

BEREWOOD PRIMARY SCHOOL



Science Policy

Summer 2019

Revised by School	April 2019
Responsible Person	Sue Patrick (head teacher)
Responsible Committee	Full Governing Body
Ratified by GB	25 th June 2019
Next Review	Summer 2022



BEREWOOD PRIMARY SCHOOL

A distinctive vision

At Berewood Primary School we see education as a journey of discovery to fire the imagination, to establish a sense of self, and to gain the confidence to take full part in the wider world.

An ethos of local partnership

Berewood Primary School and the University of Chichester Academy Trust share the belief that education has the power to transform society. Our school is deeply rooted in its locality and encourages the involvement and interest of parents and the community, recognising that strong and vibrant communities have partnership and inclusion at their heart.

SCIENCE POLICY

Introduction

The staff at Berewood Primary School are working together to formulate a relevant and workable policy for science teaching throughout the school. The aims are in line with the main school aims and the Learning and Teaching aims stated in the Learning and Teaching Policy.

Long term plans for key stage 1 & 2 have been developed to reflect the changes to the National curriculum and to utilise the opportunity to use other schemes including Hampshire Guidance and Key Ideas documents.

Reception children explore science within the seven areas of learning with most investigative opportunities planned within Understanding of the World.

Aims of the Science curriculum

Children develop knowledge and understanding of important scientific ideas, processes and skills and relate these to everyday experiences.

They will:

- be curious about the things they observe, experience and explore relating to the world around them;
- use their experiences to develop understanding of key scientific ideas;
- use models to represent things that they cannot directly experience;
- acquire and refine practical skills necessary to investigate ideas and questions safely;
- develop skills of sorting, classifying, planning, predicting, questioning, inferring, concluding and evaluating through investigative activities;
- make informed decisions based on evidence and their own experiences, and be able to apply scientific knowledge to new situations;
- practise mathematical skills (counting, ordering numbers, measuring, drawing and interpreting graphs and charts) in a real context.

Children develop effective ways of thinking, finding out about and communicating scientific ideas and information.

They will:

- think creatively about science and enjoy trying to make sense of phenomena (fact, occurrence, observation);
- develop their own ideas on how to investigate an idea or phenomena;
- develop language skills through talking about their work and presenting their ideas using writing of different kinds;
- use progressively technical scientific and mathematical vocabulary and draw diagrams and charts to communicate scientific ideas;
- use a range of media and secondary sources, including ICT to extract scientific information.

Children explore values and attitudes through science.

They will:

- work with others, listening to their ideas and valuing all contributions;
- develop a respect for the environment and living things and show they understand how human activity impacts upon these things;
- develop responsibility for their own health and safety, and that of others, when undertaking scientific activities.

Skills and attitudes are listed in the appendices.

Equal Opportunity

We are committed to providing a teaching environment conducive to learning. Each child is valued, respected and challenged, regardless of ability, race, gender, religion, social background, culture or disability.

Health and safety

In their planning of activities, teachers will anticipate likely safety issues. They will also explain the reasons for safety measures and discuss any implications with the children. When undertaking scientific activities, children should always be encouraged to consider safety for themselves, others, the environment and the resources they use. For specific guidance about safety refer to the ASE publication 'Be Safe' in the staff resource area.

The Appendices provide safety notes specific to the school grounds.

TEACHING SCIENCE

Teaching Time

Science at Berewood Primary School in Key Stages 1 and 2 is usually taught through a thematic approach and as such, there is no set model for the amount of time given over to the teaching of science on a weekly basis. The time spent on science may vary from term to term and in each topic that is taught. All teaching staff may choose, at their own discretion, how they allocate the amount of time needed to cover each unit of work. Science teaching may also take place out of topics, as stand alone lessons or as blocked periods. The responsibility of ensuring a broad, balanced and rich curriculum for Science lies first with the subject leader but ultimately the individual teacher. However, in both Key Stages, teachers aim to allocate an average of two hours weekly for Science.

In the Early Years Foundation Stage, science is an integral part of topic work. Links will also be made to other subjects so that pupils can develop and apply their scientific skills.

For more information regarding how the teaching of Science is organised, refer to the Year Group Overviews.

Class Organisation

In each year group, Science is taught in an imaginative and largely practical, investigative way. The children benefit from whole class or group teaching as well as being encouraged to work individually: finding out information, practising skills, or independently thinking in a scientific manner.

A Typical Lesson

Science lessons have no imposed formal structure but may contain the following elements:

- *Discussion*: what children already know from experience, what they have learnt so far, what they will be finding out about next;
- *Teaching*: directly to the whole class or through group or individual work;
- *Practical tasks or investigative work*: working in groups or individually, practising scientific skills, finding out answers and being encouraged to think scientifically;
- *Recording*: writing about what the children have found out, drawing charts and tables and diagrams, using the computer and other media to record what they have done or found out about. Progression in these skills is made clear on the examples of recording sheets for Sc1;
- *Communicating*: children share ideas, knowledge, and what they have found out with each other, the teacher, other classes and adults as appropriate.

Various learning styles should be addressed. As children's skills develop, they should be encouraged to take a greater part in planning, carrying out and evaluating scientific investigations.

More able pupils

More able children will be challenged and motivated by differentiated work given by the teacher, appropriate to his or her needs. Teachers will also use questions that allow the more able child to maintain their involvement in the lesson and demonstrate their knowledge and abilities. Teachers will aim to identify those children who are more able in Science so that they are given the opportunity to follow an individualised programme with more challenging concepts to tackle in science and many other areas of the curriculum.

Pupils with particular needs

Most Science lessons are appropriate for all children since the teacher will differentiate and plan appropriately to meet the needs of those children with specific needs. Liaison with the special needs coordinator will sometimes be necessary. Pupils with special educational needs and individual education plans will benefit from aspects of the lesson such as: discussion, and communicating with other children and sharing ideas. However, a pupil whose difficulties are severe or complex may need to be supported by a special needs assistant in addition to appropriately differentiated tasks given by the teacher.

Investigative Work

Investigative work remains an important element of the science curriculum. This is based on the skills shown by the children during investigative activities.

The schemes of work for KS1 and KS2 will show the key investigations which should take place in each year group. This will not be the only practical / investigational work that the children do in the year group. All areas of learning should include a large amount of practical

and investigational work where appropriate and should aim to teach the children skills which they can use.

The schemes of work will also show expected skills and essential knowledge for each year group related to the National Curriculum and Hampshire Key Ideas. The assessed investigation should only be set when the children have all the knowledge and skills they will need. The school is currently developing support and guidance regarding expectations and progression of skills which can be found in appendix C.

It is particularly important to teach the children how to use scientific equipment such as a hand lens and force meter, and further up the school how to use a microscope.

Teaching staff should check previous assessment sheets to ensure that progress is being made.

Assessment in Science

Assessment will take place at three levels: short-term, medium-term and long-term. These assessments will be used to inform teaching in a continuous cycle of planning, teaching and assessment.

Short-term assessments will be an informal part of every lesson to check the children's understanding and give the teacher information to adjust future lessons.

Medium-term assessments take place at the end of every unit of work. The teacher will assess the children based on the end of unit expectations laid down in their own medium term plans.

Long Term assessments will take place towards the end of the year. Teachers will draw upon their end of unit assessments and supplementary notes about their class against the key objectives laid down in the National Curriculum and end of year expectations to produce a summative record. Children will be assessed on the National Curriculum end of year expectations, and reported formally to the subject leader and head teacher. Science moderation within and between schools is planned to support judgements. At the start of each academic year, teachers set targets for the children and these are reviewed at the end of the year.

Termly evaluation and review sheets should be completed by each teacher. Any queries, requests or other comments should be communicated to the co-ordinator in this way. Also, any work planned but not covered should be highlighted. These issues will be shared at a termly staff meeting;

Throughout KS2, separate science books should be retained for each child.

Information and Communication Technology (ICT)

ICT will be used in various ways to support teaching and learning. ICT will involve the computer and other audio-visual aids. The promethean boards are a useful tool for delivering a range of teaching aids and can be used to support activities and enhance the

learning of scientific concepts. A microscope and data logger may be used. In addition, teachers may use some of the freely available resources on the Internet including virtual experiments, interactive games and multimedia clips to enhance their lessons.

Environmental Education

Environmental Education forms an integral and vital part of the science curriculum. Within the scheme of work, individual units naturally lend themselves to developing the children's knowledge, understanding, concern and care for the environment.

As a result of teaching about the environment, every encouragement is given to the children to apply the principles of energy efficiency, water conservation, waste reduction and recycling and litter control. Recycling is actively encouraged throughout the school and every classroom has recycling boxes to facilitate this.

Additionally, there are many opportunities within Science and other areas for children to learn about the choices they have and the impact that they can make on their environment. The school actively promotes this.

There are many resources within our school grounds which underpin effective teaching of Environmental Science, and the wider local area also adds to the provision available within the school.

Out of class and Homework

Science lessons will provide opportunities for the children to develop scientific skills, knowledge and understanding. However, science lessons should be a vehicle to motivate children to extend their learning beyond the classroom. Teachers will encourage children to find out information and practise scientific skills out of school time in a variety of ways. In addition, teachers provide opportunities to share and value the children's efforts.

Resources

Science equipment to be used across the age range is kept in the Resources Room.

Use should be made of the school grounds and local visits

Monitoring and Review

This policy will be reviewed as part of the three year policy review cycle.

SKILLS AND ATTITUDES

To support the aims of science teaching at Berewood Primary School, teachers should help each child in the class to develop an enquiring mind and a scientific approach to problems by encouraging the following skills and attitudes:

SKILLS

- a) observation
- b) classification
- c) measuring
- d) following instructions
- e) recording
- f) questioning
- g) predicting and hypothesizing
- h) planning investigations
- i) carrying out investigations
- j) evaluating and interpreting results/findings
- k) drawing inferences
- l) communicating
- m) using secondary sources

ATTITUDES

- 1) curiosity
- 2) respect for evidence
- 3) willingness to tolerate uncertainty
- 4) critical reflection
- 5) perseverance
- 6) readiness to question and suggest
- 7) inventiveness
- 8) open-mindedness
- 9) sensitivity to the living environment
- 10) sensitivity to the non-living environment
- 11) co-operation with others
- 12) working independently
- 13) enjoyment and enthusiasm for science

	Reception	Year 1	Year2
Autumn	<p><u>My favourite stories & rhymes</u> –to include Elmer Little Red Hen <u>Celebrations</u> Christmas Investigation- practical science, no assessed investigation</p>	<p><u>Light & Dark</u> Investigation-which material makes the best coat for bear?</p>	<p><u>Lighthouses</u> electricity changing materials inc. natural/ man manufactured changes i.e. stretch, boil, cool. Investigation- circuits-how do we light up a lighthouse?</p>
Spring	<p><u>Chinese New Year</u> <u>Aliens</u>-space <u>All about me</u> Investigation-what does Peter hear?</p>	<p>Investigating materials-sorting & using materials <u>Ourselves</u> Senses - Names/descriptions/purposes What affects our hearing? Investigation-Is the oldest person also the tallest?</p>	<p><u>Get moving</u> Health & Growth Forces & movement- pushes & pulls Investigation-distance a car travels</p>
Summer	<p><u>Bears</u>-plants in environment/ identify different smells in sensory garden <u>under the sea</u> –materials Investigation- which gloves keep our hands dry?</p>	<p><u>Growing plants</u> <u>Pushes & Pulls</u> Investigation-do seeds need light to grow?</p>	<p><u>Mini Beasts</u> animals in local environment <u>The seaside</u> variation Investigation-do people with big hands have big feet?</p>
Skills	<p>describe features communicate findings non-standard measuring use of hand lens intro to fair test</p>	<p>measurements start to record in simple ways predict verbally use of hand lens some understanding of a fair test</p>	<p>standard measure/ choice of equipment block graphs start to predict / explain results use of hand lens most understand fair test</p>
Essential knowledge for next class	<p>name five senses plants & animals are alive parts of the body</p>	<p>names of parts of plants role of light & water basic science vocabulary common materials pushes & pulls move things</p>	<p>materials have characteristics metal is a material pulls & pushes are forces parts of a circuit/ complete circuit some things need batteries /electricity</p>

Science Schemes of Work – Year 3 to Year 6

APPENDIX B

	Year 3	Year 4	Year 5	Year 6
Autumn	<p><u>The Ancient Greeks</u> light & shadow <u>Light & Shadow</u> <u>Characteristics of materials</u> Investigations Do Shadows change during the day? Which paper towel soaks up the most liquid?</p>	<p><u>Solids & liquids & how to separate</u> melting & freezing –particles/ growing crystals Investigation-which material will filter the most chalk from water? <u>Keeping warm</u> - measuring range of temperatures around the school. Investigation- where is the best place to put an ice cube so that it will be the fastest to melt?</p>	<p><u>Adventures in Space - The Earth, Sun, Moon & beyond</u> The Earth, Sun and Moon Keeping Healthy Investigation – which type of exercise raises our pulse rate the most? / What effect does the length of time we exercise for have on our pulse rate?</p>	<p><u>Monsters and Mountains</u> <u>World War 2</u> How we see things Investigation – the ways in which a shadow can be made to change Forces in action Investigation – spinners and air resistance investigation</p>
Spring	<p><u>Cuba & Pirates</u> How plants grow well Rocks & soils Investigations What do plants need to grow?</p>	<p><u>Forces fiction</u> air & water resistance Investigation-which footwear has the greatest grip? Which spinner has the greatest air resistance? <u>Human body, moving & growing</u> skeleton digestion alley Investigation-do people with the longest legs jump the furthest?</p>	<p><u>The Romans in Britain</u> Changing Sounds Investigation-which materials are better at muffling sound? Gases Around Us</p>	<p><u>World War 2</u> <u>Ancient Egypt</u> More About Dissolving Investigation – investigating saturation point; factors that affect the rate of dissolving Reversible / irreversible changes Investigation-how can materials be separated from water?</p>
Summer	<p><u>Chichester & The Locality-Dragons</u> Springs & Magnets Teeth & Eating Investigations What happens to eggshells in different liquids? Can we use springs to propel an object?</p>	<p><u>Habitats</u> key vocabulary, food chains data base ICT Investigation-which organisms live in a pond habitat? How have they adapted to live in this environment? <u>Circuits & conductors</u> Investigation-which materials are conductors of electricity?</p>	<p><u>Rainforests</u> Life Cycles (plants) Investigation-investigating germination of seeds (self-chosen investigation) Changing State Investigation-do draughts (air flow) affect the speed at which water evaporates from wet fabric?</p>	<p><u>Ancient Egypt</u> Circuits & switches Investigation-how does a switch affect a circuit? Micro-organisms (link to mummies) Investigation – investigating fermentation in bread dough Interdependence and adaptation</p>
Skills	<p>bar charts use of hand lens weighing measuring volume tables predictions fair tests</p>	<p>use a simple filter read a thermometer measure using newtons simple graphs writing up experiments predictions / conclusions fair test</p>	<p>use of microscope simple graphs (line) & tables can set up a fair test can explain conclusions</p>	<p>REVISION problem solving measuring- reading from scales (Newton meter) appropriate effective use of apparatus testing-planning enquiry evaluation, recording skills</p>
Essential knowledge for next class	<p>melting & freezing how to separate liquid / solid by sieving knowledge of materials science vocabulary</p>	<p>name & describe differences between some liquids & solids & gases know how to separate mixtures, filter evaporation, condensing, sieve good / bad conductors-thermal conductors /insulators/ identify common electrical insulator & conductors draw & construct simple circuit friction air & water resistance name main bones in the body & know why we have a skeleton how muscles help to move use vocabulary for food chains know what a habitat is</p>	<p>know what all plants need to grow well understand feeding relationships data handling science vocabulary</p>	

Planning Investigations in Primary Science

The grid overleaf (in A3 format) is to help you plan investigations to develop and assess pupils' investigational skills. You can use it to check whether an idea for an investigation offers opportunities across the appropriate range of skills and levels for your pupils.

What is your open question to investigate?

What are the key factors that your pupils might choose to change in their investigation?

What science knowledge, understanding and skills, if any, will pupils need to have covered before investigating this idea?

Now fill in the grid with some examples of the responses that pupils might give when carrying out their investigation.

Does your question to investigate allow for responses at the appropriate range of levels for your pupils?

What equipment will you need to prepare to help pupils carry out the range of experiments they might plan in answer to this idea for an investigation?

(Enlarge sheets to A3 if appropriate)

APPENDIX Civ

Reception orally using these headings / Year 1 start using sheet as class / Year 2 by the end of the year

YEARS R, 1 and 2

QUESTION:

WHAT WE ARE GOING TO DO:

WHAT WE THINK WILL HAPPEN:

WHAT HAPPENED:

WHAT OUR RESULTS TELL US:

Working towards in Year 3, use in Year 4

OUR QUESTIONS:

WHAT WE WILL CHANGE:

WHAT WE THINK WILL HAPPEN:

WE THINK THIS WILL HAPPEN BECAUSE:

WHAT WE WILL MEASURE:

WE WILL RECORD WHAT HAPPENS LIKE THIS:

What we changed

What we measured

WHAT OUR RESULTS TELL US:

HOW DO WE KNOW THE TEST WAS FAIR OR NOT?

Any of the following sheets can be used in Years 5 and 6 as appropriate

Name:	Teacher:
What I am trying to find out:	
Things I could change or vary:	
I will change:	
What I think will happen and why:	

What I will measure:

Equipment I shall need:

What things I will keep the same:

Now carry out your plan:

My results table

(The values of what I changed)

(The values of what I measured)

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What my results tell me:

--

Did I think this would happen?

Name:	Teacher:
My Question	
Things I could change or vary I will change:	My Prediction (what I think will happen) I think because
My Plan: What I will measure Equipment I will use	
I will keep these things the same to make it a fair test	

What my results tell me:

Did I think this would happen?

EXPECTATIONS (Source – West Sussex Statement of the Secular Curriculum)

Science in schools covers a balance of topics drawing from ideas in physics, chemistry, biology, Earth science and astronomy. It should initially be focused on pupils' home and school lives but, as they mature, increasingly relate to wider scientific issues. Pupils should gain an appreciation of the contribution science and technology make to society while developing their own curiosity and concern for the natural world.

The central role of making and testing hypotheses in a practical context is what makes science studies distinctive. This work takes place through activities which draw on increasing knowledge and understanding. Pupils use progressively more sophisticated practical skills to help them make better sense of the world around them.

Key Stage 1

Pupils should:

- explore everyday objects and events in familiar situations centred on themselves and their home and schools
- Develop concepts familiar to them by their everyday use and first-hand experience
- Suggest testable ideas: Why? What would happen if?
- Sort, group and describe objects and events, noting similarities and differences
- Use simple variables in a qualitative manner
- Use basic measuring techniques
- Develop an understanding of the purposes of recording and the use of simple techniques such as pictograms and drawings
- Make statements arising from observations, including classifications and simple relationships between variables, such as 'light objects float'.

Key Stage 2

Pupils should:

- Investigate everyday objects and events within their day to day experience in the environment of school, home or immediate locality
- Use secondary sources as well as first-hand observation
- Use secondary sources as well as first-hand observation
- Use an increasingly systematic approach involving simple variables in 'fair' tests
- Select and use appropriate measuring instruments leading to quantification of results
- Develop more systematic forms of data representation in tables and bar charts
- Use written and/or oral reporting skills, suited to purpose and audience
- Use a limited technical vocabulary
- Evaluate data in relation to the original problem and, where appropriate, identify patterns in such data

SCHOOL GROUNDS AND VISITS

The school grounds provide excellent resources for study of biology. Many different habitats are available to study:

- a) field area – closely cut grass
- b) vegetable and herb garden – under development
- c) many varied flower beds
- d) Traditional hedging area around field
- e) Logs, wood and stones beside the pond for mini-beasts
- f) Trees (newly planted)

These areas are ideal for study of different mini-environments and the plants and mini-beasts that live there. They can also be used to look at the effect humans have on their environment. Successful survival, food chains, pollution can all be studied within the school grounds. In addition, decay and compost production are also able to be studied around the vegetable garden. There is a large variety of plant and tree life, which can be used for starting work on identification and the use of keys. In addition, it is possible to set up successful bird-watching areas for the children to monitor, as well as a variety of weather stations with widely differing micro-climates.

Safety

The school does not have a pond, however, the River Wallington runs past the grounds of the school and is within very easy access.

Visits

Many local visits are suitable to be used for science activities, as well as geography, art etc. For example:

Brandy Hole Lane Copse
Pagham Harbour
Kingley Vale
Pulborough Brooks
Selsey and Bognor Beach
Woods Mill
Queen Elizabeth Gardens
Blue Reef aquarium
Marwell Zoo
The Living Rainforest
The South Downs Planetarium and Science Centre
Seeley Copse
River Lavant
Staunton Country Park
West Dean Gardens

This is not an exhaustive list; successful visits have taken place at the above. Individual teachers are encouraged to identify visits which will enhance the children's science learning and experience.

See Staff Handbook and Policy for Off-site visits for Regulations and Notes of Guidance for Off-Site Activities for guidance when planning a visit. Pro formas are kept online and in the school office.