

# **Queen's Drive Primary School.**



## **Science Policy Document.**

Miss Parkinson & Miss Simmons September 2019  
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## **CONTENTS.**

1. Document purpose
2. Audience
3. Subject aims
4. Purpose of study
5. Curriculum and School Organisation.
6. Subject Planning
7. Time Allocation
8. Subject Planning
9. Assessment and Record Keeping
10. Homework
11. Safety
12. Reporting to Parents
13. Marking Work
14. The role of the Subject Leader.
15. Resources.
16. INSET provision.
17. Equal Opportunities.
18. Special Educational Needs and Inclusion.
19. Cross Curricular skills and themes.
20. Computational Thinking
21. Evaluation.

## Document Purpose

This policy reflects the values and philosophy of Queen's Drive School's relation to the teaching and learning of Science. It gives a framework with which all staff, both teaching and non-teaching, work and gives guidance on planning, teaching and assessment.

The policy is intended to be used in conjunction with the Lancashire Schemes of Work for Science Key stages 1 and 2 which gives details of what pupils in different year groups are taught.

## Audience

This policy document, having been presented to and agreed by the whole staff and Governing Body, is distributed to all individual members of the teaching and non-teaching staff and school governors. Further copies of the policy are available in the Headteacher's office. Such distribution ensures the accessibility of the document to visiting teachers, for example outreach/support staff and parents. A copy of the document is also available from the subject leaders for Science, Mr Aspinall and the office staff.

## Subject Aims

Our Science policy follows The National Curriculum 2014 for Science Guidelines and aims to ensure that all pupils;

- Are provided with a Science Curriculum which is broad, balanced, relevant and differentiated.
- 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, using a wide variety of materials and equipment;
- Are equipped with the scientific knowledge required to understand the **uses and implication** of Science, today and for the future.
- To ensure the progressive development of **scientific concepts, knowledge, skills and attitudes**.
- To promote **positive attitudes** towards, and **enthusiasm** for, Science work in and out of school.

Work in Science is divided into Key Stages (KS1, LKS2 and UKS2) and organised into units of increasing challenge.

It is expected that most children will achieve the ‘expected progress’ for their particular year group, which will be tracked using the Lancashire tracking tool.

### **Purpose of study – Why teach Science?**

A high-quality Science education provides foundations for understanding the world. Science has changed our lives and is vital to the world’s future prosperity. Through building key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how key knowledge and concepts can be used to explain what is occurring, predict how things will behave, and analyse causes. This understanding should be consolidated through their appreciation of applications of Science in society and the economy.

In the teaching and learning of Science we can identify a number of objectives:

- To provide a balanced range of scientific activities as an integral part of the whole school curriculum.
- To ensure continuity and progression in science work from Reception (Foundation Stage) to Year 6 by means of careful, structured planning.
- To incorporate opportunities to develop basic scientific skills, attitudes and knowledge appropriate to the development of the child.
- To provide opportunities for children to acquire, practice and develop scientific skills and strategies through a carefully structured activity based programme centred on investigations.
- To provide flexible ways of working including class, group and individual.
- To provide opportunities for children and staff to share and develop ideas and respect each other’s views.
- To develop children’s natural curiosity about themselves and their world and use to foster positive attitudes to scientific learning.
- To provide first-hand experiences which help children to understand themselves and the world in which they live.
- To develop children’s ability to reason, predict, think logically and to work systematically and accurately.
- To build upon the experiences children bring to science and develop them in a wide range of contexts.
- To build upon children’s confidence and competence when working in science.
- To encourage children to work in an increasingly independent way and develop their own research skills.

### **Curriculum and School Organisation.**

Much of the work undertaken in Science will be investigational activities with pupils often working in pairs or small groups. It can be appreciated then that co-operation and respect

for others in a group are qualities that need to be nurtured from an early age. Of course there will be occasions when pupils will work independently and also when whole class teaching is required to instigate, develop or conclude an investigation. A balance of these methods of teaching depends on the individual teachers, the topic being studied and possibly the availability of resources.

Through the practical work, children will have the opportunity to discuss their ideas and findings with each other and the teacher. This should aid their understanding of how and why things happen and the effects of change on materials and situations. Teachers should encourage the use of technically vocabulary within the children's explanations.

In practical activities the children are encouraged to recognise the importance of a fair test in scientific investigations and realise that only one variable should be altered at any one time to keep the test fair and draw conclusions.

Interactive activities using computers and data loggers, television and radio broadcasts are often used as starting points or aids to develop stimulating learning activities.

Educational visits are of a cross-curricular nature and Science work is often linked to visits in preparatory work, on site work or follow up work.

The development of work will be allocated to pupils on an individual, group or class basis according to the child's age and ability. Science activities are timetabled to facilitate the most efficient use of resources such as equipment and ICT.

All lessons are planned to ensure range and progression, and to ensure coverage of all the programmes of study of the National Curriculum 2014 for Science.

## **Planning**

### **School curriculum**

The programmes of study for Science are set out year-by-year for Key Stages 1 and 2. We are however, only required to teach the relevant programme of study by the end of the key stage.

Teachers will base their planning on the programmes of study for their relevant year groups therefore, it is the duty of the teaching staff to ensure that the scheme is fully implemented and supported by other activities within a lesson. A detailed scheme of work can be viewed in the Scheme of work document.

Teachers and subject leaders have worked together, using a variety of planning tools to create their own curriculum unique to their year group and the children here at Queen's Drive.

## Curriculum Intent

Science at Queen's Drive – Every unit of work includes a strong focus on skills or scientific inquiry implemented through an investigation and exploration approach, that makes learning memorable, whilst building on essential key knowledge. Impacting every child's ability to retain a deep understanding of science content and scientific methods.

### **The Three 'I's: intent, implementation and impact**

- **Intent** – the extent to which schools demonstrate a rich and varied curriculum, one which is not simply focused on teaching to the tests or achieving good exam results.
- **Implementation** – that teachers present all aspects of this broad and balanced curriculum (not just English and maths) and are visibly encouraging discussion and the whole-hearted engagement of pupils, without an over-concentration on outcomes and with a far greater emphasis on processes.
- **Impact** – that learners develop detailed knowledge and skills across the whole curriculum. It follows that there will be a greater emphasis on the behaviour and attitudes of pupils and a much less single-lens approach to data.

Value/Skill	Definition	Subject View (What does it look like within a subject?) Subject = Science
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1 - Physically & Emotionally healthy	Self belief, happiness, self esteem, active, mental well being, emotional intelligence. Communication.	Children will know the knowledge of the human body and have confidence to be able to ask questions about change.
2 – Love of learning	Ask questions, motivated, curious, independent, continual learning, inquisitive, excited	Children will be able to carry out (and access) a range of experiments, enquiries, educational visits, visitors and outdoor learning.
3 – Communicative	Asking for help, sharing ideas, collaborative, maintain relationships, literate, numerate	Children will be able to work as a team to discuss their investigations, adapt to different roles within investigations.
4 -Resilience	Taking risks, problem solving, never give up, accepting failure,	Children able to make mistakes during investigations and find ways to make it work
5 - Compassionate	Kind, respectful, caring, tolerance, responsible, fair, polite, understanding, empathetic	Children will respect scientific beliefs, respect equipment and peers during experiments.
6- Confident	Self assured, self belief	To independently carry out investigations with confidence.
7 - Aspirational	Motivated, ambitious, driven, ‘dream – believe – achieve’	Children will be introduced to aspirational scientists (past and present) of various genders.
8 - Reflective	Evaluative, open-minded, empathetic, self aware,	Children will build upon prior knowledge in order to create new questions and reflect on experiments.
9- Creative	Problem solving, thinking outside the box, resourceful, individuality, uniqueness, hands-on	Children will have a range of hands-on learning through various environments and experiments.

## **Scientific knowledge and conceptual understanding**

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage.

Knowledge organisers are individually created for each year group and reviewed by the science leaders. These knowledge organisers outline knowledge specific for each year group. It is the role of the science leader to ensure the progression of knowledge is in line with the whole school curriculum overview. It is also the role of the science leader to assess long term knowledge acquisition, through pupil voice, to ensure knowledge is embedded throughout year groups. Pupils should be able to describe associated processes and key characteristics using the scientific vocabulary, which is highlighted on their knowledge organiser. They should also be familiar with, and use, scientific vocabulary from previous knowledge organisers, taught in previous year groups, accurately and precisely to explain scientific concept. It is extremely important that children can use their scientific experiences to build on their prior knowledge, being able to recall previous experiments and investigations is not embedded learning. Children should be able to apply their knowledge to new concepts using the age appropriate vocabulary highlighted in the knowledge organisers.

Knowledge organisers should be sent home each half term to parents and guardians, be displayed on the school website and also be present and visible in both children's theme books and classrooms.

Knowledge organisers should be updated half-termly - if necessary, by year group teams and sent to the science leaders to ensure coverage and progression.

### **The nature, processes and methods of science**

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. At Queen's Drive children should be provided with opportunities for working scientifically at least once a week, through a creative curriculum this could be seen in any lesson. The notes and guidance from the national curriculum give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

### **Assessment**

#### **Due to the organisation of the curriculum, informal retrieval**

At the end of each year, children will be tested using appropriate assessments. These will then give an overall progress grading for each child (less than expected progress/expected progress/more than expected progress). All staff have access to the Lancashire Tracker (an ICT based progress tracker), in which they can monitor and track pupil progress in science. Coupled with a booklet of diagnostic and end of unit tests appropriate for each year group, teachers will be able to provide a clear progression in children's Science knowledge and understanding.

Teachers will assess and monitor using a , and these will be placed in the class assessment folder. Subject leaders can then analyse the data from each class and year group.

### **Key Stage 1**

The main focus of science teaching in Key Stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of **scientific ideas** by using different types of scientific enquiry to answer **their own questions**, including **observing** changes over a period of time, noticing patterns, **grouping** and **classifying** things, carrying out **simple comparative tests** and finding things out using secondary sources of information. They should begin to use **simple scientific language** to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about Science should be done through the use of **first-hand practical experiences**, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

Pupils should read and spell scientific vocabulary at a level consistent with their reading and spelling knowledge at Key Stage 1.

## **Lower Key Stage 2**

The main focus of Science teaching in Lower Key Stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through **exploring, talking about, testing** and **developing ideas** about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should **ask their own questions** about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including **observing changes over time**, noticing patterns, **grouping** and **classifying** things, carrying out **simple fair tests** and finding things out using secondary sources of information. They should **draw simple conclusions** and use some **scientific language**, first, to talk about and, later, to write about what they have found out.

‘Working scientifically’ must **always** be taught through and clearly related to substantive Science content in the programme of study.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing reading and spelling knowledge.

## **Upper Key Stage 2**

The main focus of Science teaching in Upper Key Stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through **exploring** and **talking about their ideas; asking their own questions** about scientific phenomena; and analysing functions, relationships and interactions more systematically.

At Upper Key Stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and **predict** how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should **select the most appropriate ways to answer Science questions** using different types of scientific enquiry, including **observing** changes over different periods of time, noticing patterns, **grouping** and **classifying** things, carrying out **fair tests** and finding things out using a wide range of secondary sources of information. Pupils should **draw conclusions** based on their **data and observations**, use evidence to **justify their ideas**, and use their scientific knowledge and understanding to explain their findings. Pupils should read, spell and pronounce scientific vocabulary correctly.

‘Working and thinking scientifically’ must **always** be taught through and clearly related to substantive Science content in the programme of study.

### **Coverage**

Certain units may require more time allocation. Teachers...

### **Assessment and Record Keeping**

Records of pupils’ achievements are kept to:

- Plan pupils’ future learning.
- Report progress to parents.
- Maintain a written record of pupils’ learning.
- Provide a curricular record for each child.
- Fulfil legal requirements.
- Share and celebrate best practice
- Moderate across key stages to ensure progression

General assessment is an on-going process in which teachers may note children’s activities, responses and achievements in Science at any time.

Subject Leader File:

The Science Subject Leader keeps a detailed information file which includes a full record of children’s assessment and attainment throughout school. This data helps to make predictions for future attainment.

Purple subject leader files to follow the schools subject leader policy.

### **Homework**

Please refer to the Homework policy.

## **Safety**

Following COSHH guidance 'Be Safe'.

Risk assessments are kept in a central area on the shared drive and are adapted by individual class teachers for the specific needs of their class. It is the responsibility of the subject leaders and health and safety leader to ensure these are assessed and updated yearly.

## **Reporting to Parents**

Parents, families and guardians at Queen's Drive School are invited in half-termly to celebrate and enjoy the work created by their children during the half term. Class teachers are flexible in how and what they want to present to the parents, for example an art exhibition, a story telling session, a short play or presentation of music/dance. This time should be used to celebrate cross curricular learning. Children must be given the opportunity to share aspects of their learning from all subjects including science. Pictures of these events will be collected by subject leaders to celebrate our creative curriculum.

Parents of children at Queen's Drive School will receive a written report in the summer term of each year. This will provide parents with information about their child's attainment and progress in all subjects including Science. The report will be written by the class teacher and signed by the Headteacher. Parents' Evenings will provide opportunities for discussion regarding children's progress and attainment.

Knowledge organisers and newsletters will be sent out half-termly.

## **Marking Work**

Refer to the whole School Marking Policy.

## **The Subject Leaders Role**

The current subject leaders for Science are Miss Parkinson for Key Stage 2 and Miss Simmons for Key Stage 1. They are responsible for co-ordinating Science throughout the school.

The duties of the Science Subject leaders are:

- To prepare a policy and scheme of work for the whole school in Science in consultation with the Headteacher, Staff and Governors.
- By reading, consultation and INSET to maintain up-to-date knowledge of development and practises in Science.
- To provide guidance and support to other members of staff in implementing the National Curriculum in Science by meetings, guidance and example.
- To be responsible for the acquisition and maintenance of Science resources within the school whose quality, sufficiency and accessibility will effectively promote Science in the school.

- To help the school devise a useful and manageable assessment and recording system within the school which teachers can use to inform their teaching and monitor progress within their own classes.
- To keep and use the assessment data, to analyse pupils' progress in Science, to monitor the effectiveness of the schools' teaching in Science and to identify strengths and weaknesses.
- To monitor progress throughout the school in Science.
- To establish strong community links with businesses, local primary schools and high schools in the aim of further developing the delivery of Science in the school.

## **Resources**

A wide variety of Science resources are available in the school. These include children's reference books, teachers' resource books and notes, Science materials and practical equipment, DVDs and videos along with access to the internet for online learning and support. The schools' network and ICT suite has software available to extend the learning experiences within Science through the use of interactive activities. A range of pictorial resources such as posters, photographs and pictures are also available. Resources are stored in a secure store room and shared amongst all classes in the school.

The majority of the science materials and equipment are kept in dedicated science cupboards where there are many topic/theme boxes which are clearly labelled for ease of finding resources. This cupboard is only available to teaching and support staff; no children are allowed to enter this cupboard. A small booklet is kept inside the store for staff to report damaged items and possible suggestions for future purchases.

## **INSET Provision**

INSET needs to be identified through curriculum review / evaluation, inspection / external advice and school development/improvement planning.

Areas for development will be recorded and prioritised by the subject leader, the school leadership team and staff development planning.

There should be consistency with the School Improvement Plan and the Science Action Plan to ensure that any developments are planned thoroughly in the interests of progressing the teaching and learning of science in the school.

INSET providers may include school staff, cluster school groups, Local Authority advisors and local Science College staff.

The effectiveness of INSET provision on the teaching and learning will be reviewed by the subject leader, the curriculum manager and the school leadership team.

As a designated Teaching School for the Preston area, the staff may well be asked to provide training for local schools and trainee teachers.

### **Equal Opportunities.**

All teaching and non-teaching staff at Queen's Drive School are responsible for ensuring that all pupils, irrespective of gender, ability, ethnicity and social circumstances have access to the whole curriculum and opportunities to make the greatest progress possible in all areas of the curriculum while in our school.

All children in all year groups have equal opportunity to undertake all aspects of work in Science and have access to Science based teaching and learning throughout any one school year.

Monitoring of the policy for Equal Opportunities in terms of its provision is ultimately the responsibility of the Headteacher and the School Leadership Team, but every member of staff is responsible for the day to day operation of the policy in terms of promoting good practice.

All staff should be familiar with the school Equal Opportunities Policy.

### **Special Educational Needs.**

All pupils should have access to a broad and balanced curriculum which includes Science and should make the greatest progress possible.

The role of all staff working with pupils and the work of support agencies should be under constant review.

Provision for pupils with SEN in science is the responsibility of the class teacher, support staff, curriculum leader, SEN Co-ordinator and the Schools' Leadership Team.

Resources in Science should satisfy materials and accommodation. Teaching arrangements in Science may include specialised groups and support in class teaching situations. Work should be differentiated to an appropriate level for such pupils whilst maintaining a practical nature of their work. Expectations should be set by the class teacher and any support staff for the learning outcomes of the session.

The effectiveness of the policy and arrangements for pupils with SEN in Science will be reviewed by the class teacher, subject leader, SENCO, and School Leadership Team.

All staff should be familiar with the school Special Educational Needs Policy.

## **Cross Curricular Skills and Themes.**

The use of cross-curricular themes and links are encouraged and celebrated at Queen's Drive School. Pupils will be given the opportunity to learn through a variety of subject areas to enable them the best possible opportunity to through a creative curriculum.

Children should be presented with a range of scientific experiences and these should be used in a wide variety of contexts throughout the whole curriculum. Plans to make use of cross-curricular approaches in science should be clearly defined.

With a thematic based curriculum, created specifically for our children at Queen's Drive teachers are able to creatively link subjects. The use of specialist teachers such as Ms Jewitt and Ms Keavell are utilised, linking music, art and DT to the science curriculum. English is a specific area of focus for cross curricular science, linked to our SDP, all teachers are encouraged to use science to stimulate a Big Write for each theme.

Teachers should also provide cross curricular opportunities for science to be taught through maths – applying their mathematical knowledge to their understanding of Science, including collecting, presenting and analysing data.

Within cross-curricular work, staff should be aware of the links between science and issues such as European Awareness, Environmental Education, Citizenship, Health Education and also Economic and Industrial Understanding. The school has a very strong commitment to the Lancashire Healthy Schools programme which encompasses many scientific themes and issues.

## **Cross Phase/School Transfer.**

Teachers have opportunities to liaise with a child's previous and subsequent teachers throughout the school year. This may be carried out informally or more formally at designated Key Stage meetings. The purpose of these meetings is to transfer documentation and information about the children's science capabilities and experiences to facilitate curriculum development and continuity wherever possible. Internal transfers of documentation between class teachers will be completed by the end of the academic year in July.

## **Computational thinking**

Science and scientific skills will be developed through the use of computational thinking. This will be involved, where possible, in each area of science. The following concepts and approaches should be included in the learning, planning and teaching of science.

### Concepts

**Logical thinking** can be addressed during the prediction stage of an investigation. **Algorithms** will be the steps and rules the children follow when carrying out an

investigation and ultimately repeating these steps as part of a fair test. **Patterns** can be spotted when looking at investigation results; looking for similarities and anomalies. **Evaluation** should be undertaken by all pupils to conclude an investigation; this could be a written, spoken or recorded evaluation.

### Approaches

**Thinking** prior to an investigation, regarding the selection of appropriate equipment and methods. **Creating** will be approached by designing graphs and ways to present investigation findings. **Preserving** and being determined to find results even when something within an investigation is not working or seemingly going to plan. **Collaborating** and working as part of a team throughout investigations and discoveries in science.

## **Evaluation**

Evaluation is carried out to enhance the teaching and learning of Science within the 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. However, detailed evaluation is undertaken by the Subject Leader, together with the Assessment Leader and the Headteacher. As with all evaluation, the Headteacher has overall responsibility for this work.

Evaluation includes a regular evaluation of the content of the Science Curriculum to ensure that National Curriculum requirements are being fulfilled in the best possible way. This involves reviewing the coverage of the Programmes of Study at each Key Stage. Pupils' progress and performance is evaluated together with the standards achieved in Science work, taking account of factors which may influence this such as teaching methods, resources, schemes of work and accommodation. The organisation of the Science Curriculum and the teaching styles undertaken by all the staff are regularly evaluated. The effectiveness of any INSET for Science provided internally from within the school or by an external agency is evaluated. This may involve examining the written evaluation sheets completed by each member of staff after a course has taken place or asking staff to give verbal feedback about a course in a staff meeting.

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

- The assessment of pupils' work and their achievements.
- Discussion amongst groups of staff or the whole staff.
- Classroom observation.
- Scrutinising children's work.
- External inspection and advice.

Evidence of these evaluations can be viewed within the subject leader's information file for Science.

Evaluation will be conducted according to the priority given to Science within the School Improvement Plan. Thus the timescale involved in the evaluation may differ from year to year. Evaluation is most likely to be on an annual basis but will also have to take account of any changes in the National Curriculum for Science.

Evaluation and review of the policy for Science and any Schemes of Work for Science takes place on an annual basis. The Science Curriculum Team will work together to consider any necessary changes or adoption to the policy. These are then discussed and agreed by the whole staff before the policy document is amended. Throughout the year the whole staff are encouraged to feed back information and ideas to the Science Curriculum Team. This may include comments as to how a particular topic is progressing and the work that children are undertaking, comments upon the availability and suitability of resources and any other relevant comments about the overall structure of the Science Schemes of Work.

This policy is due for review in September 2020.