Thorn Primary School Science Policy

Our Vision

Through science, pupils at Thorn Primary School will continue to deepen their respect, care and appreciation for the natural world and all its phenomena enabling them to make sense of the world in which they live through investigation, as well as using and applying process skills.

Introduction

This policy document reflects the school's values and philosophy in relation to the teaching and learning of Science. It sets out a framework within which teaching and non-teaching staff can operate and gives guidance on planning, teaching and assessment. The policy should be read in conjunction with the Science Curriculum and Science medium term plans contained within the class curriculum files, which set out in detail the topic areas and the knowledge and skills that pupils in different year groups will be taught.

Intent

Science is a body of knowledge built up through experimental testing and exploration of ideas. Science is also methodology, a practical way of finding reliable answers to questions we may ask about the world around us through systematic investigation of the physical, chemical and biological aspects of the world which relies on first hand experiences and on other sources of information. The scientific process and pupils' problem-solving activities will be used to deepen their understanding of the concepts involved. The main aims of Science teaching and learning will be determined by the programmes of study of the National Curriculum 2014:

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

In supporting theses aims, at Thorn Primary School we strive to:

- develop pupils' enjoyment and interest in science and an appreciation of its contribution to all aspects of everyday life
- build on pupils' curiosity and sense of awe of the natural world
- use a planned range of investigations and practical activities to give pupils a greater
- understanding of the concepts and knowledge of science
- introduce pupils to the language and vocabulary of science
- develop pupils' basic practical skills and their ability to make accurate and appropriate
- measurements
- develop pupils' use of computing in their science studies.
- extend the learning environment for our pupils via our environmental areas and the locality
- promote a 'healthy lifestyle' in our pupils.

Upon leaving Thorn Primary School, Science teaching and learning will have enabled children to develop:

- ***Resilience*** – Don't give up when things don't go to plan.
- ***Perseverance*** – Try more than one idea and work hard
- ***Critical thinking*** – The ability to challenge and question ideas both in a practical and creative sense.
- ***Communication and collaboration*** – use appropriate language, recording and techniques to work as a team appreciating the collaborative nature of science.
- ***Open-mindedness*** – co-operate, respect and understand others.
- ***Self-confidence*** - A positive attitude towards ourselves and the environment.
- ***Looking to the future*** – an understanding of the impact of Science and an understanding of its contribution to our quality of life now and the developments it can make in the future.

- ***Curiosity*** - to be interested and enjoy science building on pupils' curiosity and sense of awe of the natural world

Implementation

The Science National Curriculum 2o14 splits science into:

- Scientific knowledge and conceptual understanding - Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely.
- The nature, processes and methods of science - 'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group so that pupils learn to use a variety of approaches to answer relevant scientific questions.

In enabling children to develop their scientific skills, whilst broadening and deepening their knowledge and understanding of scientific content, we aim to ensure continuity alongside progression through a spiralling curriculum. Whilst learning science at Thorn Primary School, children will have regular opportunities to work scientifically developing the skills to:

- Sort/group/compare/classify and identify
- Research
- Modell
- Record explorations/observations
- Question
- Plan & Test
- Use equipment and measures
- Communicate and record
- Consider results & write a conclusion.
- Collaborate

Objectives:

The following objectives derived from the above aims and the Science National Curriculum 2014 will form the basis of our decisions when planning a scheme of work. Assessment will also be related to these objectives:

- **To develop pupils' enjoyment and interest in science and an appreciation of its contribution to all aspects of everyday life.**
  • to develop a knowledge and appreciation of the contribution made by famous scientists to our knowledge of the world including scientists from different cultures
  • to encourage pupils to relate their scientific studies to applications and effects within the real world
  • to develop a knowledge of the science contained within the programmes of study of the National Curriculum.
- **To build on pupils' curiosity and sense of awe of the natural world**
  • to develop in pupils a general sense of enquiry which encourages them to question and make suggestions
  • to encourage pupils to predict the likely outcome of their investigations and practical activities
- **To use a planned range of investigations and practical activities to give pupils a greater understanding of the concepts and knowledge of science**
  • to provide pupils with a range of specific investigations and practical work which gives them a worth-while experience to develop their understanding of science
  • to develop progressively pupils' ability to plan, carry out and evaluate simple scientific investigations and to appreciate the meaning of a 'fair test'.
- **To develop the ability to record results in an appropriate manner including the use of diagrams, graphs, tables and charts**
  • to introduce pupils to the language and vocabulary of science
  • to give pupils regular opportunities to use the scientific terms necessary to communicate ideas about science
  • to develop pupils' basic practical skills and their ability to make accurate and appropriate measurements
  • within practical activities give pupils opportunities to use a range of simple scientific measuring instruments such as thermometers and force meters and develop their skill in being able to read them.
- **To develop pupils' use of ICT in their science studies**
  • to give pupils opportunities to use ICT (video, digital camera, data logger) to record their work and to store results for future retrieval throughout their science studies
  • to give pupils the chance to obtain information using the internet.

Organisation

At Key Stage 1 and 2 the curriculum is taught using both a cross-curricular and discrete subject approach. Time is used effectively and flexibly to allow professionals to organise teaching and learning experiences through a 'blocked' approach to best meet the needs of our children. The expectation is that, if taught weekly, subject teaching is planned so that either two separate sessions or a half-day are dedicated to Science involving at least two hours of teaching time weekly over the half

term. If blocked, this teaching time will be accrued through several Science lessons taught daily over two weeks. Some aspects of Science may be taught as part of the whole school theme. However, children must be made aware that they are taking part in a Science lesson or developing scientific skills to prevent the Science learning from being diluted. The whole school will also take part in four 'Seasons Weeks' in Autumn, Spring, Summer and Winter to teach the curriculum content for plants and animals throughout the year to allow for monitoring and recording of changes linked to seasons. These are timetabled to ensure a whole school event.

Foundation Stage pupils investigate science as part of Understanding of the World. Children are encouraged to investigate through practical experience; teachers guide the children and plan opportunities that allow the children to experience and learn whilst experimenting for themselves. By careful planning, pupils' scientific skills and knowledge gained at Key Stage 1 will be consolidated and developed during Key Stage 2.

Cross-curricular (Thematic)

Cross – curricular links arise between Science and a range of National Curriculum subjects. Science provides opportunities for teachers to link cross-curricular dimensions as they feel appropriate. Cross-curricular links are identified through the use of whole school themes each term with links identified on medium term **curriculum overview** allowing teachers to plan and teach thematically. Curriculum days and events (contextual learning) are planned by subject leaders to enhance learning in a creative way. Enrichment weeks, visiting experts and trips are used to bring the curriculum to life.

Planning:

In KS1 and KS2, each year group tackles a series of topics that are divided into basic areas:

- Human Beings
- Plants and Animals
- Materials
- Forces
- Physical Processes

Throughout each year, there is a continued emphasis upon practical and investigative Science. Based upon a spiralling curriculum, the skills and content strands are revisited and extended; the focus altering and the skills advancing, through further investigation ensuring progression as pupils' move through the school.

Curriculum overviews, developed from the National Curriculum 2014 by the Subject Leader, ensure full, broad and balanced coverage of the Science Curriculum throughout the year with cross-curricular links to other subjects clearly identified to allow relevant and purposeful connections in learning to be made. From these **curriculum overviews** teachers develop their short-term plans. Further planning support is provided through the **Science Plants Progression** overviews and **Science Skills and Knowledge Sheets**. All planning documents are stored in **Curriculum Planning Files** for ease of reference as well as being available in the Science area of the school website staff secure zone. The Lancashire Creative Contexts planning resource was introduced in Spring 2012 to support teachers in planning creative opportunities across all areas of Science, which incorporate 'real life' links and was updated in 2014 to meet the demands of the new curriculum.

Written Reports of Practical Investigations

Continuity and development of the children's written reports on practical investigations and activities, is ensured throughout the school through an agreed and standardised approach of using Lancashire Planning Boards (KS2) and Discovery Dog (KS1) which incorporate the following:

- Investigation title
- Variables to change/variables to measure
- Investigation question
- Fair test
- Prediction
- Results
- What We Learnt / Evaluation / Conclusion.

Though it is not expected that each investigation be written up in full, as the focus may be on a particular area or areas, the Science Skills document provides details of how the skills and vocabulary of investigations progress throughout the year groups, but in summary:

KS1

From the introduction to Science early in Key Stage One, children should be introduced to the concepts of asking a ***QUESTION***. By year 2 the term ***PREDICTION*** and ***RESULTS*** should be in regular use.

LKS2

The terms ***FAIR TEST, RESOURCES, METHOD, DATA*** and ***CONCLUSION*** should be introduced and familiar to the children in years 3 and 4. By Year 3 children should be aware that some questions are testable and make suggestions in groups. By Year 4 children should be asking and raising their own relevant questions to be investigated.

UKS2
The terms ***RELIABILTY, VARIABLES, PATTERNS, ANOMALIES, COMPARATIVE*** and ***JUSTIFY*** should be introduced and become familiar to the children in years 5 and 6. By Year 6 children should be refining scientific questions for investigation and raising different kinds of questions.

Presentation
All children will strive to set out their work as neatly as possible. As they progress to Key Stage 2, an emphasis will be placed upon the importance of carefully presented tables, charts and graphs in line with the 'Mathematics Policy'. Children will also be familiar with the fact that diagrams need neatly written labels. Teachers regularly emphasise the value of good presentation in Science. The rules for presentation are standardised throughout the school in the 'Handwriting and Presentation Policy'.

Teaching
When planning, the needs of specific children are taken into account. Every effort is made to ensure that each child understands the concepts of each topic being taught, and that they are developing scientific skills at a level appropriate to them. The central aim is that children should be able to apply their knowledge practically and use it to interpret results and relate findings to everyday life.
Teachers will plan for a variety of structured activities to ensure breadth and balance and more open-ended investigative work:
• activities to develop good observational skills
• practical activities using measuring instruments which develop pupils' ability to read scales accurately
• structured activities to develop understanding of a scientific concept
• open ended investigations.
On some occasions pupils will carry out the whole investigative process themselves or in small groups. Wherever possible, science work will be planned relating to the real world and everyday examples will be used.

Differentiation and Additional Educational Needs

Science a core subject within the National Curriculum. It is a subject that should be enjoyed by both pupils and teachers. It should make no distinction on grounds of culture, sex, ethnic origin or ability. As Science is largely practically based, the teachers' input and support should enable children of all levels of ability to tackle the topics successfully. What should differentiate the responses of children with differing abilities is the greater depth of skills practised and the quality and quantity of the factual information understood. Classes should reveal the extent to which specific individuals are able to develop ideas that have begun as part of planned work. Support and extension activities are an integral part of many lessons. These are left to the teachers' "professionalism", though guidelines and suggestions for differentiation within Science are in place.

Special Needs
Careful consideration is given to each pupil's level of achievement and ability. Work is set appropriately, using relevant resources. Science is aimed at the full ability range within the class. We feel that, where possible, no child should be prevented from taking part in any of the scientific activities. All children should have the opportunity to develop and reveal abilities of thought, insight, understanding and interpretation. With a range of teaching strategies, possibilities for groupings, varied flexible/ supportive resources and appropriate expectations; Science teaching should be effective across the ability range. It should have relevance to all children at all levels. Ongoing, continuous assessment should allow teachers to establish each child's capabilities and to plan and structure work appropriately. (Refer to document outlining suggestions for differentiation in Science)

Able, Gifted and Talented
At Thorn Primary School we aim to provide a curriculum that is appropriate to the needs and abilities of all our children. We plan our teaching and learning in such a way that we enable each child to reach the highest level of personal achievement.
To meet the needs of individual able, gifted and talented pupils, a range of strategies should be adopted that include:
- Setting
- Target setting
- Differentiation
- Teaching and learning styles
- Enrichment and extension opportunities
- Challenge

Impact

Feedback and Marking
We assess for learning (AFL). Children are involved in the process of self-improvement, recognising their achievements and acknowledging where they could improve. Activities during, and at the end of each unit of work record achievements and celebrate success. Children may self-assess and peer-assess and indicate according to the whole school marking policy. We mark each piece

of work positively, making it clear verbally (VF), or on paper, where the work is good and how it could be further improved. We use AFL to provide next steps for learning using the tickled pink and green for growth marking approach. As per the whole school marking policy, any guided group must be quality marked.

Formative and summative assessment

Children's work in Science will be subject to ongoing assessment. Assessment for learning (AFL) is applied through the use of a pre-unit concept map completed by the children at the start of each science unit. This is used to inform teacher's next steps in planning and teaching thus ensuring children's learning is relevant and purposeful. At the end of each science unit, the concept map is repeated thus serving as a post-unit assessment allowing teachers to make a summative judgement regarding a child's understanding and application of knowledge and skills. Theses assessments feed directly into the completion of Science Skills Sheets which are completed by class teachers termly as part of assessment week. This ongoing record of children's attainment allows teachers to identify whether children are working at/above or below the expected level for their age based upon the National Curriculum 2014 content. Skills sheets are collected by the science subject leader termly for data to be tracked and analysed to support the identification of any trends or areas for development which feed directly into the science subject action plan. At Key Stage 1, or in the case of particular individuals, teachers may annotate children's work with relevant comments made.

To support teachers further in making accurate and informative assessment decisions, Rising Stars test materials are available but must be used to inform teacher assessment not as the only method of assessment. Teachers are also encouraged to plan regular 'outcomes' at the end of a unit of work to inform assessment.

Progress and attainment is reported to parents through parents' evenings and end of year reports.

Record Keeping

Planning is used to note any over and under achievers, significant absences and misconceptions. This can then be used to complete skills sheets. Following the guidelines in place, the teacher will make note of any areas of misconception, or aspects of a topic which were not covered for any reason. Notes will also be made of specific children with particular difficulties, or who missed a significant part of a topic through absence. Equally, individuals with exceptional strengths in Science would be mentioned. This system operates in such a way, that children who successfully reach all the objectives of a topic require no individual mention. This will provide the basis for AFL. Completed Science Skills Sheets will be stored in each year group's Assessment File with a copy being passed to the subject leader. Records completed throughout the year are monitored annually and passed onto the next teacher, forming a useful point of reference when planning and revisiting related areas of work, as well as detailing progression. (See Whole School Record Keeping Policy).

Resources and Accommodation

Science throughout the Primary age range requires the use of many and varied resources. These need to be kept readily available, requiring careful planning and management before and during the period in which they are needed in the classroom.
Currently the Science resources are stored in the large storage cupboard on the lower junior corridor. The resources are stored neatly in trays and boxes and are clearly organised and labelled. Staff are consulted regarding priorities for Science resources before large orders are made. Individual teachers are responsible for informing the co-ordinator of their consumable needs in advance, as well as any breakages or faults. Items from resource boxes must be returned after use. ***It is the responsibility of each class teacher to have the resources ready before the beginning of a lesson as children must not enter the Science stock room.***

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. Children should always be encouraged to consider safety for themselves, others, the environment and the resources they use, when undertaking scientific activities. This includes :

- teaching pupils to recognise hazards in a range of products, activities and environments and to take action to control the risks to themselves and others.

We subscribe to CLEAPS and have downloaded an up to date Health and Safety risk assessment for Science. For specific guidance about safety in science teachers will refer to the ASE publication 'Be Safe' (2nd edition).

The Role of the Subject Leader

The subject leader for Science is Mrs Johnson.

It is the role of the subject leader to :-

- take the lead in policy development and the production of schemes of work designed to ensure progression and continuity in Science throughout the school.
- support colleagues in their development of detailed work plans and implementation of the scheme of work.
- monitor progress in Science.
- take responsibility for the purchase and organisation of central resources for Science.
- attend the Science Cluster meetings at local schools and liaise with staff to organise events for children and develop subject leadership e.g. CPD opportunities, specialist teaching in school, workshops.
- keep up-to-date with developments in Science education and disseminate relevant information to staff.
- produce a report to Governors at the end of each school year.