Science & Technology

Deanwood Science

Curriculum 2023-24

Contents

Science & Technology aims to deepen a respect and sense of wonder for the world through practical activity and a developing inquisitive nature.

Science & Technology curriculum comprises of:

- Science
- Design & Technology
- Computing

Deanwood School Values

Our Science & Technology Curriculum underpins our school values in the follow way:

Happy exploring the possibilities of their imagination, whilst discovering the scientific outcomes and putting these to use in computing, design and technology and science.

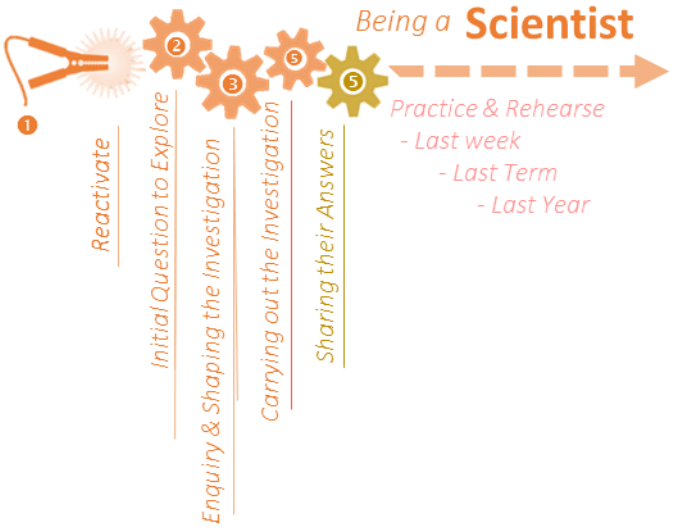
Successful To be challenging and spark excitement - unlocking the potential. Learners, taking initial ideas through the technical and scientific processes to outcomes that inspire and are celebrated.

Safe children can experiment with technology and implement their findings. Thus learning the importance of independent and team work which are vital in creating inspirational projects.

How Do We Teach Science?

We have the scheme '*Switched On Science*' which supports teacher's subject knowledge and scaffolds the learning.

The Teaching of Science follows a specific routemap which builds up the knowledge of their unit in small steps.



1. Re-Activating

The unit will begin with the children activating prior knowledge. This can be a Flashback 4 and the Pre Assessment test.

2. Initial Question to Explore

The pupils will be given a question to explore. This will be given the opportunity to

3. Enquiry and Shaping the Investigation

The pupils will be taught how to shape an investigation. They will be taught which type of enquiry they can carry out to find the answer to the question. Each type is different and the investigation will be suited to finding the answers to the initial question.

4. Carrying out the Investigation

As the pupils carry out the investigation

5. Evaluating their findings

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Working Scientifically

Science is a large subject area which draws on other subject areas as well as developing its own subject specific skills.

Throughout all of these, the children will be learning how to be a scientist and how to work scientifically. There are seven key scientific skills which we develop in the children. These cross through all year groups and strands of science.


Asking Questions

Making Predictions


Setting up tests

Observing & Measuring

Recording Data

Analysing Data


Sharing their answers

How Do We Teach **Working Scientifically**?

Initial Question to Explore

We start with a question. These questions should be asked in a manner which gives children the opportunity to answer in a manner of their choosing and using, wherever possible, their own methods. This stage is key for:

Asking Questions

Making Predictions

Enquiry & Shaping the Investigation

In Science, there are five Enquiry Types which the children will undertake. They each are varied and look at developing different scientific enquiry and skills.

1. **Identifying, classifying & grouping**
In this type of investigation, children will be exploring and looking for similarities, differences such as exploring materials, alive, dead or never been alive or states of matter.

2. **Research using secondary sources**
The children will use a variety of sources such as books or the internet.

3. **Observing over time**
The children will observe and study over a longer period of time, such as moon cycle, weather and plant growth. This links well with Science and use of tables and charts.

4. **Pattern seeking**
Children will be making observations or measurement where variables cannot be controlled and so 'not fair'. This could include exploring trees and the size of leaves; is there pattern between the size and shape of the bird's beak and the food they eat?

5. **Comparative and fair testing**
Children will be exploring changing one variable in an experience to find evident to create their own hypothesis. They need to decide which variable to change and how to measure and observe this variable.

From the initial question, children need to identify which of the Five Enquiry Types they would be best to use to find the answer. This stage teaches the children:

Setting up tests

Making Predictions

Carrying Out the Investigation

Throughout the investigation, the children need to develop their scientific skills. For each stage of the investigations, we have symbols which link to the scientific skill the children will be using.

Carrying out the investigation – Observing & measuring

Developing observation skills is key and children need to be taught through questioning to develop these. From these observations, further enquiries can be created. Children need to learn to take measurements. Measurements should be taken in various ways and over various time periods to devise results. This stage looks:

Observing & Measuring

We link this to maths with measurement where possible so that the skills are age appropriate for the children.

Carrying out the investigation – Recording data

When working with measurements, children need to collect data. They can use a range of methods such as tables, charts and can include IT. They can represent data – Line graphs, bar charts, pie charts – with the freedom of choice on how to display results as long as they are accurate and easy to read. This stage focuses on:

Recording Data

Again, we link this to the mathematics curriculum so that the statistic is age appropriate.

Carrying out the investigation – Analysing Data

As well as representing data, children must be able to interpret data. Children do not always have to represent the data but can use prepopulated data to examine. They need to be able to understand what the data tell us. From this, children need to be taught how to make conclusions – Have we answered our question? If not, what can we do next? This focuses on:

Analysing Data

Sharing their Answers to the Question

At the end of the investigation, it is important that children bring their investigation to a conclusion to the original question. This does not need to be a written evaluation but allow the children to explore the evidence collected and formulate their hypothesis.

Teachers are free to use a range of methods for them to reflect on what we have learnt they have learnt from the data. For example, using PMI where a statement is given which relates to what has been learnt – e.g. 'Imagine people have their own plant-like green skin, so they can create their own food in sunlight'.

Sharing their answers

How do we support pupils in Science?

Non Negotiables that need to be in place in all lessons/classrooms when teaching science

1. Opportunities to explore tactile resources/equipment where appropriate
2. New vocabulary on display/dual coded (pre-taught where necessary)
3. Explicit modelling of key skills – scientific enquiry, investigations

Cognition and Learning

Subject Challenges	Provision for SEND
Age appropriate content for all children in the science lessons	Using personal stories to understand different contexts 1:1 session Use of books/stories
Gaps in knowledge and understanding in science due to (Covid19)	Ensure previous years science learning objectives are covered
Accessing learning due to poor literacy skills	Key words displayed Use of shorter/less complex sentences in resources given Writing frames where possible
Children may struggle to remember information/facts/previous learning in science	Lots of retrieval opportunities and reinforcement in science lessons Clear differentiation Apply new vocab into lots of different contexts – pre teaching vocab Physical warm ups to recall previous learning

Communication and Interaction

Subject Challenges	Provision for SEND
Children may struggle to communicate and express opinions in science	Visual cues Visual words/ phrases Minimise background noise Child to face T to support lip reading Write new vocabulary down Dual coding Language Buddies
Language difficulties may make chn unable to access their science learning	Lots of reinforcement Lots of repetition Scaffold observational skills through careful questioning Use of simple instructions Step by step instructions Careful and appropriate modelling to support understanding Visual aids and dual coding Video's of examples and practice

Physical and sensory

Subject Challenges	Provision for SEND
Children with visual impairment may find it difficult to see images shown during the science lessons.	Ensure images are enlarged and accessible Ensure chn are close to whiteboard/ sources
Recording information may be difficult from a scientific investigation.	Provide additional ways to record e.g. video, drawings, verbal explanation
Children with fine motor difficulties may find it difficult to use specific Science equipment	EYFS tools that may be larger to use Working in groups to support Pencil grips and tripod pencils Use of ICT to support access
Children who might not be able to touch or handle equipment	Addressing individual needs on a school trip to ensure full access eg breaks for walking etc

Social Emotional and Mental Health

Subject Challenges	Provision for SEND
Chn may become frustrated/withdraw/ aggressive when work is challenging	Ensure instructions are clear Children provided with a role which may not involve active participation Use of ICT to support access Providing appropriate resources so that children can access the lesson eg fiddle toy Providing a safe space for the children within the lesson if needed- breakout spaces
Children's mental health and wellbeing may impact on their ability to access their learning	Teach with empathy and understand Ensure children have opportunities to have sensory breaks etc from their work Consider cognitive overload and children's ability to manage this Ensuring that parents are aware of curriculum and can support in science.

The Science Spine for the Pupils

The Science knowledge for the pupils is sequenced to build up not only in year but also in three key themes over each year.

Biology

Physics

Chemistry

Working Scientifically

	Biology	Physics	Chemistry	
N				**Working Scientifically**: Across all topics, children will be learning to work scientifically – using and developing investigative skills, including observation, pattern-seeking, fair testing, classification and identification
R				
1	**Animals, including humans** (*naming animals and body parts*) **Plants** (*names & structure*)	**Seasonal Changes** (*changes and weather*)	**Everyday materials** (*names and properties of simple materials*)	
2	**Living things and their habitats** (*suitable habitats/simple food chains*) **Plants** (*growing conditions for seeds and bulbs*) **Animals, including humans** (*Health and growth*)		**Uses of everyday materials** (*suitability and changing shapes of materials*)	
3	**Plants** (*functions of parts and life cycles*) **Animals, including humans** (*skeletons*)	**Light** (*dark is the absence of light, size of shadows*) **Forces and magnets** (*friction – how things move on different surfaces, magnets*)	**Rocks** (*simple properties, fossils, soils*)	
4	**Living things and their habitats** (*grouping and simple classifying/changes to habitats can pose dangers*) **Animals, including humans** (*teeth, eating and digestions*)	**Sound** (*fainter sounds further away, vibrations, pitch and volume*) **Electricity** (*simple circuit, switches, conductors and insulators*)	**States of matter** (*solids, liquids, gases, heating & cooling, water cycle*)	
5	**Living things and their habitats** (*life cycles, reproduction*) **Animals, including humans** (*changes in humans as they grow*)	**Forces** (*gravity, friction, airresistance, levers, pulleys and gears*) **Earth and Space** (*other planets*)	**Properties and changes of materials** (*more properties including thermal and electrical conductivity, mixing and separating reversible and irreversible*)	
6	**Animals, including humans** (*circulatory system, functions of heart, blood vessels and blood, health, water transport in animals*) **Living Things and their habitats** (*classifying including microorganisms*) **Evolution and inheritance** (*more about fossils, adaptation*)	**Light** (*travels in straight lines, how we see things*) **Electricity** (*what affects bulb brightness, buzzer volume, voltage, symbols*)		

These are delivered in the following Terms.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
N						
R						
1	Animals Including Humans	Scientists and Inventors	Seasonal Changes: Autumn and Winter	Seasonal Changes: Spring and Summer	Plants	Everyday Materials
2	Living Things and Their Habitats	Materials	Animals Including Humans	The Environment	Plants	Scientists and Inventors
3	Scientists and Inventors – Investigation Unit	Magnets	Light	Plants	Healthy Eating	Rocks and Soils
4	Sound	Animals Including Humans	States of Matter	Electricity	Scientists and Inventors	Living Things and their Habitats
5	Forces	Living things and their habitats	Space	Scientists and inventors	Animals including humans	Properties and changes of materials
6	Animals inc Humans	Evolution & Inheritance	Electricity	Light	The Titanic	Living Things & Their Habitats

Disciplinary (*Know how…*) Working Scientifically Knowledge

Assessment Question 1. What do the pupils need to learn? *Assessment Question 2. What do the pupils understand?*

Year N

WS.N.1. Asking Questions

EYFS Development Matters

Talk about what they see, using a wide vocabulary and Explore how things work.

WS.N.3. Observing

I. Use all their senses in hands-on exploration of natural materials.

II. Explore how things work.

I.

Vocabulary

look closely, watch, touch, feel, smell, listen, same, different,

Year R

WS.R.1. Asking Questions

WS.R.3. Observing

I. Explore the natural world around them.

II. Describe what they see, hear and feel whilst outside.

Vocabulary

observe, watch, compare, ask questions, record, sort, group

Year 1

National Curriculum – Asking Questions

a. asking simple questions and recognising that they can be answered in different ways

WS.1.1. Asking Questions

I. Ask simple questions when prompted.

National Curriculum - Predictions

WS.1.2. Predictions

National Curriculum – Setting up Tests

b. performing simple tests.

WS.1.3. Setting Up Tests

I. Suggest ways of answering a question

National Curriculum – Observing

c. observing closely, using simple equipment.

WS.1.3. Observing

I. Make relevant observations

II. Conduct simple tests, with support

National Curriculum – Recording & Classifying

d. identifying and classifying.

WS.1.4. Recording & Classifying

I. With prompting, suggest how findings could be recorded

National Curriculum – Analysing Data

e. using their observations and ideas to suggest answers to questions.

WS.1.5. Analysing Data

I. Recognise findings

II. Gather and record data

National Curriculum- Drawing Conclusions

f. gathering and recording data to help in answering questions.

WS.1.6. Drawing Conclusions

I. Use observations to suggest answers to questions

Vocabulary

Test, notice, change, group, pattern, measurement, information, scientific,

Year 2

WS.2.1. Asking Questions

I. Ask simple questions

WS.2.2. Predictions

WS.2.3. Setting Up Tests

I. Recognise that questions can be answered in different ways

WS.2.3. Observing

I. Observe closely, using simple equipment

II. Perform simple tests

WS.2.4. Recording & Classifying

I. Identity and classify

WS.2.5. Analysing Data

I. Gather and record data to help answer questions

WS.2.6. Drawing Conclusions

I. Use their observations and ideas to suggest answers to questions

Vocabulary

Collect, record, findings, classifying, patterns,

Year 3

National Curriculum – Asking Questions

a. Plan scientific enquires to answer questions

WS.3.1. Asking Questions

I. independently, about the world around them.
II. Suggest relevant questions and know that they could be answered in a variety of ways, including using secondary sources such as ICT.

National Curriculum - Predictions

b. Using test results to make predictions to set up fair tests.

WS.3.2. Predictions

I. Suggest what they would need to change in order to answer a further question from their learning with support.

National Curriculum – Setting up Tests

c. setting up simple practical enquiries, comparative and fair tests

WS.3.3. Setting Up Tests

National Curriculum – Observing

d. Make careful measurements with scientific equipment

WS.3.4. Observing

I. Make decisions about what to observe during an investigation.
II. Make systematic and careful observations.

National Curriculum – Recording & Classifying

d. Record data in tables, charts and diagrams.

WS.3.5. Recording & Classifying

I. Talk about criteria for grouping, sorting and categorising using technical scientific vocabulary
II. Record their findings using scientific language and present in note form, writing frames, diagrams, tables and charts.

National Curriculum – Analysing Data

e. Create conclusions from their observations and recording.

WS.3.6. Analysing Data

I. begin to see patterns and relationships.

National Curriculum – Drawing Conclusions

f. Answer a question using evidence from their own observing and recordings.

WS.3.7. Drawing Conclusions

I. Gather, record and use data in a variety of ways to answer a simple question.
II. Use identified patterns, similarities and differences in data (with support) to help form conclusions.
III. Use scientific evidence to support their findings.

Vocabulary

Enquiry, Fair test, Prediction, Conclusion, Similarities, data, Differences, Observations, Appropriate, interpret

Year 4

WS.4.1. Asking Questions

I. Answer questions using straight forward scientific evidence.
II. Discuss enquiry methods and describe a fair test.
III. Make decisions about different enquiries, including recognising when a fair test is necessary and begin to identify variables.

WS.4.2. Predictions

I. Make a prediction for the outcome using previous results and knowledge

WS.4.3. Setting Up Tests

WS.4.4. Observing

I. Take accurate measurements using standard units and a range of equipment, including thermometers and data loggers.

WS.4.5. Recording & Classifying

I. Use and begin to create simple keys.
II. Choose appropriate ways of present information, findings and conclusions for different audiences (e.g. displays, oral or written explanations)

WS.4.6. Analysing Data

I. Identify similarities/differences/ changes when talking about scientific processes.

WS.4.7. Drawing Conclusions

I. Draw, with help, a simple conclusion based on evidence from an enquiry or observation.
II. Use recorded data to make predictions,
III. pose new questions and suggest improvements for further enquiries

Vocabulary

Systems, Function, Materials, Measurable, Temperature, Evidence, Accurate, Classification, Environment, thermometer

Year 5

National Curriculum – Asking Questions

a. planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.

WS.5.1. Asking Questions

I. Raise different types of scientific questions, & hypotheses.
II. Pose/select the most appropriate line of enquiry to investigate scientific questions.
III. Plan a range of science enquiries, including comparative and fair tests.
IV. Select and plan the most suitable line of enquiry, explaining which variables need to be controlled and why, in a variety of comparative and fair tests

National Curriculum - Predictions

b. Using test results to make predictions to set up further comparative and fair tests

WS.5.2. Predictions

I. Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models.

National Curriculum – Setting up Tests

WS.5.3. Setting Up Tests

National Curriculum – Observing

c. taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

WS.5.4. Observing

I. Choose the most appropriate equipment in order to take measurements, explaining how to use it accurately.
II. Take measurements using a range of scientific equipment with increasing accuracy and precision.

National Curriculum – Recording & Classifying

e. recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

WS.5.5. Recording & Classifying

I. Record data and results of increasing complexity using scientific diagrams, labels, classification keys, tables, bar and line graphs and models.

National Curriculum – Analysing Data

f. 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.

WS.5.6. Analysing Data

I. Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas.

National Curriculum – Drawing Conclusions

g. identifying scientific evidence that has been used to support or refute ideas or arguments.

WS.5.7. Drawing Conclusions

I. Use a simple modes of communication to justify their conclusions on a hypothesis.
II. Begin to recognise how scientific ideas change over time.

Vocabulary

Investigate, Comparative, Diagrams, Relationship, Properties, Reversible, Irreversible, Associated, biology, Communicate, biology, Controlled, Variable, Chemistry, Physics

Year 6

WS.6.1. Asking Questions

I. Plan and carry out comparative and fair tests, making systematic and careful observations.
II. Make their own decisions about which observations to make, using test results & observations to make predictions or set up further comparative or fair tests.

WS.6.2. Predictions

I. Choose the most effective approach to record and report results, linking to mathematical knowledge.

WS.6.3. Setting Up Tests

WS.6.4. Observing

I. Choose the most appropriate equipment to take a measurement and give a rationale as to it's suitability.
II. Decide how long to take measurements for, checking results with additional readings.

WS.6.5. Recording & Classifying

I. Choose the most effective approach to record and report results, linking to mathematical knowledge.

WS.6.6. Analysing Data

I. Identify and explain causal relationships in data and identify evidence that supports or refutes their findings, selecting fact from opinion.

WS.6.7. Drawing Conclusions

I. Identify validity of conclusion and required improvement to methodology.
II. Discuss how scientific ideas develop over time.

Vocabulary

Hypothesis, Precision, Systematic, Effective, Presentations, Support Refute, Methodology, Adapted, Characteristics, Quantitative, qualitative

Substantive (*Know…*) Science Knowledge

Assessment Question 1. What do the pupils need to learn? Assessment Question 2. What do the pupils understand?

Year N

S.N.1. Plants

I. Plant seeds and care for growing plants.
II. Understand the key features of the life cycle of a plant

Vocabulary
plant, leaf, stem, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil, names of plants they grow

S.N.2. Animals, inc. Humans

I. Understand the key features of the life cycle of an animal.
II. Begin to understand the need to respect and care for the natural environment and all living things

Vocabulary
natural, plant, animal, leaves, seeds, conkers, acorns, twigs, bark, shells, feathers, pebbles, stones, same, different, pattern

egg, chick, bird, caterpillar, cocoon, chrysalis, butterfly, frog spawn, tadpole, froglet, frog, grow, change, die, names of animals and their young, fur, feathers, scales, tail, wings, beak, claws, paws, hooves, swim, walk, run, jump, fly, patterns, spots, stripes, grow, change, baby, toddler, child, adult, old person, smell, taste, touch, feel, hear, see, blind, deaf

S.N.3. Materials

I. Use all their senses in hands-on exploration of natural materials.
II. Explore collections of materials with similar and/or different properties.
III. Talk about the differences between materials and changes they notice.

Vocabulary
mix, stir, cook, hot, oven, microwave, change, burn, melt, hard, runny, set, freeze, freezer, cold, blended, hard, soft, bendy, stiff, wobbly, wood, plastic, paper, card, fabric, natural, shells, pebbles, stones

S.N.4. Seasonal Change

I. Understand the different weathers and seasons throughout the year.

Vocabulary
light, torch, bulb, lamp, spotlight, shiny, bright, brighter, brightest, Sun, shine, glow, mirror

S.N.4. Forces

I. Explore and talk about different forces they can feel.

Vocabulary
object, float, sink, water, up, down, top, bottom, push, pull, magnet, spring, squash, bend, twist, stretch, turn, spin, smooth, rough, fast, slow, sound, noise, loud, quiet, high, low, music, bang, blow, pluck, soft, hard, fast, slow, names of instruments

Linked Texts
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Year R

S.R.1. Plants

I. Name a variety of plants and trees.
II. Draw and label pictures of plants

Vocabulary
plant, tree, bush, flower, vegetable, herb, weed, tree, bush, herb, names of plants they see

S.R.2. Animals, inc. Humans

I. Name a variety of animals.
II. Talk about the environments animals live in.
III. Talk about changes over time, babies, older animals.
IV. Shows care and concern for living things in the environment

Vocabulary
animal, names of plants and animals they see, name of a contrasting environment (e.g. beach, forest

names of animals, live, on land, in water, jungle, desert, North Pole, South Pole, sea, hot, cold, wet, dry, snow, ice, hair (e.g. black, brown, dark, light, blonde, ginger, grey, white, long, short, straight, curly), eyes (e.g. blue, brown, green, grey), skin (e.g. black, brown, white), big/tall, small/short, bigger/smaller, baby, toddler, child, adult, old person, old, young, brother, sister, mother, father, aunt, uncle, grandmother, grandfather, cousin, friend, family, boy, girl, man, woman

S.R.3. Materials

I. Explore materials and the similarities and differences.
II. Understand that materials can change – melting, boiling, freezing,

Vocabulary
ice, water, frozen, icicle, snow, melt, wet, cold, slippery, smooth, big, bigger, biggest, smaller, smaller, smallest, hard, soft, bendy, rigid, wood, plastic, paper, card, metal, strong, weak, hot, apply heat, waterproof, soggy, not waterproof, best, change, change back

S.R.4. Seasonal Change

I. Understand the effect of changing seasons on the natural world around them.

Vocabulary
spring, summer, autumn, winter, seasons, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, windy, rainbow, animals, young, plants, flowers, Sun, Moon, Earth, star, planet, sky, day, night, space, round, bounce, float, Sun, sunny, light, shadow, shady, clouds, torch, see-through, not see-through, source, light source

S.R.4. Forces

I. Able to predict cause and effects for forces
II. Explore mechanisms in toys and objects
III. Be able to talk about how mechanisms work.

Vocabulary
float, sink, up, down, top, bottom, surface, move, roll, drop, fly, turn, spin, fall, fast, slow, faster, slower, fastest, slowest, further, furthest, wind, air, water, blow, bounce, sound, noise, listen, hear, music, voices, bird song, traffic, sirens, thunder, high, low, loud, quiet, soft, volume, crackle, thunder, hum, buzz, roar

Linked Texts
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Year 1

S.1.1. Plants

i. identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
Identify a range of local plants.
ii. identify and describe the basic structure of a variety of common flowering plants, including trees

Vocabulary
leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, names of trees in the local area, names of garden and wild flowering plants in the local area. names of garden and wild flowering plants in the local area

S.1.2. Animals, inc. Humans

I. identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
II. identify and name a variety of common animals that are carnivores, herbivores and omnivores.
III. describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)
IV. identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Vocabulary
head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals experienced first-hand from each vertebrate group, parts of the human body including those within the school's RSE policy, senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ears, tongue

S.2.3. Everyday Materials

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

Vocabulary
object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through, opaque, transparent, translucent, reflective, non-reflective

S.2.4. Seasonal Change

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

Vocabulary *weather,*
sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length

Linked Texts
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Year 2

S.2.1. Plants

I. Observe and describe how seeds and bulbs grow into mature plants
II. Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Vocabulary
light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling
names of plants in local habitats and micro-habitats

S.2.2. Animals, inc. Humans

I. Notice that animals, including humans, have offspring which grow into adults
II. Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)
III. Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Vocabulary
offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/chicken, kitten/cat, caterpillar/butterfly), survive, survival, water, food, air, exercise, heartbeat, breathing, hygiene, germs, disease, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy)

S.2.3. Uses of Everyday Materials

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

Vocabulary
opaque, transparent, translucent, reflective, non-reflective, flexible, rigid, shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

S.2.4. Living Things and their environment

I. Explore and compare the differences between things that are living, dead, and things that have never been alive
II. 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
III. identify and name a variety of plants and animals in their habitats, including microhabitats
IV. 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.

Vocabulary
living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, names of local habitats (e.g. pond, woodland etc.), names of micro-habitats (e.g. under logs, in bushes etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and micro-habitats studied

Linked Texts
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Substantive (*Know…*) **Science** Knowledge

Assessment Question 1. What do I need to teach? Assessment Question 2. What do the pupils understand?

Year 3

S.3.1. Plants

I. Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
II. Explore the requirements of plants for life and growth (air, light, water, nutrients & room to grow)
III. Explore how the needs of a plant vary from plant to plant, such as cacti, moss, flowers etc.
IV. Investigate the way in which water is transported within plants
V. Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Vocabulary
photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport

S.3.2. Animals, inc. Humans

I. 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
II. Identify that humans and some other animals have skeletons and muscles for support, protection and movement

Vocabulary
nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine

S.3.3. Rocks

I. Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
II. Describe in simple terms how fossils are formed when things that have lived are trapped in rock
III. Recognise that soils are made from rocks and organic matter

Vocabulary
rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorbs water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, types of soil (e.g. peaty, sandy, chalky, clay)

S.3.4. Forces and Magnets

I. Compare how things move on different surfaces
II. Notice that some forces need contact between two objects, but magnetic forces can act at a distance
III. Observe how magnets attract or repel each other and attract some materials and not others
IV. 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
V. Describe magnets as having two poles
VI. Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Vocabulary
magnetic force, magnet, attract, magnetic material, metal, iron, steel, *force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole*

S.3.5. Light

I. Recognise that they need light in order to see things and that dark is the absence of light
II. Notice that light is reflected from surfaces
III. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes
IV. Recognise that shadows are formed when the light from a light source is blocked by an opaque object
V. Find patterns in how the size of shadows change.

Vocabulary
light, light source, Sun, sunlight, dangerous, light, light source, dark, absence of light, surface, shadow, reflect, mirror, Sun, sunlight, dangerous

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Year 4

S.4.1. Living Things and their habitats

I. Recognise that living things can be grouped in a variety of ways
II. Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
III. Recognise that environments can change and that this can sometimes pose dangers to living things.

Vocabulary
classification, classification keys

S.4.2. Animals, inc. Humans

I. Describe the simple functions of the basic parts of the digestive system in humans
II. Identify the different types of teeth in humans and their simple functions
III. Construct and interpret a variety of food chains, identifying producers, predators and prey.

Vocabulary
herbivore, carnivore, omnivore, producer, predator, prey, digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, large intestine, rectum, anus, incisor, canine, molar, premolar, herbivore, carnivore, omnivore, producer, predator, prey

S.4.3. States of Matter

I. Compare and group materials together, according to whether they are solids, liquids or gases
II. 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)
III. Identify the part played by evaporation and condensation in the water cycle an associate the rate of evaporation with temperature.

Vocabulary
solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle

S.4.4. Sound

I. Identify how sounds are made, associating some of them with something vibrating
II. Recognise that vibrations from sounds travel through a medium to the ear
III. Find patterns between the pitch of a sound and features of the object that produced it
IV. Find patterns between the volume of a sound and the strength of the vibrations that produced it
V. Recognise that sounds get fainter as the distance from the sound source increases.

Vocabulary
sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, quiet, loud, insulation

S.4.5. Electricity

I. Identify common appliances that run on electricity
II. Construct a simple series electrical circuit, identifying and naming its basic parts,
III. including cells, wires, bulbs, switches and buzzers
IV. 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
V. Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit
VI. Recognise some common conductors and insulators, and associate metals with being good conductors.

Vocabulary
electrical conductor, electrical insulator, metal, non-metal

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Year 5

S.5.1. Living Things and their habitats

I. describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird
II. Describe the life process of reproduction in some plants and animals.

Vocabulary
life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, cuttings

S.5.2. Animals, inc. Humans

I. describe the changes as humans develop to old age.

Vocabulary
life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, cuttings, puberty, the vocabulary to describe sexual characteristics in line with the school's RSE policy

S.5.3. Properties and changes of materials

I. 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
II. know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution
III. use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating
IV. give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic
V. demonstrate that dissolving, mixing and changes of state are reversible changes
VI. 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.

Vocabulary
thermal insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

S.5.4. Forces

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

Vocabulary
force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears

S.5.5. Earth & Space

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

Vocabulary
Sun, Moon, Earth, planets (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, Solar System, rotate, star, orbit

Linked Texts
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Year 6

S.6.1. Living Things and their habitats

I. describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals
II. ive reasons for classifying plants and animals based on specific characteristics.

Vocabulary
flowering, non-flowering, mosses, ferns, conifers

S.6.2. Animals, inc. Humans

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

Vocabulary
vertebrates, fish, amphibians, reptiles, birds, mammals, warm-blooded, cold-blooded, invertebrates, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers, heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, cycle, circulatory system, diet, drugs, lifestyle

S.6.3. Evolution and Inheritance

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

Vocabulary
offspring, sexual reproduction, vary, characteristics, adapted, inherited, species, evolve, evolution

S.6.4. Light

I. recognise that light appears to travel in straight lines
II. 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
III. 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
IV. use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Vocabulary
straight lines, light rays

S.6.5. Electricity

I. associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
II. 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
III. use recognised symbols when representing a simple circuit in a diagram.

Vocabulary
circuit diagram, circuit symbol, voltage

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How We Assess in Science?

Assessment Question 1. What do I need to teach?

Curriculum Overview
The previous years knowledge is outlines in this Curriculum Booklet. We look back at the units in the themes and so they are able to see the previous learning.

Preassessment Quiz
Staff use a short quiz to see what knowledge the pupils already have and identify the gaps.

Previous Learning
Staff are able to look at the pupils' books and the Assessment information in Arbor to see which children had met the expected standard and which would need additional support.

Assessment Question 2. What do the pupils understand?

Use of Questioning
Use of questioning to check whole class understanding - Avoiding closed questions

- Probing questions – finding out what the child and unpicking their thoughts
- Prompting questions – help direct pupils and draw attention to specific aspects
- Promoting questions – open ended sparking discussion and allow to explore and deepen thinking

Live Feedback
All staff give in the moment marking/feedback is in the lesson when working with the child.
Whole Class Feedback sheets are used to track the pupils who require more support in the later sessions.

Marking and moving on comments
Marking and moving on comments in books – time given for children to respond (*Adults use a coloured pen, children respond in purple*).

Mini- Quizes
Adults will use mini-quizzes at the end of a lesson or in a mini-plenary. These will be verbal or physically moving such as 'true or false' or 'point to the answer'

Key Performance Indicators
The staff will use the KPIs to ensure that the key Sticky is focused on.

Assessment Question 3. What can the pupils apply?

End Unit Assessment
At the end of the unit, the pupils will be set a task to apply their knowledge from the unit by conducting an independent experiment in line with the theme of the topic. The task will allow them to show the key knowledge which the children can apply. Staff will use the Key Performance Indicators (*KPI*) to assess the task and to The KPIs will be used to inform planning and future learning.

Assessments
At the end of a unit, the pupils take part in a short assessment quiz checking the knowledge they have gained over the topic.

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