

Granby Junior School



Science Policy

Review Date	Approved by	Governor Minute Reference
Dec 2024		

Date: Dec 2022



The new 2021 policy was created after a whole school review of science in the curriculum and written to reflect updated requirements.

Introduction

This document is a statement of the aims, principles and strategies for the teaching and learning of science at Granby Junior School.

This policy will be reviewed by the Science Co-ordinator in Dec 2023 or as required by the School Improvement Plan.

Curriculum Statement

Intent

Science is a body of knowledge built up through experimental testing of ideas, hypotheses and theories. It involves the skill of being able to apply scientific knowledge to a wide variety of situations. Science is also a methodology, a practical way of finding reliable answers to questions we may ask about the world around us.

At Granby Junior School, our aims and objectives in teaching science are in line with the National Curriculum 2014 guidelines which state that children should:

- Develop **scientific knowledge and conceptual understanding** through the specific disciplines of physics, chemistry and biology.
- Develop understanding of the **nature, processes and methods of science**, through different types of scientific enquiry in order to answer scientific questions about the world around them.
- Possess the scientific knowledge required to understand the **uses and implications of science**, today and into the future.

We recognise the importance of science in every aspect of daily life. The teaching and learning of science increases our children's knowledge and understanding of the world, and we develop their skills through experimental testing of ideas, hypotheses and theories. We provide children with opportunities to apply scientific knowledge to ask and solve questions through practical and investigative work.

As a result of our science teaching, we want to develop children who:

- See science as an enjoyable experience;
- Can work individually and cooperatively, listening to, and valuing, the opinions of others;
- Can observe, question, hypothesise, plan, measure, construct a fair test, communicate and draw conclusions based on evidence.
- Can use skills from other subjects, such as Maths to represent data, and technology where appropriate to enhance the science curriculum.
- Are observant, curious and caring about our environment;
- Are able to relate science to everyday life and appreciate its contribution both in the present, and historically, to our British values and other cultures;
- Appreciate the nature of science and the importance of collecting fact-based evidence

At Granby Junior school, we are ideally located to utilise the natural environment – both in our school grounds and in the immediate area. A short walk to the local allotments, Bennerley viaduct, Ilkeston canal and Shipley Park enables our children to explore a range of habitats. We provide an excellent foundation for further learning in KS3 and have strong connections with Outreach Special Projects that promoting science-driven careers and equality by challenging stereotypes.

Implementation

Teachers create a positive attitude to science learning within their classrooms and reinforce an expectation that all pupils are capable of achieving high standards in science. A clear and comprehensive scheme of work that is in line with the Key Stage 2 curriculum for science is taught at Granby Junior School. Science is delivered through a creative, cross curricular themed topic-based curriculum which follows the National Curriculum expectations and is supported by science specific knowledge-based projects, where learning will be planned for practical investigative opportunities. Any instances of gaps in our coverage of the key stage 2 programmes of study for science have been identified and are delivered as discrete focused lessons.

Through our planning, we involve problem solving opportunities that allow children to apply their knowledge, and find out answers for themselves. Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. Planning for science consists of three types: long term plans, medium term plans and short term plans.

Long term

Each year group bases its science planning on the appropriate statutory programmes of study from the 2014 national curriculum for science. (See Appendix 1.1)

Medium term

These consist of half termly outlines of units of work. Each unit plan details lesson teaching objectives from the relevant year's program of study for science. The science Leader will periodically check these plans to ensure continuity, curriculum coverage and progression throughout the school. (See Appendix 1.2)

Short Term

This includes identification of science lessons on a weekly timetable together with annotated lesson plans as a minimum. The class teacher evaluates the taught plans to inform future planning.

Whole class teaching, co-operative group work, paired work and individual work are all utilised as appropriate by teachers to enable children of all abilities to progress. Discussion, research, questioning and practical innovation are central to our philosophy of relating Science to everyday life. The use of scientific vocabulary is practised through cross curricular writing, displays, word banks and teacher modelling. Similarly, Mathematical skills such as graph work, data handling and measurement are reinforced as an important element in the children's understanding of scientific enquiry.

Children have access to key language and meanings, in order to understand and readily apply to this to their written and verbal communication of their skills.

Granby Junior School also participates in National Science education initiatives such as National Science week. The development of a STEM afterschool club provides opportunity for children to extend their love of science.

Achievement in science is promoted through display, discussion and demonstration to encourage independent questioning and investigation in class. Children's written work is marked in line with the school's current feedback policy, allowing children to recognise and reflect on their own achievements.

Impact

The successful approach at Granby Junior School results in a fun, engaging, high-quality science education that provides children with the foundations and knowledge for understanding the world. Engagement with the local environment ensures that children learn through varied and first-hand experiences of the world around them. Through various workshops, trips and interactions with experts including STEM ambassadors, children have the knowledge and understanding that science has changed our lives and that it is vital to the world's future prosperity.

Children learn the possibilities for careers in science, as a result of our community links and connection with national agencies such as the STEM association, ensuring that children have access to positive role models within the field of science from the immediate and wider local community. From this exposure to a range of different scientists from various backgrounds, all children feel they can be scientists and capable of achieving.

Assessment, recording and reporting

Science assessment is a continual process, being carried out regularly to assess a taught unit. These assessments will be in the form of topic beginning/mid-term and end vocabulary assessment sheets, focused questioning, discussion or the application of scientific knowledge and understanding in the children's written work.

At Granby Junior School, we put emphasis on checking back on science taught in previous lessons. All science lessons now begin with a recap on relevant prior knowledge this a starter activity. We use a lot of multiple-choice questions for quick, formative assessment. 'Explorify' is used as a tool to support this informative assessment process.

A science whole class feedback book, which identifies Learning objective of lesson, identify children who've made good progress, need support, any misconceptions and next steps in learning, is used by all teachers to record progress and inform future planning.

A written report is provided to parents in the Summer term to advise on each child's attainment, attitude and effort in Science.

For a more detailed account of Assessment and record keeping please refer to the school's feedback and assessment Policies.

Health and Safety

Consideration for health and safety is considered before a topic is introduced in the classroom. The curriculum guidelines within each topic are taken into account with reference to HES Health and Safety guidelines.

The role of IT

IT is regularly used to promote scientific knowledge and understanding. Computers, laptops and ipads are used for research. Work may be recorded using a variety of apps, databases, spreadsheets and graphical tools. Use of data loggers and other electronic measuring tools are being developed across school across school to enhance children's investigative work and further embed cross curricular links.

Equality and Inclusion

Children of all abilities enjoy and benefit from the study of Science at Granby Junior school, and teachers are able to adapt teaching to respond to the strengths and needs of all pupils enabling them to achieve.

Teachers have a secure understanding of how a range of factors can inhibit pupils' ability to learn and know how best to overcome these through adaptive teaching. High-quality teaching approaches to engage and support the needs of all pupils are used within classrooms during Science lessons. Assessment of pupils' progress is employed to identify barriers to learning and develop strategies to support all pupils through a graduated response – including but not limited to those with SEND, those of high ability, and those with English as an additional language.

Adaptive science teaching focuses on the whole class while providing scaffolding such as differing levels of support, access to resources, modelled first step examples or focused questioning to those who need additional initial support or challenge in order to access the same ambitious curriculum and meet our high expectations.

Diversity

At Granby Junior school our curriculum offers a diverse view of the world, beginning in our local community and extending beyond. Through the lenses of British values, children are positively exposed to a range of role models, reflected within the wider society, redressing the balance seen within our local community.

In Science, children learn about diversity both in terms of cultural diversity and that of gender. This is shown by celebrating women in science such as Marie Curie and Mary Annings and celebrating Scientists through Black History month including Mae C Jemison and George Washington Carver.

Resources

Physical resources are kept centrally in a designated science cupboard. Individual teachers are responsible for collection and return of resources. Shortages and breakages should be reported to the subject leader.

In addition, a number of electronic resources can be accessed by teachers through a whole school Science file kept in the school's server.

A large range of non- fiction books and encyclopaedias are housed in the school library. These can be accessed by the children on a class rota basis.

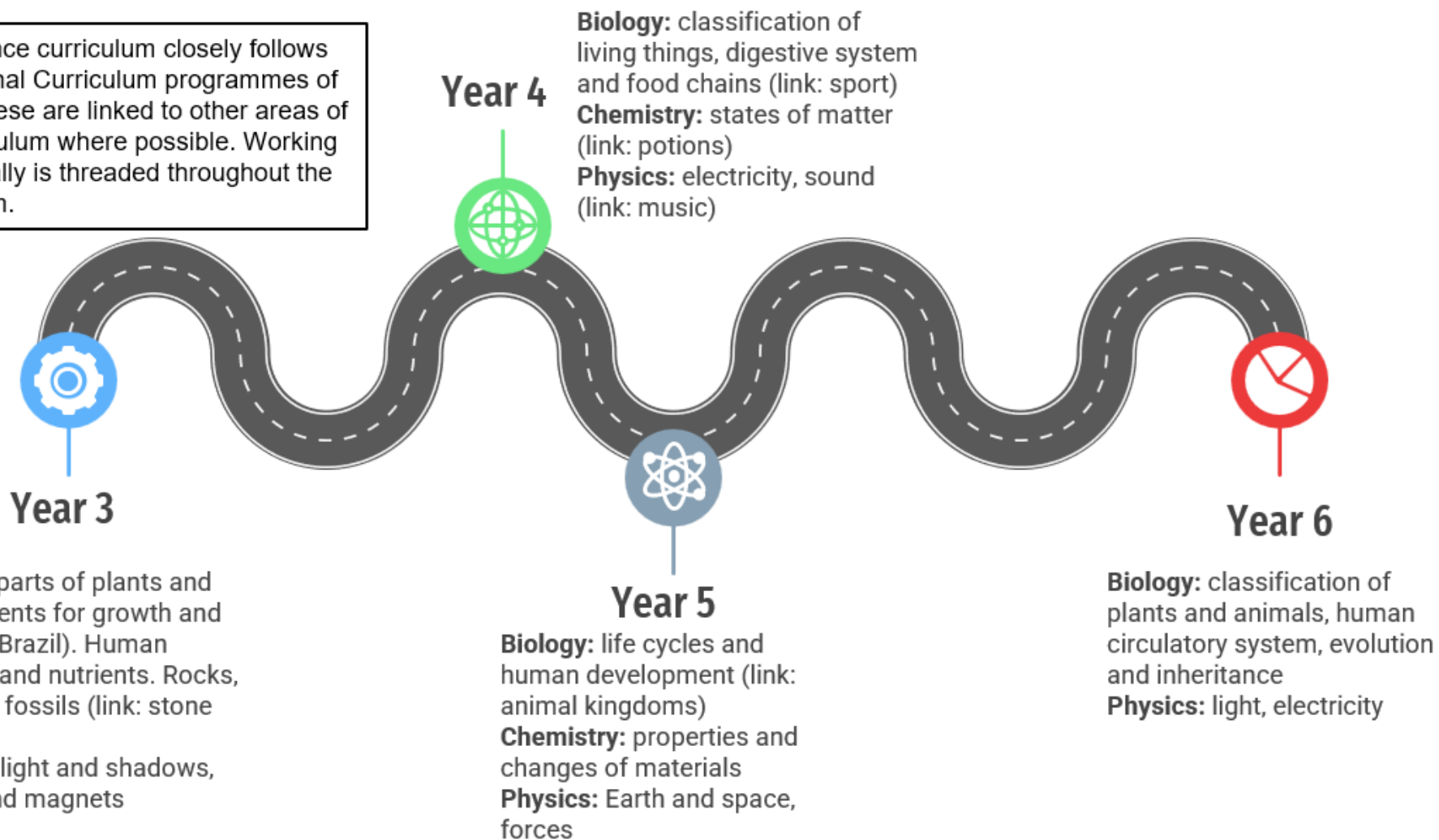
The Role of the Science Subject Leader

The science subject leader should:

- Take the lead in policy development and the monitoring and evaluation of the science curriculum to ensure coverage, progression and continuity in science throughout the school.
- Support colleagues in their development of planning, implementation of the curriculum and in assessment of the children's progress.
- Monitor progression in science and advise on action needed and areas for future focus or development.
- Take responsibility for the purchase and organisation of central resources for science and to manage the subject budget.
- Keep up to date with developments in science education and disseminate information to colleagues as appropriate, including professional development opportunities.
- The science subject leader will observe science lessons throughout the school in order to ensure continuity and progress across year groups. This also provides an opportunity to support class teachers, talk to children about their experiences and celebrate good practise.

Science

Our Science curriculum closely follows the National Curriculum programmes of study. These are linked to other areas of the curriculum where possible. Working scientifically is threaded throughout the curriculum.



Appendix 1.2 – Medium Term Plan Example

Autumn 2022 Year 6 Science : Electricity (Plus Love to Investigate: Does wire length affect how components in a circuit work?)		
Resources PowerPoints, bulbs, electrical circuits, wires, motors, batteries, crocodile tricks, children's Science Knowledge books, children's Scientific enquiry books Health and safety: Check all equipment is safely stored, replaced (when needed) and used with care.		
	Activities & key questions	Alternative provision
L.O. To explain the importance of the major discoveries in electricity. (Physics)	<p><i>Use knowledge grids to pre-assess what the children already know about the Science Topic: Electricity</i></p> <p>Explain to children that this session is a Physics session linked to how electricity has impacted our lives and the history of electricity</p> <p>Electricity Quiz: Children answer questions, recapping the key concepts they learnt in Electricity in Year 4. Children answer questions on the Are You an Electricity Expert? Using the powerpoint.</p> <p>Whole Class: How Has Electricity Impacted on Our Lives?</p> <ul style="list-style-type: none"> - Children to complete the table in the Impact of Electricity Activity Sheet by sorting between electrical and non-electrical appliances. Can they then match up which appliances were used for the same tasks? <p>History of Electricity: Children read and answer questions using the History of Electricity Reading Comprehension Sheets. Children to record in their <u>Science Knowledge books</u></p>	<p>Partner work (mixed ability)</p> <p>History Reading comprehension sheets.</p>
LO: To recognise and draw scientific circuit symbols (physics)	<p>Explain to children that this session is a Physics session linked to circuits and symbols.</p> <p>Class discussion What is a circuit? What parts do all circuits contain? Can you draw a circuit which includes a bulb? All children draw a circuit containing a bulb on a whiteboard.</p> <p>Using PowerPoint, match the parts of a circuit with their scientific symbols.</p> <p>Using the Interpreting and Drawing Circuit Symbols Activity Sheets, children will label parts of a circuit and then convert circuit diagrams using informal pictures into a circuit diagram using scientific circuit symbols. Children to record in their <u>Science Knowledge books</u></p>	<p>Group work - the Interpreting and Drawing Circuit Symbols Activity Sheets</p> <p>SEND Work within a group of similar ability with LSA guidance</p> <p>Challenge: How many circuit symbols can you recall? Write down the part of the circuit which matches the symbols that you see.</p>

<p>L.O. To identify faults in electrical circuits and circuit diagrams (before suggesting how to fix the problem) (Physics)</p>	<p><i>Use Explorify for review of previous learning regarding electrical sources</i></p> <p>Explain to children that this session is a Physics session linked to looking for faults in electrical circuits</p> <p>Go to hall or playground. Position one child in a space next to a large bucket of balls. you are the battery/cell in the circuit. Now for some wires! Children should stand in a line with legs shoulder width apart. Their toes should touch the toes of the other 'wire children' next to them.</p> <p>Recap symbols to draw circuit diagrams. Why are they important? Play a game of circuit symbol bingo in groups.</p> <p>STEM/ Careers link: You are going to become electricians called out to repair circuits. In each case you will be asked to describe: what would be required to make it work? Use the necessary equipment to create the circuit to check your explanation. Were you right?</p> <p>Ask pairs of children to create 'deliberately broken' circuit diagrams using, before allowing pairs to swap, can they identify the problem? Pairs should start by creating one error but build to having to correct more than one mistake. The 'repairers' should identify the error, before making the change building the circuit to see if their repair has solved the problem!</p>	<p>Partner work (mixed ability)</p> <p>SEND: Work with adult first repairing broken circuits. Children make a complex circuit which should be given to the teacher. The teacher should change the circuit in some way so that it no longer works correctly, before returning it to the children. Can they repair the damage? Move towards the identification of faults in circuit diagrams.</p> <p>Challenge: Take a look at some circuit diagrams from electronic manuals - washing machine, car manual, DVD player, etc (<i>session resource</i>). Why might these be useful? – <i>In the same way that a map can help navigation in a car a circuit diagram can provide a simpler version of the actual circuit to aid repair and help locate parts.</i></p>
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<p><i>Love to investigate: Does wire length affect how components in a circuit work? (PART 1)</i></p> <p>L.O. To plan an effective investigation</p>	<p><i>Mid-term assessment: Use knowledge grids to assess what children have learnt about Electricity</i> GROUP CHILDREN ACCORDING TO THEIR VOCABULARY ASSESSMENTS.</p> <p><u>Lesson 4</u> – <i>Does wire length affect how components in a circuit work?</i></p> <p>Explain to children that this session is a Physics session linked to planning an investigation <i>Does wire length affect how components in a circuit work?</i></p> <p>Discuss this question with your talk partner and predict:</p> <ul style="list-style-type: none"> • what difference it might make; • to which component/part of the circuit. <p>Planning Your Investigation: Outline the different types of scientific enquiries they can choose from. Address any misconceptions or errors.</p> <p>Investigation: All children select a type of enquiry and plan their investigation using the Electricity Investigation Activity Sheets</p> <p>Peer Assessment: Children swap their investigations with a partner. Children read their partner’s Electricity Investigation Activity Sheet and discuss if there are any improvements that need to be made. Complete the Assessment I can Statements</p>	<p>GROUPING BASED ON ABILITY</p> <p>SEND: Children are given key words to support planning</p> <p>Challenge: Children formulate their own question</p>
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<p><i>Love to investigate: Does wire length affect how components in a circuit work? (PART 2)</i></p> <p>L.O. To conduct an investigation To effectively record data and report findings</p>	<p><i>Use the first slide in the powerpoint to review the scientific circuit symbols.</i></p> <p><u>Lesson 5 – Does wire length affect how components in a circuit work?</u></p> <p>Explain to children that this session is a Physics session linked to conducting an investigation <i>Does wire length affect how components in a circuit work?</i></p> <p>Remind children that they will have planned their investigation in lesson 4. Children to refer back to their Electricity Investigation Activity Sheet and give them time to read and edit if necessary.</p> <p>Degree of Trust: Define what degrees of trust are. Discuss the different criteria. Which of these should you bear in mind while conducting your investigation? What will you do to ensure you can have a high degree of trust in your results?</p> <p>Conducting the Investigation: Discuss the important points relating to how the investigation should be conducted.</p> <p>Children to create a table to record their results before conducting the investigation. Reporting Findings: Children use the Electricity Reporting Activity Sheet to report their findings</p> <p>Complete the Assessment I can Statements</p>	<p>Partner work (mixed ability)</p> <p>SEND: Children explain one way they established a degree of trust when conducting their investigation.</p> <p>Challenge: Children explain how else they can establish a high degree of trust in their results with the Degrees of Trust Mat to support.</p> <p>Improve Degrees of Trust in Your Results: Which of these is an appropriate way to establish a higher degree of trust in your results? What would you need to do? Children participate in a whole class discussion and then decide on which ways of establishing a higher degree of trust are appropriate and which are not, giving reasons why.</p>
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<p><i>Love to investigate: Does wire length affect how components in a circuit work? (PART 3)</i></p> <p>L.O. To investigate results further</p>	<p><i>Use knowledge grids to pre-assess what the children already know about the Science Topic: Light.</i></p> <p><u>Lesson 6</u> – <i>Does wire length affect how components in a circuit work?</i></p> <p>Explain to children that this session is a Physics session linked to investigating further <i>Does wire length affect how components in a circuit work?</i></p> <p>Review results from the last experiment. Were they reliable? What Would You Do Differently? Children are given their Electricity Investigation and Electricity Reporting Activity Sheets to refer to as necessary and feedback their ideas to the whole class. Scribe ideas and discuss which are plausible changes that could be made (e.g. change investigation type) and which are not plausible. Explore reasons why. How can you conduct a different investigation in order to further investigate your results?</p> <p>Making Predictions From Results: Show how to make a further prediction based on their test results. What did your results show? How will you investigate further? What will your new prediction be? <i>Check that children are referring to the length of wire, brightness of the bulb, loudness of the buzzer, making predictions about whichever component they did not test and the investigation type they used.</i></p> <p>Children need to create a new question, make new predictions, explain how they are related to their results, and add the variables and equipment. Degree of Trust: How do degrees of trust come into it? Which ones are applicable to this study?</p> <p>Complete the Assessment I can Statements</p>	<p>Group work</p> <p>SEND: Children explain one way they established a degree of trust when conducting their investigation.</p> <p>Challenge: Children explain how else they could further establish a high degree of trust in their results</p>
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