


# Curriculum Intent for Science



**Your curriculum Intent is your plan of what you want pupils to know and be able to do, at different stages and by the time they leave school.**

The intent of the curriculum is the content you expect children to learn. More simply, the intent of the curriculum is the curriculum, or as Spielman puts it, “what [curriculum leads] expect pupils to know by certain points in their life”.

<b>Curriculum Content</b>	<p><b>Working Scientifically</b></p>  <p>At Kings Road the science leaders work closely with SEERIH (Science and Engineering Education Research and Innovation Hub) which is linked through the TTSA (Trafford Teaching Schools Alliance) and The University of Manchester. The curriculum leaders regularly meet for CPD’s which enable current research and activities implemented through the school. Since the 31<sup>st</sup> October 2019, all classes display the 5 areas of working scientifically (5 strands of enquiry) posters so that children can recognise these as they progress through school and build on their skills. Teachers are also encouraged to either use the correct enquiry strand colour sticker or a correct coloured dot when marking the lesson in the books, which</p>

will in time help our children to notice the relationship between the science lesson/experiment they have just had and which enquiry strand they have met.

‘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. The notes and guidance 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.

### **School Curriculum**

The national curriculum for science reflects the importance of spoken language in pupils’ development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

The programmes of study for science are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage if appropriate. All schools are also required to set out their school curriculum for science on a year-by-year basis and make this information available online.

### **EYFS**

Children explore creatures, people, plants and objects in their natural environments. They observe and manipulate objects and materials to identify differences and similarities. For example, they may look at an egg whisk, sand, paper and water to learn about things that are natural and manmade and their different functions. Children also learn to use their senses, feeling dough or listening to sounds in the environment, such as sirens or farm animals.

Your child will be encouraged to ask questions about why things happen and how things work. They might do activities such as increasing the incline of a slope to observe how fast a vehicle travels, or opening a mechanical toy to see how it works. Your child will also be asked questions about what they think will happen to help them communicate, plan, investigate, record and evaluate findings.

**Year 1 and 2**

The principal 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.

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

**Year 3 and 4**

The principal 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 comparative and 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.

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

**Year 5 and 6**

The principal 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 comparative and

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.

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Below is a table to show the topics taught throughout Year 1 to Year 6:

	Y1	Y2	Y3	Y4	Y5	Y6
Biology	Plants	Plants	Plants			
	Animals, including humans	Animals, including humans	Animals, including humans	Animals, including humans	Animals, including humans	Animals, including humans
		Living things and their habitats		Living things and their habitats	Living things and their habitats	Living things and their habitats
						Evolution and inheritance
Chemistry	Everyday materials	Uses of everyday materials			Properties and changes of materials	
			Rocks			
				States of matter		
Physics	Seasonal Changes				Earth and Space	
			Light			Light
			Forces and Magnets		Forces	
				Sound		
				Electricity		Electricity

### Is your curriculum well defined?

After thoroughly looking at all the year group timetables, it is clear there is a lack of consistency of the timetabling of science. Science lessons were being taught as:

- PPA cover with a cover teacher or TA
- 45 minute lessons
- Entire afternoon

Looking at the timetables from Nursery to Year 6, we can identify that the curriculum makes explicit links and connections across other subjects, such as:

- **Nursery** – The book ‘The Very Hungry Caterpillar’ with the lifecycle of a caterpillar.
- **Reception** – Spring with baby chick’s life cycle. Night and dark during Winter. Gingerbread man experiment with retelling the story. Cooking and Pancake Day. Growing in Spring.
- **Year 1** – learning about the human body and working on yourself in English. Animals including humans and trip zoo to you.
- **Year 2** –
- **Year 3** –
- **Year 4** – summer 1 and 2 when the children explore outside and living things and their habitats.
- **Year 5** – Forces in summer 2 to link in with rivers in geography.
- **Year 6** –

During our curriculum day, the science leaders met and spent the day redesigning the new medium term plans for year groups 1 to 6. The new plans now include prior learning, the National Curriculum statements and includes a section for cross curricular links. Adding the prior learning to the new medium plans was crucial to show both progression and continuity. After a couple of book looks throughout the year groups during the year, the science leaders discovered that there were gaps in learning within the year groups. It was vital for us to go back to basic and only use the statements from the national curriculum in the planning of lessons.

Below is an example of a medium term plan the science team have designed:

Year 2

Science Medium Term Planning Term:

Prior Learning:

- I can identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals
- I can identify and name a variety of common animals that are carnivores, herbivores and omnivores
- I can describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)

I can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

NC I can statements: ANIMALS INC HUMANS

- I can notice that animals, including humans, have offspring which grow into adults
- I can find out about and describe the basic needs of animals, including humans, for survival (water, food and air)

I can describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Date:	Learning Objectives:	Success Criteria	Teaching Activities	Individual class notes	Cross Curricular Links
Week 1					
Week 2					
Week 3					

**Are you teaching the right things?**

- **Enjoyable and engaging**

All children are given opportunities to succeed in Science. Children are encouraged to ask questions and lessons are planned according to these where possible, as well as meeting year group objectives. Year group teams work together to find exciting and innovative ways to teach Science and share ideas from children's interests.

A whole school pupil voice will also be taken as soon as it is safely possible to do so to understand the children's views and feelings about their science lessons. A pupil voice was taken in Reception and it was clear the children connected science to experiments and were clearly able to

	<p>remember when science lessons were conducted. Science is however, taught through continuous provision in EYFS and children are unknowingly exposed to science all around them.</p> <p>We provide our children with rich learning experiences, educational visits, extra-curricular activities and enrichment opportunities. Looking at pictures on science walls in classrooms and during book looks, it is wonderful to see how our children have been exposed to so many learning opportunities. Some classrooms also have science investigation stations which regularly change to keep children enticed.</p> <ul style="list-style-type: none"> <li>• <b>Ambitious e.g. does the curriculum allow pupils to reach a high standard?</b></li> </ul> <p>Children are also taught practical scientific skills, including:</p> <ul style="list-style-type: none"> <li>• Asking questions and finding ways to answer them</li> <li>• Setting up and performing fair tests and observing carefully in order to answer questions</li> <li>• Gathering, recording and presenting data</li> <li>• Making conclusions and predictions</li> </ul>
<p><b>Curriculum Rationale</b></p>	<p><b>Why you teach it.</b></p> <p><b>Are your choices based on a strong rationale? Do you know why you've made choices in your long term and medium term plans, in terms of what you teach and when?</b></p> <p>Through the teaching of Science, children understand the world around them and develop their natural curiosity. One of the ways to achieve this is to understand which topics are being taught in a particular year group. When designing and creating both the long term plan and medium term plans, we had to think about what knowledge the children had to first and what knowledge they came up with. We have thought about the children we have in our school and worked on that when creating the plans.</p> <ul style="list-style-type: none"> <li>• <b>Does our curriculum prepare pupils for the next stage of education or for life beyond school?</b></li> </ul> <p>At Kings Road it is our vision to ensure a lifelong love of science within all our children. Science has made a huge impact in our lives and reminders of these successes are all around us. Science is not only taught in the lessons but also as part of history and geography. It is therefore vital to allow our children to understand the importance and to the worlds future prosperity.</p> <ul style="list-style-type: none"> <li>• <b>How are exciting and memorable experiences planned in the curriculum?</b></li> </ul> <p>We work hard to provide a rich and varied curriculum at Kings Road by challenging and meeting the needs of all our children. From EYFS to Key Stage two, our children will have built up key foundational knowledge and concepts and are encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomenon. The teachers use a lot of local experiences available to the school, such as the allotments next door, families involved with scientific areas and having access to farms for eggs to grow to baby chicks. The</p>

science team work hand in hand with the ECO club and this has immensely helped our children to be exposed to nature and how science is inspired by nature.

- **Alignment with vision and values**

It is absolutely vital we plan our science lessons in alignment with the schools vision and values. As science leaders, we ensure that all the lessons taught at the school from EYFS to Key Stage Two should be planned not only to teach the knowledge, skills and vocabulary of science but more importantly to making sure emotional health and well-being is embedded in our curriculum too by providing a nurturing and safe environment for experiments to be conducted.

- **Contextual considerations**

After a lot of research in this area, the science team discovered and agree to a lot of the answers which are summarised by the following bullet points from the science teacher website:

- It shows the relevance of what we are learning and therefore improves student attitudes
- It provides a rationale to make the problem clear – this reduces the need for teacher instruction and supports students if they get stuck to be clear on the end goal e.g. make salt for dinner
- It makes abstract ideas more concrete
- It can spark curiosity
- If a relevant context is used it personalises the science e.g. investigating air pollution in your local area

- **Subject knowledge**

All the science leaders attend a variety of CPD's throughout the year which help to maintain and enhance the knowledge and skills to teach different concepts to our children. The leaders come back with lots of ideas for practical activities which are fun and easy to do. This allows our subject leaders to discover relevant knowledge which is then distributed to the entire school either by either updating documents to help teachers plan good quality science lessons or useful ideas on assessment. The CPD's are aimed for all year groups by covering all areas and objectives for each learning stage.

- **Pupil assessment (stretch & challenge)**

	<p>The subject leaders regularly monitor progress as a whole school approach by book looks, monitoring days and hopefully future learning walks with the head teacher and deputy head teacher. The leaders attend CPD's which give ideas about assessment</p>
	<p><b>Does the way you SEQUENCE topics maximise pupil progress and enable progress</b></p> <p>Although the national curriculum has a programme of study, it is essential for science leaders and teachers to think about when topics are being taught. This is all dependent on many factors, such as skills children already know (prior knowledge), building on that knowledge for future skills and knowledge. When planning teachers are deciding which topics need to be taught first, as they progressively get more complex as the year goes on. After looking at the LTP's it is also clear to see that related topics are taught close to each other and some topics are split as they are longer. There are some topics such as seasonal change, which can be taught throughout the year, as this enables children to observe weather all year round and see how this affects living things.</p> <p>Here is an example of when topics are taught in each year group from the Primary Science Education Consultancy. Kings Road are following a similar way of sequencing the topics.</p>

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**Year 3**

<p><b>Throughout the year</b></p>	<p><b>Plants</b></p> <p>Many plants have an annual cycle – having buds, flowers, seeds/berries at certain times in the year. Pupils should therefore visit the same plants throughout the year gathering evidence linked to their life cycle e.g. collecting seeds and taking photographs or making observational drawings for buds, flowers etc. This evidence can then be reviewed at the end of the year to exemplify a range of plants' life cycles.</p>
<p><b>Sequencing</b></p>	<p><b>Plants</b></p> <p>This topic is best taught in the summer term when there is sufficient light in the classroom to grow seedling and plants as part of enquiry work.</p> <p>Links can be made between the Plants, Rocks and Light topics. The ordering is not significant, but the links should be made explicit for the children by the teacher.</p> <p><b>Animals, including humans</b></p> <p>This topic can be split into two topics: nutrition; and movement.</p> <p><b>Rocks</b></p> <p>Links can be made between the Plants and Rocks topics. The ordering is not significant, but the links should be made explicit for the children by the teacher.</p> <p><b>Light</b></p> <p>Links can be made between the Plants and Light topics. The ordering is not significant, but the links should be made explicit for the children by the teacher.</p>

**Year 4**

<p><b>Throughout the year</b></p>	<p><b>Living things and their habitats</b></p> <p>While learning to name and identify plants, the pupils should be drawing on a range of different clues. Many plants change in appearance over the year – losing leaves, buds developing into flowers, flowers developing into seeds or berries. At any particular time, only some of these parts will be present. To ensure correct identification, all parts should be considered. Pupils should therefore visit the same plants throughout the year gathering additional clues for identification.</p> <p>Animals visible in a habitat will change depending on the weather on the day and the season. In order to build up a full picture of the animals in a habitat, the habitat should be visited at different times throughout the year.</p>
<p><b>Sequencing</b></p>	<p><b>Living things and their habitats</b></p> <p>Pupil should be taught to construct and interpret a variety of food chains, identifying producers, predators and prey. This statement is within the Animals, including humans topic. In order to construct food chains based on their first-hand experience, this statement should be taught after they have visited a habitat to name and identify the plants and animals.</p> <p><b>Animals, including humans</b></p> <p>Pupil should be taught to construct and interpret a variety of food chains, identifying producers, predators and prey. In order to construct food chains based on their first-hand experience, this statement should be taught after they have visited a habitat to name and identify the plants and animals as part of the Living things and their habitats topic.</p> <p>Teaching pupils to identify producers, predators and prey represents an opportunity for pupils to apply their knowledge of the function of teeth. Consequently, it makes sense to teach the statement 'construct and interpret a variety of food chains, identifying producers, predators and prey' after learning about teeth within the Animals, including humans topic.</p>

Year 5

Throughout the year	
Sequencing	<p><b><i>Living things and their habitats</i></b></p> <p>Before learning about the life cycle of humans, it is helpful if pupils have learnt about the life cycle of plants and animals. It is therefore appropriate to teach the Living things and their habitats topic before the Animals, including humans topic.</p>
	<p><b><i>Animals, including humans</i></b></p> <p>Before learning about the life cycle of humans, it is helpful if pupils have learnt about the life cycle of plants and animals. It is therefore appropriate to teach the Living things and their habitats topic before the Animals, including humans topic.</p> <p>The content in this topic is small and therefore requires less time to cover adequately than other topics.</p>
	<p><b><i>Properties and changes of materials</i></b></p> <p>There is a lot of content to cover in this topic and therefore more time should be allocated to allow for sufficient coverage. Schools may choose to separate the content into more than one topic e.g. properties of materials and changes of materials.</p>
	<p><b><i>Earth and space</i></b></p> <p>If the Forces topic is taught before the Earth and space topic, pupils are able to use their understanding of gravity to help them make sense of why the planets orbit the Sun, and the Moon orbits the Earth.</p> <p>This topic is conceptually more challenging and is therefore best taught later in the year.</p>
	<p><b><i>Forces</i></b></p> <p>If the Forces topic is taught before the Earth and space topic, pupils are able to use their understanding of gravity to help them make sense of why the planets orbit the Sun, and the Moon orbits the Earth.</p>

Year 6

Throughout the year	
Sequencing	<p><b><i>Evolution and inheritance</i></b></p> <p>This topic is conceptually more challenging and is therefore best taught later in the year.</p>
	<p><b><i>Light</i></b></p> <p>This topic is conceptually more challenging and is therefore best taught later in the year.</p>

**Curriculum  
Accessibility**

**Is your curriculum accessible to all?**

- **How accessible is your curriculum to all pupil groups? (PP, SEN, EAL, Stretch & challenge (talent spotting), poor attendance).**

All children at Kings Road have the opportunities to access the learning with a carefully planned broad and balanced curriculum. All children are exposed to high quality teaching and learning experiences. The ability to learn is underpinned by the teaching of basic skills, knowledge, concepts and vocabulary. There are clear, identified end points in each phase of learning which build upon what has been taught before and gives pupils the required knowledge and skills for their next stage of learning.

Science lessons are structured in a way that all children have access to the curriculum with absolutely no discriminations at all. Within the year groups, there may be a teacher or all the year group teachers who plan the science lessons and challenge our children based on children’s interests, questions and of course our ignite and knowledge maps which is unique to our school.

Specific vocabulary is used and taught explicitly through visual prompts and resources.

Science club and Eco club are on offer each year to those children who share a keen interest in the subject. As the science team is getting bigger, science clubs will be offered to a wider range of children throughout the year.

- **Does your curriculum provide equal opportunities?**

In the EYFS Pupil Premium promise there are many science themed activities.

- **Does your curriculum add to pupils ‘cultural capital’? (Context).**

By encouraging independent learners through asking open ended questions, child led, children are the facilitators of science learning

Aids EAL – Scientific vocab is displayed and being used on displays.

Respect for resources.

Promoting ‘British Science Week’ throughout the years from Nursery to Year 6.

Give children ‘Job Roles’ - ownership over that role. (PDF file for every class to be distributed)

Links with Eco warriors and the Eco Club.

Being able to visit the allotments behind the school.

