Caldecote Primary School

Science Policy

July 2020

1. Introduction

This policy reflects the approach to teaching and learning at Caldecote Primary School in relation to Science. Our school's policy for Science is based on the Primary National Curriculum 2014 Framework and provides guidance on planning, teaching and assessment.

2. Aims

Science at Caldecote aims to teach pupils skills and knowledge they need to question and understand concepts and phenomena that occur in the world around them, for now and in the future and equips them with the motivation to seek explanations. We also aim to use science that is all around us to spark interest and sense of fun which will help children to apply their critical thinking techniques more broadly.

The aims of Science are to enable pupils to:

- Ask and answer scientific questions
- Plan and carry out a range of scientific investigations, using equipment including ICT
- Acquire excellent scientific knowledge and understanding through Biology, Chemistry and Physics building upon their prior learning
- Evaluate evidence and present information in a clear and concise manner using scientific vocabulary

3. Curriculum

The teaching of Science at Caldecote Primary School is in line with the Primary National Curriculum 2014 and is divided into year groups. See the Science curriculum overview and curriculum maps (Appendices 1 and 2) for an outline of National Curriculum coverage. In each year group, pupils should also be taught to use practical scientific methods and skills. These can be seen in Appendix 3.

4. School Organisation and planning

Although Science is taught as a discrete subject, it is enhanced by exploiting links with the class topic. Each class has two topics per year that have Science as its key driver and we use the Cornerstones and Reach curriculums for further support.

Caldecote's Science curriculum is planned to ensure pupils build on and extend prior learning. They are given opportunities to develop their skills and knowledge in each unit. Progression is built into our Science curriculum to ensure that pupils are increasingly challenged as they move up through the school curriculum.

5. Teaching

Caldecote uses a variety of teaching and learning styles in Science lessons. Our principal aim is to develop the pupils' knowledge, skills and understanding. We do

this through a mixture of whole-class teaching and individual/group activities. Teachers encourage pupils to ask as well as answer scientific questions. They have the opportunity to use a variety of secondary sources of information, where it will enhance learning, as well as gaining first hand experiences through experiments, visiting speakers and workshops.

Two types of questions are used to show understanding. Big questions, for example 'How do we hear?' are given at the beginning of a topic to gain an understanding of what children already know, and this same question may be revisited at the end of the teaching sequence to show progress. Deeper thinking questions are also used at the end of a unit in order to challenge pupils to 'showcase' and apply their knowledge and skills.

We recognise that in all classes pupils have a wide range of scientific abilities and so we provide suitable learning opportunities for all pupils with consideration to the age and needs of the pupils.

6. Assessment, Record Keeping and Reporting

Each half-term, teachers assess their pupils against the objectives laid out in the National Curriculum for the particular unit they have taught. For each unit, they record whether a child is working towards, working at or exceeding the expected standard in their knowledge, understanding and skills. These assessments are used to inform a summary science assessment which is recorded termly on TargetTracker (TT) and progress within the subject is reported to parents in the termly and end of year reports.

7. Resources

A wide variety of Science resources are available in school. These include pupils's reference books, web based resources and science materials and equipment. A range of pictorial resources such as posters, pictures, concept cartoons and photographs are also available.

As well as Cornerstones and Reach curriculums to further support teacher subject knowledge, supporting documents created by the Science Leader provide information about each unit for each year group. These documents include ideas for activities, examples of enquiry types, key learning and common misconceptions.

The majority of Science materials and equipment are kept in the science storage units in the corridor. Pupils should only remove or replace resources with adult supervision. An inventory of all available equipment is available in school.

The Science Leader is responsible for maintaining science resources, monitoring their use and organising the storage area. Resources are replaced and purchased following the general school ordering procedures. The current lists of resources are examined each year before requisitions are made. Staff are also asked to inform the Leader if any resources are damaged or need replacing.

Some resources for science lessons may sometimes be requested. Parents are usually very willing to respond to appeals for such resources.

8. Equal Opportunities

All teaching and non-teaching staff at Caldecote Primary School are responsible for ensuring that all pupils, irrespective of gender, ability, ethnic origin and social circumstances, have access to the whole curriculum which includes Science. We aim to give every pupil the opportunity to experience success and achieve as highly as possible.

9. Foundation Stage

Science is taught through the strand of 'Understand the World'. Pupils are encouraged to be creative and use their natural inquisitiveness in order to make sense of their world. Their learning is supported through offering opportunities for them to use a range of tools safely, encounter creatures, people, plants and objects in their natural environments and work with a range of materials when undertaking practical experiments. Whilst some aspects of Science are taught discretely, others are taught through continuous provision.

10. Special Educational Needs and Gifted Pupil Support

We aim to provide learning opportunities that are matched to the needs of pupils so that they achieve as highly as they can according to their individual ability. We work to ensure that all pupils have the opportunity to gain scientific knowledge and that expectations do not limit pupils' achievements, supporting where there is a need and extending pupils who need further challenging through appropriate differentiation.

Greater Depth
Depth of learning is achieved when pupils build on, apply and make links using their pre-existing scientific knowledge. This is achieved through providing thought provoking questions and scenarios. Additionally, deep learners will continue to develop scientific skills through reasoning, explaining and justifying their responses at relevant points throughout their science learning journeys.

11. Health and safety

We enable all pupils to have access to the full range of activities involved in learning science. Where pupils are to participate in activities, we carry out a risk assessment prior to the activity to ensure that the activity is safe and appropriate for all pupils.

12. Evaluation

Evaluation of our science curriculum is carried out to enhance the teaching and learning of Science within our school. It is the responsibility of all staff, both teaching and non-teaching, to monitor and evaluate the curriculum provision made for Science within the school in order that pupils make the greatest possible progress.

Evaluation may take place by means of a number of methods including:

- The assessment of pupils' work and their achievements

- The analysis of teachers' planning as seen in long and short term plans
- Discussion amongst staff
- Classroom observation
- Pupil voice
- Work scrutiny
- Learning walks
- External inspection and advice

12. Policy Review

The Policy statement will be reviewed in line with the rolling programme of Policy reviews.

Headteacher: …… Date: ……..…

Chair of Governors: …….. Date: ……..

Appendix 1

Curriculum Coverage for Science

	Biology						Chemistry				Physics					
	Senses	Keeping healthy	Plants	Animals including humans	Livings things & habitats	Evolution & inheritance	Rocks	Everyday materials	Properties & changes of materials	States of matter	Light	Sound	Forces & magnets	Seasonal changes	Earth & space	Electricity
Yr R	X	X			X			X						X		
Yr 1			X	X				X						X		
Yr 2			X	X	X			X								
Yr 3			X	X			X				X		X			
Yr 4				X	X		X			X		X				X
Yr 5				X	X				X				X		X	
Yr 6				X	X	X					X					X

Appendix 2

Curriculum Map for Science

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Reception	Senses	Seasonal changes	Freezing and melting	Keeping healthy	Living things and their habitats	Growing up Everyday materials
Year 1	Seasonal change Humans	Everyday materials	Use of everyday materials	Animals including humans	Plants and animals	Everyday materials
Year 2	Living things and their habitats	Animals including humans	Living things and their habitat	Plants	Everyday materials	Everyday materials
Year 3	Rocks (types of rocks and their properties)	Living things & their habitats (skeletons and food chains)	Animals including humans	Plants	Forces and magnets	Light
Year 4	States of matter	Electricity	Sound	Rocks (fossils and soils) Living things and their habitats	Animals including humans (teeth and digestion)	Living things and their habitats
Year 5	Living things and their habitats	Earth and Space Forces	Properties and changes of materials	Living things and their habitats	Forces and magnets	Animals including humans
Year 6	Light and shadows	Electricity	Living things and their habitats	Animals including humans	Animals including humans Plants	Evolution and inheritance

Appendix 3

Working Scientifically Skills

EYFS	Year 1	Year 2
Show curiosity by **asking questions** about aspects of their familiar world Ask **how** and **why** questions e.g. how did the dinosaur get stuck in the ice? Why do leaves fall off the trees?	**Ask simple questions** which begin with does/do, how and what/which e.g. What is a bud? How do the seasons change? Does it snow in the summer? Which materials are waterproof? Recognise that these questions could be **answered in different ways**	**Ask questions** beginning with would, why and where e.g. why are these seeds shaped as they are? Would plants go in the dark? Where do snails live? Discuss ways in which their questions could be answered e.g. through research, observations or simple tests
Closely **observe** what animals, people and vehicles do **Observe changes** e.g. lifecycle of a butterfly / water into ice back into water?	**Observe** closely using **simple equipment** such as magnifying glasses including bug collectors and binoculars	**Close observations** are made independently considering which equipment would be most useful Use microscopes Use non-standard units
Find ways to **solve problems**/find new ways of doing things **Test ideas** through open-ended activities	**Use comparative tests** to gather data e.g. set up a test to see which material for mopping up water? Know if the test has been successful	Suggest and perform **comparative tests** using discrete data
Identify **similarities** and **differences**	There is an ability to **sort and classify**	Independently **classify and group** things according to a given criteria or **justifying reasons** why it is grouped in this way
Gather data using non-standard measurements e.g. loud, quiet, short, long, fast, slow	**Gather data** in line with Year 1 measurement curriculum (non-standard units) Use drawings, videos, photos and simple tables to record results	**Gather data** in line with Year 2 measurement (standard units) and statistics curriculum (tally charts, pictograms, block charts) as well as labelled diagrams
Develop their own narratives and **explanations**	**Explain** what has been observed using appropriate vocabulary Use observations to **suggest reasons 'why'** something has happened Say what has been learned	**Draw conclusions** from observations, measurements and scientific knowledge Independently **suggest answers to questions** based on what they have found out

Year 3	Year 4
Ask relevant questions using a range of question stems Understand that science investigations begin with a question An awareness that there are different ways of asking scientific questions which result in **different types of enquiries**	**Questions** related to prior knowledge Identify which **type of enquiry** they would need to use to answer their question Recognise when secondary sources can be used to answer question that cannot be answered through practical work.
Make a **prediction** which has a plausible reason	Make a **prediction** which has a plausible reason **Amend predictions** according to findings
Set up **comparative tests and fair tests**	**Plan and conduct** investigations independently to produce evidence to answer a question Set up a fair test using **continuous data** identifying a variable that can be changed and measured Explain why a test is a fair one
Make careful and accurate **observations** including the use of **standard units** taking into account mathematical knowledge up to Year 3 (read time, add and subtract length, mass and capacity)	Make careful and accurate **observations** including the use of **standard units** taking into account mathematical knowledge up to Year 4 (convert units of measurements) Accurately **read scales** on a range of thermometers and know that there are two main scales used to measure temperature
With support use **drawings, labelled diagrams, bar charts** and **tables** to record findings	Suggest **appropriate ways** in which **to gather, record and classify** **Present continuous data** on a **line graph** e.g. to show the temperature of a melting material changes with time
Recognise **why it is important to collect data** in order to answer a question Draw simple **conclusions** from the data collected With prompts, **report findings** from investigations in a range of ways	**Planning, doing** and **evaluating** process (with support) Make sense of findings **noticing patterns, similarities** and **differences** to draw simple conclusions and answer questions

Year 5	Year 6
Plan and set up an investigation Understand the difference between **comparative** (discrete data) and **fair tests** (continuous data)	Decide which type of test they will do based on the type of data collected (**continuous or discrete**) Understand the difference between **dependent** and **independent variables**
Know what **variables** are in a given enquiry and **isolate** them	Justify why the **variable** has been **isolated** in the investigation
Use all **measurements** set out in **Year 5 mathematics** which includes converting different units of metric measure Use **scientific instruments** accurately e.g. thermometer, rain gauge, spring scales, lux meter	Use all **measurements** set out in **Year 6 mathematics** which includes capacity, mass, ratio and proportion Select **measuring equipment** to give the most precise results for particular investigations e.g. spring scales, lux meter, thermometer, trundle wheel, force meter with a suitable scale Take **repeated readings** in order to get accurate data e.g. check further secondary sources (research), increase the sample size (pattern seeking), repeated readings (fair testing), adjust the observation period and frequency (observing over time).
Record and present data in a range of ways including diagrams, labels, Venn and Carroll diagrams classification keys, tables, scatter graphs and bar and line graphs	Decide how best to **record an** present their data based on their investigation and justify their reasons why
Use **data** generated to help **make sense of the investigation** Use information gleaned from investigations to make **predictions** for further comparative and fair tests Create **new investigations** which take into account what has been learned previously	Confidently use data generated to explain the possible **reasons for the results** Make **accurate predictions** for further tests by referring back to the results from previous investigations Create **new investigations** based on their previous findings **rationalising** why they think this is the next step
Present information using IT such as power-point and iMovie Use written methods to **report findings** **Orally present** findings to other students in the class	**Present** information using IT such as power-point, animoto and iMovie Focus on the **planning, doing** and **evaluating** phases when reporting findings Use **diagrams** when necessary Confidently **present findings** orally in front of the class and **compare findings** with other students
Clear about what has been found **Evaluate** investigation for example, the precision and accuracy of measurements, the choice of method used Identify **causal relationships**	Explain about what has been found through the investigation and compare this to other enquiries **Evaluate** investigation considering the degree in which results should be trusted e.g. repeated readings, the control of variables Explain **causal relationships** suggesting reasons why based on scientific knowledge.
Aware that the outcome needs to be supported with **scientific knowledge** and state whether the evidence **supports or refutes** an argument or theory Give an example of something that has been focused on e.g. how much easier it is the lift a heavy object using pulleys using **scientific theories to support this theory**	Make **conclusions** based scientific theories and decide whether the results from an investigation support or refute an argument or theory Explain **reasons why** evidence could contradict scientific knowledge Talk about how **new discoveries** change scientific understanding

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