • A bucket of cold water should be readily available in case of a burn. □ Stress the danger of playing with mains sockets. □ Never use electricity near water. □ Check any electrical equipment for faulty plugs or wires. □ Children should be taught to switch off at the wall socket before plugging or unplugging mains equipment. • Use RCDs when operating mains appliances. • Check equipment visually (see General information section overleaf). • Fully extend extension leads to prevent overheating. • Cover extension lead wires with mats. • Display a hot warning sign when heating appliances in use and follow safety procedures. • Teach pupils how to prevent short circuiting batteries. • Ask pupils to disconnect wires from the battery during any breaks in the lesson. • Include a component in a circuit when using lengths of wire to make a resistor or an electromagnet. • Warn pupils that steel wool and aluminium foil may become hot or burn when conducting electricity	• Switch off appliances at mains. • In the event of electrocution - switch off mains before touching victim. • Ensure airway is open . • If a burn is sustained - flood affected area with cold water for at least 10 minutes. • Wrap broken bulb(s) in newspaper and place in a dustbin (not waste paper bin) and liaise with cleaning staff . • If a burn is sustained - flood affected area with cold water for a minimum of 10 minutes.

		Materials	
Topic: Materials testing for strength/ hardness/flexibility. • Fragments from brittle plastics causing cuts and eye injuries. • Dust from polystyrene causing breathing problems. • Sharp, jagged edges if materials break, causing cuts. • Broken glass causing cuts. • Heavy masses falling and damaging feet. • Splinters from wood. • Whiplash injuries from breaking wires or elastic bands, etc, under tension.	(Low)	• Wear goggles if testing strength or if there is the risk of brittle plastic breaking. • When squashing rigid materials use a vice or G-clamp. • Wear strong gardening gloves to protect hands when testing rigid materials. • Avoid glass . • Warn pupils of the dangers of breaking wires and elastic bands under tension. • Wrap broken glass in newspaper and place in a dustbin (not waste paper bin) and liaise with cleaning staff.	
Topic :Rocks & Soils Fragmenting rocks. • Contaminated soils (see general information below). • Injury due to damaged gardening tools.	(Low)	• Wear goggles if there is a risk of rocks fragmenting. • Wash hands following the handling of soils. • Use sterilised compost. • Cover cuts and broken skin. • Wear gloves when using tools and un-sterilised soils. • Warn pupils of the potential hazard of contaminated soils and the importance of not touching eyes and mouth when handling soils. • Check for loose handles and broken parts on gardening tools Staff to model safe use. . • Rinse tools after use and regularly wash with disinfectant solution. • Soils may be contaminated with pathogens such as toxocara and tetanus.	• Identify the cause of an allergic reaction and remove from the pupil - seek medical advice in the event of a severe reaction.

Topic: Using water & other liquids • Allergic reaction to substances such as washing-up liquid. • Swallowing liquids, eg: when exploring bubbles. • Slippery surfaces . • Scolding. • Water and electricity. • Chemical reaction when mixing substances with liquids. • Oil must not be heated unless in a water bath. Topic:Conductors & Insulators	(Low) (Low)	• Most soils are contaminated with parasites and pathogens, particularly as a result of animal fouling. • Compost from garden centres is sterilised and should be used in preference to local soils if the risks are thought to be high or to minimise risks. Identify any pupils with skin allergies - wear gloves □ When using liquids for senses topic **to smell**, only use cinnamon sticks, garlic or onion powder, red, cider and white vinegar, vanilla, peppermint, mixed spices, mixed herbs, rubbing alcohol, cocoa, lemon essence, coconut essence . • Blow through straw or use shaped bubble blowers. • Use absorbent material to cover area to avoid slipping. Warn pupils of the dangers of spilt liquids . • To avoid spillage, encourage pupils to carry small containers of water within a larger one such as in a bucket . • If hot water is required other than from sink, ensure adult supervision . • Restrict other liquids to cooking ingredients such as vinegar, cooking oil, syrup . • Site activities away from electrical appliances and mains supply. • For mixing purposes, use only cooking ingredients. • Restrict hot water to that from a tap. • Ensure adult supervision. • Only adults should pour hot water into	• Identify the cause of an allergic reaction and remove from the pupil - seek medical advice in the event of a severe reaction.

• Scolding. • Broken thermometers. • Allergic reaction to insulating materials such as fibreglass and loft insulation materials.		containers in a tray . • Place an elastic band around the thermometer to prevent rolling. • Use plastic covered thermometers, thermosticks,digital thermometers, computer or hand-held sensors. • Mercury thermometers must not be used. • Identify any pupils and adult helpers with skin allergies. Symptoms of an allergic reaction include: wheezing, coughing, sneezing, skin rash, skin reddening, itching, sweating, runny noses, runny eyes. • Mercury thermometers should not be used. This is because liquid mercury vaporises at a low temperature and can therefore get into the body easily. Mercury is poisonous.	
Topic: Testing materials/twisting Young children swallowing magnets. • Sharp edges and broken fragments, eg: from springs, splinters from wood . • Loose iron filings can irritate the skin and eyes . • Trapped skin when compressing springs • Injury from springs or elastic bands when released after compression or stretching. • Expanded polystyrene must not be used to test bending or twisting since the polystyrene dust released is hazardous.	(Low)	Warn pupils not to put magnets near or in mouths . • Wear goggles if testing strength. • When squashing rigid materials use a vice or G-clamp. • Wear strong gardening gloves to protect hands when testing rigid materials. • Avoid glass. • Iron filings must be used in sealed containers. • Warn pupils to release compressed or stretched materials slowly to avoid injury.	
Topic: Mixing materials	(Low)	• Cover cuts. • Mixing materials together may produce materials	• Identify cause of an allergic reaction and remove from the pupil.

Pupils and staff may experience an allergic reaction to different substances. • Lemon juice and vinegar will sting if it gets into a cut . • Because carbon dioxide is released during the reaction between vinegar and sodium bicarbonate, and between lemon juice and baking powder, placing a thumb over the end of a container and shaking may lead to the container breaking or exploding. • Mixing unknown substances. • Inhalation of dust or powders Topic: The Human body and senses	(Low)	with unknown hazards, therefore use common combinations when doing this: lemon juice and baking powder, vinegar and sodium bicarbonate, cement and water, plaster of Paris and water. • Use cooking ingredients when mixing substances. • Use small quantities of powders to minimise the need for dust masks and safety goggles. • Symptoms of an allergic reaction include: wheezing, coughing, sneezing, skin rash, skin reddening, itching, sweating, runny noses, runny eyes. • Because a gas is often produced when substances are mixed, the contents in a container may overflow, so have paper towels to hand. • **Washing powder and dishwasher powder are often highly irritant and would not be recommended for mixing. Look for hazard symbols on packs** . • Plaster of Paris generates heat when mixed with water. • Some children have an allergic reaction to some food colouring/colourants □ Always check pink forms to see what children are allergic to. All precautions to be taken to ensure these children do not come into contact with such substances. □ **Smell** - When using liquids for senses topic **to smell**, only use cinnamon sticks, garlic or onion powder, red, cider and white vinegar, vanilla, peppermint, mixed spices, mixed	Identify cause of an allergic reaction and remove from the pupil - seek medical advice in the event of a severe reaction.

		herbs,, cocoa AND lemon essence. - **DO NOT USE MAN MADE CHEMICALS OR SUBSTANCES.** - Taste - DO NOT USE ANY SUBSTANCES CONTAINING NUTS and other substances which children and adults could be allergic to. - ONLY USE ITEMS FIT FOR HUMAN CONSUMPTION - ALWAYS CHECK PINK MEDICAL FORMS - IF IN DOUBT, ASK A MEMBER OF THE SLT OR SCIENCE COORDINATOR FOR ADVICE. - Hearing - Select sounds which will not harm hearing. - Advise children NOT to get too close to the sound. - Do not play the sound directly into the ear. - Advise children and adults NOT to shout into ears. - STAFF ARE RESPONSIBLE FOR THEIR OWN ACTION IF THEY DO NOT FOLLOW SCHOOL PROCDUERS OR SEEK ADVICE. **Touch** - see plants guidelines Only use objects which will not cause harm. **Sight - Advise children and adults NOT to look directly into lights or the sun.** **During eclipses, follow Government advice and DO NOT take part in activities unless permission has been sought from SLT and parents.**	

		Forces	
Topic: Pushes and pulls Young children swallowing magnets. • Flying objects hitting pupils. • Cuts from changing the shape of objects by squashing, bending or twisting. • To pupils with respiratory problems when blowing bubbles, balloons, etc . • Inhalation of bubble mixture . • Trips and falls due to moving objects.	(Low)	• Warn pupils not to put magnets near or in mouths. • Teach pupils to look out for others when exploring moving objects and also know how to carry out the activity safely. • Consider whether activities using flying objects would be best carried out indoors or outdoors. • Avoid using brittle materials to test. • Wear gloves if there is a risk of cuts when changing the shape of objects. See Hazard Card Sc3.5. • Identify pupils with medical conditions, including those with respiratory problems. • Ensure inhalers are readily available. • Teach pupils to blow rather than suck when exploring bubbles. • **Ensure that you choose a bubble mixture that will not harm pupils.**	• Wash any small cuts and cover. • Adults dealing with cuts should wear protective gloves, use disinfectant to clear spillages and thoroughly wash their hands after contact.
Topic: Magnets & Springs • Irritation of skin and eyes when using loose iron filings. • Damage to toes from falling objects such as kilogram masses. • Injuries to eyes and face from snapping materials when overstretched.	(Low)	Iron filings must be placed in a sealed container. • Wash hands after contact with loose iron filings . • Raise pupils' awareness of effect of falling objects. Place a box containing soft, absorbent material to cushion falling objects. • Eye protection must be worn when there is a risk of snapping or overstretching materials. • Loose iron filings are difficult to remove from magnets. • Iron filings can be purchased in sealed	

Topic: Forces • Friction burns. • Injury to fingers if exploring bicycles. • Injury from moving or flying objects.	(Low)	containers. • Spring-based instruments, including home-made Newton meters, can be dangerous if suddenly released under tension. • Stronger meters, which might be used to measure a pupil's strength, must be firmly anchored with plenty of clear space around the pupil. • Tell pupils that friction generates heat. • Allow plenty of space for activities involving moving objects. • Ensure hanging structures, such as pulleys, are firmly fixed. • Limit the size and load of moving objects. • Teach pupils to aim away from each other when testing flying objects and projectiles. • Naked flames must not be used for hot air balloons. • When releasing objects from a height, ensure pupils stand on secure structures, such as physical education boxes, rather than classroom furniture. • It is dangerous to use hand-held electrical appliances near water. When testing movement of boats, use battery powered fans. • Activities involving flying things, such as kites, hot air balloons, catapults, water rockets, paper aeroplanes, etc, often require a large space and require close supervision. • Hot air balloons should be filled with hot air from a hairdryer	In the event of a burn - flood affected area with cold water for at least 10 minutes. Seek medical attention immediately.
		Light & Sound	

Topic: Light • To eyes when looking at very bright light sources. • Burns from naked flames. • To pupils with respiratory problems, such as asthmatics. • Skin burns from focusing lens on the skin in sunshine	(Low)	Make pupils aware of the dangers of looking at very bright lights. • Teach pupils that they should never look directly at the Sun, or through binoculars, telescopes, prisms or lens . • Ensure there is sufficient supervision. • Tell pupils to keep away from naked flames. • Identify pupils with medical conditions, including those with respiratory problems. • Ensure inhalers are readily available. • Ensure room is well ventilated. • Use a snuffer to extinguish candles. • Fix candles or night lights on a stable base and place in a sand tray. • Use safety matches. • Tie back long hair and secure loose clothing, such as at the wrist, when using candles or night lights. • Pupils should be taught not to sit down when using candles, so they can move more quickly if there is an accident.	• In the event of a burn - flood affected area with cold water for at least 10 minutes. • If a pupil suffers an asthma attack - ensure they keep taking their inhaler until symptoms subside (it can be taken up to 30 times if necessary). Seek medical attention immediately.
Topic: Sound • Damage to hearing from excessive sound close to ear. • Injuries caused by breaking or flicking materials. • Damage to teeth from vibrating tuning forks. • Cross-infection from shared equipment..	(Low)	Instruct pupils not to shout into the trumpet or diaphragm ends of stethoscopes or tubes. • Use robust materials or those designed specifically for musical activities which are unlikely to fracture when exploring sources of sounds. • Teach pupils to avoid contacting a vibrating tuning fork with their teeth or glass objects. • Any equipment which is placed into the mouth or ear should be disinfected after each use by a pupil.	

For activities outside of those suggested above please ensure an additional risk assessment is carried out.