

Science Policy

"I can do all things through him who strengthens me..." Philippians 4:13

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1. OUR VISION FOR SCIENCE

At Rattlesden our intention is that our Science curriculum is ambitious for all learners and driven by strong leadership who have a clear vision of high-quality education. We want to stimulate our children to be inquisitive and have a desire to find out answers to their own questions, creating a real 'buzz' to their learning and being inspired to follow career opportunities linked to science. Encouraging them to develop a genuine interest in the world around them and a passion to find out about it.

The children will build resilience through trial and error exploration, where they will not always get the results they expect and things will not always go right. Independently they will begin to link prior scientific knowledge with current learning. Our children will develop a greater, secure depth to their science understanding and appreciate the relevance of science to themselves and the world around them.

Through our curriculum we will support pupils to develop their aspirations for their futures and become lifelong learners.

Rattlesden C of E Primary Academy School endeavours to promote a positive attitude to Science through additional activities such as:

additional activities socii as.	
Themed Science days and weeks;	
School visits;	

Forest school activities;

Guest speakers;

Eco-activities;

and

Classroom and whole school displays.

CURRICULUM TIME

The time allocated to science will be approximately 54 hours per year in Key Stage 1 and 72 hours per year at KS2. This is approximately 1.5 hours per week at KS1 and 2 hours at KS2.

2. AIMS AND OBJECTIVES

Children are natural scientists. They begin investigating their surroundings from birth, they question the world around them, they experiment and draw conclusions. The steps in this process lead to a progressively deeper scientific understanding. It is important therefore to build upon a child's natural curiosity and to encourage a scientific approach based on a rich resource of experiences.

In primary school it is important that many of these experiences are first-hand although the use of secondary sources of information has a part to play. The aims of the subject should be realised by all pupils, regardless of ability, gender or ethnic group.

3. CONTENT, ORGANISATION AND PLANNING

The school follows the programme of study outlined in the 2014 Curriculum. In addition to this, teachers refer to the PLAN primary science assessment resources such as the knowledge matrices to ensure that key scientific vocabulary, concepts and learning are embedded within their planning. The use of long, medium and short-term planning facilitates the organisation of a broad, balanced, coherent and differentiated curriculum. We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each unit.

There are three main areas of scientific knowledge in the National Curriculum, Life processes and Living things, Materials and their Properties and Physical Processes. These are taught as an integral part of each term's topic work. Due to the mixed age classes, the topics form a two-year plan in years R to 2 and a three-year plan in 3 to 5, which ensures that each area is met at Key stage 1 and again at Key stage 2. With the national curriculum's year 6 content being solely covered in the final year of primary school.

(See appendix 1)

The organisation of content in the scheme of work allows all pupils to build on previous experiences to ensure that progression in knowledge and skills is achieved.

Cross curriculum links with other subjects should be made whenever possible and ICT should be recognised as a useful learning tool which can improve pupils' motivation, assist pupils in analysing and interpreting data, develop thinking skills and increase scientific knowledge.

Early Years Foundation Stage (EYFS)

Science is covered in the EYFS through practical, stimulating activities, which develop knowledge and understanding through cross curriculum learning. Scientific skills in the reception class are taught as an integral part of the topic work covered during the year. The scientific aspects of the children's work are related to the objectives set out in the 'Early Years Foundation Stage Framework'. Science makes a significant contribution to achieving the Early Years Outcomes and understanding of the world, e.g. through investigating what floats and what sinks when placed in water.

4. OPPORTUNITIES

Equality of opportunity is a fundamental right that must be allowed to all children regardless of race, culture, gender or special educational needs. Teachers need to plan to provide equal opportunities for all pupils and should refer to the school policy on this.

Links are made to "real life" to promote the relevance of STEM subjects.

Gender

It needs to be acknowledged that science is a subject which many adults associate with boys. It is very important that teachers adopt very positive attitudes to counteract this apparent prejudice. Girls' curiosity and interest in science will be enhanced by an atmosphere of investigation and discovery. Placing science in a social context will also improve the performance of girls. In group work teachers will need to be alert and ensure that both girls and boys are allowed to play a full and active part. Female visitors are actively encouraged into school to promote STEM subjects.

Race

Teachers should be aware of the contributions made to science by people from all over the world. Many units of work can incorporate a global perspective and opportunities can be taken to compare how science has helped to solve problems in a wide range of differing environments. Teachers will need to be sensitive to the different dietary habits of different cultures when looking at food and diet.

Special Educational Needs

We teach science to all children, whatever their ability. Science forms part of the school's curriculum policy to provide a broad and balanced education to all children. We provide learning opportunities matched to the needs of the children.

- Children with learning difficulties should be expected to succeed and be provided with appropriate
 opportunities to succeed. Able children should be given appropriate challenges so that they can fulfil
 their potential. Open-ended activities can often be successful in challenging able children. Successful
 teaching and learning will depend on the effectiveness of the differentiation as well as the extent to
 which:
- the learning process is broken down into manageable steps;
- children are clear about what is expected of them, demonstrated through well-defined lesson objectives;
- assessment procedures are used to identify learning difficulties;
- children are aware of their own successes and progress;
- children are given opportunities to become independent learners;
- children are able to improve their self-esteem.

5. DIFFERENTIATION

This is a key issue and a very difficult one to tackle. At Rattlesden we recognise that there are children of widely different scientific abilities in all classes and ensure that we provide suitable learning opportunities for all by matching the challenge of the task to the ability of the child. No one teaching strategy will be sufficient in itself but teachers will use a variety of approaches as appropriate:

- children may be given different resources to assist them;
- children may be given differing levels of support by the teacher, TA and other children;
- children may be given different tasks;
- children may be given open-ended tasks which will allow for a range of different outcomes.
- children may be given access to ICT to support their learning.

6. ASSESSMENT

Assessment is important in that it provides information about children's achievements, which can then be used to inform the planning of future work. Teachers are encouraged to assess the children's knowledge of a topic prior to teaching to assess levels of understanding, uncover misconceptions and inform planning. This can be in the form of observed tasks, "What I know" and "What I want to find out" posters, Concept Cartoons, KWL grids (What I know/What I want to find out/What I have learnt) and Explorify clips from the internet.

The class teacher maintains a personal ongoing record of the individual's work and his/her development.

The school's approach to assessment in Science can be summarised as follows:

- pupils will be aware of the objectives for all lessons and will be encouraged to self-assess to these objectives;
- assessment must be planned and relate to the objectives chosen in lessons or units;
- assessment should be a regular feature of classroom practice informing pupils about what they have done well and enabling the teacher to plan next steps and set targets;
- a variety of approaches can be used with 'fitness for purpose' the determining factor;
- professional judgement should be supported by a limited number of samples of evidence;
- assessment records must be passed onto the next class teacher and be available to the Subject Leader for monitoring;
- Teachers should have opportunities to share and standardise their judgements.

Key Stage SATS results are reported to Parents, LEA and DFEE as required by law. Staff hold regular parents' meetings and written annual reports are forwarded to parents in the summer term.

7. RESOURCES

The responsibility for maintaining an adequate supply of resources rests with the Science Subject Leader. Although all teachers are to ensure they have any specific materials and equipment necessary to cover the objectives for their year group. Most of the resources will be stored centrally in the Maple classroom in the Science rack. The effective management of these resources, whilst ultimately the responsibility of the Science Subject Leader, is also the responsibility of each classroom teacher who uses them. It is important

that the Science Subject Leader receives requests for resources well in advance of their planned use and that any breakages are reported immediately.

8. SAFETY

Science poses a number of potential dangers in the classroom as a result of its practical nature. The school has adopted the safety policy included in the 4th edition of the 'Be Safe' document produced by the Association for Science Education. Teachers will need to refer to H&S documents when they plan to perform new techniques or to introduce particular activities for the first time. Children should be made aware of safety requirements and they should be taught how to work safely considering their own safety and the safety of others.

9. MONITORING AND EVALUATION

Monitoring the standards of children's work and the quality of teaching in science is carried out periodically. The work of the science subject leader involves supporting colleagues in the teaching of science, being informed about current developments in the subject and providing a strategic lead and direction for the subject in the school.

Science will be monitored by the Science Subject Leader through:

- teachers' planning
- pupils' work
- pupil perception interviews
- lesson observations or drop ins.
- informally talking to children about their lessons
- working walls

Meetings of staff within the school and liaison with staff in other schools will ensure that opportunities are provided to discuss and compare standards of children's science work, as well as the continuity of the children's education in science.

Appendix 1

Year R - Annually, (taken from www.planassessment.com)

Topic	Reception
Animals, excluding humans	Name and describe animals that live in different habitats. Describe different habitats
Humans	Describe people who are familiar to them Learn about how to take care of themselves
Living things and their habitats	Explore the plants in the surrounding natural environment Explore the animals in the surrounding natural environment Explore plants and animals in a contrasting natural environment
Plants	
Seasonal changes	Play and explore outside in all seasons and in different weather Observe living things throughout the year
Materials, including changing materials	Explore a range of materials, including natural materials Make objects from different materials, including natural materials Observe, measure and record how materials change when heated and cooled Compare how materials change over time and in different conditions.
Electricity	
Light	Explore shadows Explore rainbows
Forces	Explore how to change how things work Explore how the wind can move objects Explore how objects move in water
Sound	Listen to sounds outside and identify the source Make sounds
Earth and space	Learn about the Solar System and stars Learn about space travel

<u>Years 1 & 2</u>

YEAR A	YEAR B	
Seasonal change & plants are woven in across the year to be relevant and at that	Seasonal change & plants are woven in across the year to be relevant and at that	
moment. Built into and explored within Science, forest school, English & art lessons.	moment. Built into and explored within Science, forest school, English & art lessons.	
Working scientifically will also be threaded through lessons through the terms.	Working scientifically will also be threaded through lessons through the terms.	
AUTUMN TERM: ANIMALS (Inc. HUMANS)	AUTUMN TERM: ANIMALS - (SPECIFIC HUMAN FOCUS)	
Identify and name a variety of common animals including amphibians, reptiles, and	Identify, name, draw and label the basic parts of the human body and say which	
mammals.	part of the body is associated with each sense.	
Identify and name a variety of common animals that are carnivores, herbivores and	Describe the importance for humans of exercise, eating the right amounts of	
omnivores.	different types of food, and hygiene. (yr2)	
Describe and compare the structure of a variety of common animals (amphibians,	Food groups.	
reptiles, and mammals, including pets).	Human part of animals Inc. humans.	
Find out about and describe the basic needs of animals, including humans, for	Find out about and describe the basic needs of animals, including humans, for	
survival (water, food and air). (Yr2)	survival (water, food and air). (Yr2)	
	Notice that animals, including humans, have offspring which grow into adults,	
Observe and describe weather associated with the seasons and how day length	including a basic human life cycle and key characteristics of at each stage (yr2)	
varies.		
Observe, identify and record seasonal change connected to plants, trees etc.	Observe and describe weather associated with the seasons and how day length	
	varies.	
	Observe, identify and record seasonal change connected to plants, trees etc.	
Also included within forest school:	Also included within forest school:	
Identify and classify a variety of common plants and animals, seasonal change,	Identify and classify a variety of common plants and animals, seasonal change,	
describe the weather, name, describe and change the shape of different materials,	describe the weather, name, describe and change the shape of different materials,	
life cycles, habitats.	life cycles, habitats.	
SPRING TERM: EVERYDAY MATERIALS & USES OF EVERYDAY MATERIALS	SPRING TERM: EVERYDAY MATERIALS & USES OF EVERYDAY MATERIALS	
Distinguish between an object and the material from which it is made.	Compare and group together a variety of everyday materials on the basis of their	
Identify and name a variety of everyday materials, including wood, plastic, glass,	simple physical properties.	
metal, water, and rock.	Identify and compare the suitability of a variety of everyday materials, including	
Describe the simple physical properties of a variety of everyday materials.	wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (yr2)	
•Identify and compare the suitability of a variety of everyday materials, including	Find out how the shapes of solid objects made from some materials can be	
wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Yr2)	changed by squashing, bending, twisting and stretching. (y2)	
•Find out how the shapes of solid objects made from some materials can be		
changed by squashing, bending, twisting and stretching. (Yr2)	RECAP of these built into lessons:	
	Distinguish between an object and the material from which it is made.	
Plus (as season relevant):	Identify and name a variety of everyday materials, including wood, plastic, glass,	
	metal, water, and rock.	

Year 1 & 2 continued.

Observe and describe weather associated with the seasons and how day length	Describe the simple physical properties of a variety of everyday materials.
varies.	- Describe the simple physical properties of a variety of everyday materials.
Observe, identify and record seasonal change connected to plants, trees etc.	Plus (as season relevant):
Notice that animals, including humans, have offspring which grow into adults. (yr2)	Observe and describe weather associated with the seasons and how day length
(in RE and EYFS too) R/1 Chicks, 1/2 tadpoles	varies
(11112 1112 1112 1112 1112 1112 1112 11	Observe, identify and record seasonal change connected to plants, trees etc.
Also included within forest school:	Also included within forest school:
Explore the differences between things that are living, dead or have never been	Explore the differences between things that are living, dead or have never been
alive, observe the growth of seeds and bulbs, discover what a plant needs to grow,	alive, observe the growth of seeds and bulbs, discover what a plant needs to grow,
seasonal change, describe the weather.	seasonal change, describe the weather.
SUMMER TERM: ANIMALS (Inc. HUMANS)	SUMMER TERM: LIVING THINGS AND HABITATS
•Identify and name a variety of common animals, fish and birds. (water-based	explore and compare the differences between things that are living, dead, and
mammals yr1/2)	things that have never been alive
Describe and compare the structure of a variety of common animals (fish and	identify that most living things live in habitats to which they are suited and
birds).	describe how different habitats provide for the basic needs of different kinds of
Identify and name a variety of common animals that are carnivores, herbivores and	animals and plants, and how they depend on each other
omnivores.	identify and name a variety of plants and animals in their habitats, including
Human part of animals Inc. humans.	micro-habitats
Find out about and describe the basic needs of animals, including humans, for	 describe how animals obtain their food from plants and other animals, using the
survival (water, food and air). (Yr2)	idea of a simple food chain, and identify and name different sources of food.
Notice that animals, including humans, have offspring which grow into adults. (yr2)	
	Observe and describe how seeds and bulbs grow into mature plants. (yr2)
Plus (as season relevant):	Find out and describe how plants need water, light and a suitable temperature to
Observe and describe weather associated with the seasons and how day length	grow and stay healthy. (yr2)
varies.	
Observe, identify and record seasonal change connected to plants, trees etc.	Plus (as season relevant):
Observe and describe how seeds and bulbs grow into mature plants. (yr2)	Observe and describe weather associated with the seasons and how day length
Find out and describe how plants need water, light and a suitable temperature to	varies.
grow and stay healthy. (yr2)	Observe, identify and record seasonal change connected to plants, trees etc.
Also included within forest school:	Also included within forest school:
Seasonal change, describe the weather, describe the basic structure of a flowering	Seasonal change, describe the weather, describe the basic structure of a flowering
plant, identify habitats, life cycle, habitats.	plant, identify habitats, life cycle, habitats.

Years 3-5, 3 year cycle.

YEAR A	YEAR B	YEAR C
AUTUMN TERM:		
MATERIALS: CLASSIFYING AND GROUPING give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic (5) compare and group materials together, according to whether they are solids, liquids or gases (4) 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. (5)	MATERIALS: WATER CYCLE ② 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) (4) ② identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. (4)	MATERIALS: SEPARATING In know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution (5) In demonstrate that dissolving, mixing and changes of state are reversible changes (5) In 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. (5) In use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating (5)
ELECTRICITY: CIRCUITS & SWITCHES Bidentify common appliances that run on electricity (4) Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers (4) 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 (4) recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit (4) recognise some common conductors and insulators, and associate metals with being good conductors (4)	EARTH & SPACE describe the movement of the Earth, and other planets, relative to the Sun in the solar system (5) describe the movement of the Moon relative to the Earth (5) describe the Sun, Earth and Moon as approximately spherical bodies (5) use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. (5)	ROCKS Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (3) Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties (3) Compared to the basis of their appearance and simple terms how fossils are formed when things that have lived are trapped within rock (3) Compared to the rocks and organic matter. (3)

Appendix 1 cont.

(Years 3-5 cont.)

SPRING TERM: LIGHT: SHADOWS

recognise that they need light in order to see things and that dark is the absence of light (3)
 notice that light is reflected from surfaces (3)
 recognise that shadows are formed when the light from a light source is blocked by an opaque object (3)
 recognise that the light from the sun can be dangerous and that there are ways to protect their

eyes.

If find patterns in the way that the size of shadows change. (3)

FORCES: GRAVITY, FRICTION & MECHANISMS

explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object (5)

identify the effects of air resistance, water resistance and friction, that act between moving surfaces (5)

☑ recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (5)

CONTACT, NON-CONTACT FORCES & MAGNETS

②compare how things move on different surfaces (3) ☑ notice that some forces need contact between two objects, but magnetic forces can act at a distance (3) ☑ observe how magnets attract or repel each other and attract some materials and not others (3)

② 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 (3) ② describe magnets as having two poles (3)

 $\ensuremath{\mathbb{D}}$ predict whether two magnets will attract or repel each other, depending on which poles are facing. (3)

ANIMALS: TEETH, DIET & DIGESTION

humans and their simple functions (4)

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 (3) describe the simple functions of the basic parts of the digestive system in humans (4) lidentify the different types of teeth in

SOUND

identify how sounds are made, associating some of them with something vibrating (4) recognise that vibrations from sounds travel through a medium to the ear (4) find patterns between the pitch of a sound and features of the object that produced it (4) find patterns between the volume of a sound and the strength of the vibrations that produced it (4) recognise that sounds get fainter as the distance

from the sound source increases. (4)

ANIMALS: SKELETONS & MUSCLES

identify that humans and some other animals have skeletons and muscles for support, protection and movement. (3)

SUMMER TERM

PLANTS: REPRODUCTION & GROWTH

☐ identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers (3)☐ 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 (3)

 $\ensuremath{\mathbb{B}}$ investigate the way in which water is transported within plants (3)

② explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (3) OUR LOCAL ENVIRONMENT *

② explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment (4)

construct and interpret a variety of food chains, identifying producers, predators and prey (4).
 recognise that environments can change and that this can sometimes pose dangers to living things (4)

ANIMALS: LIFECYCLES & REPRODUCTION

describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird (5)
 describe the life process of reproduction in some plants and animals. (5)

describe the changes as humans develop to old age.(5)

Year 6, annually.

AUTUMN TERM:

CLASSIFICATION

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 (6)
give reasons for classifying plants and animals based on specific characteristics. (6)

ANIMALS: HEALTHY LIFESTYLE, EXERCISE AND CIRCULATION ☑ identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood (6) recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function (6) describe the ways in which nutrients and water are transported within animals, including humans. (6)

SPRING TERM:

ELECTRICITY: ADDING COMPONENTS ☐ associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit (6) 🛮 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 (6) use recognised symbols when representing a simple circuit in a diagram.

EVOLUTION & INHERITANCE ☑recognise that living things have changed over

time and that fossils provide information about living things that inhabited the Earth millions of years ago (6) □ recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents (6) ☐ identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to

evolution. (6)

SUMMER TERM:

LIGHT: HOW DO WE SEE? 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 (6) □ 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 (6) □ recognise that light from the sun can be dangerous and that there are ways to protect their eyes (6) I use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them (6)

You will notice that there are five units per year.... This matches what is in the national curriculum. But remember some units will take longer than others. So use this time to follow children's interests.....