

# Yorke Mead Primary School

## Science Policy

May 2020



### Our School Vision Statement

*BRINGING LEARNING to LIFE*

*We are a school dedicated to creating an environment where children are able to grow into happy, well-rounded individuals with a love of learning through which they can achieve to the best of their abilities.*

*We want our pupils to enter the wider world as*

- *Happy, positive individuals*
- *Responsible citizens who make a positive contribution*
- *Confident, resilient, healthy & life-long learners.*

**D - Determination**

**A - Ambition**

**R - Resilience**

**E – Enjoyment**

**T - Trust**

**O - Openness**

## Rationale and Ethos

Science is exciting. Science leads the way in understanding the world, making sense of processes, methods and how we use science in everyday life. Through the teaching of science we are opening the children's eyes to what has come before us and how this knowledge continues to be used and built upon today. Science develops the whole child: developing curiosity, asking questions, making observations and predictions, working with peers, testing and analysing results and causes. This policy details how Yorke Mead delivers the science curriculum to our children.

## Aims of the Curriculum at Yorke Mead

The curriculum at Yorke Mead is intended to ensure each child:

- Develops high self-esteem, confidence and a true feeling of self-worth
- Develops a lively, enquiring mind and life skills so that he/she will have the ability to experiment, investigate, take risks, challenge, discriminate and make informed choices
- Is enriched, motivated and challenged by a broad and balanced curriculum and recognises the value of all areas of learning, including literature, sciences, the arts and humanities.
- Is valued for their individual contributions, recognises their role and develops a positive attitude towards everyone in the life of the school and community.
- Develops the positive skills and attitudes necessary to work both independently and collaboratively.
- Will be given equal opportunities to participate in all aspects of school life, with high expectations and ambition for every child and appropriate levels of challenge and support to enable them to achieve.
- Develops an understanding and respect for other races, cultures, gender, people with disabilities, religions and associated points of view.
- Understands the importance of and develops responsibility for keeping themselves physically and emotionally healthy
- Acquires a set of moral values and attitudes including honesty, respect, sincerity, trust and personal responsibility.
- Is supported in their spiritual, moral, social and cultural development
- Is equipped with the knowledge and cultural capital they need to succeed in life

## Aims of the Science Curriculum

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.

Yorke Mead also aims to:

- Enable pupils to develop an understanding and respect for the natural world
- Enable pupils to question, hypothesize, test and discover for themselves about our world.
- Develop the skills required to investigate the world around them.
- Enable pupils to make decisions about the uses and values of scientific work and achievements

## Curriculum Design

The science curriculum is organised into key themes / units of work, some of which are repeated in each year group. Children will revisit these key themes (such as Animals Including Humans) but with increasing difficulty and with a different focus each time. For example, in Year One, children learn to name and label different parts of the human body and which parts are linked to the 5 senses. By year six, the children will have learnt about the skeletal structure of the body, how muscles work, learnt about the teeth and the digestive system, how the human body develops and changes and will go on to learn about the circulatory system. Children are actively encouraged to talk about previous learning and questioned about their skills, knowledge and understanding. This is recorded in their book at the beginning of each key theme and added to using their purple pen at the end of each theme to demonstrate growth.

Children explore, demonstrate and develop their ability to work scientifically throughout the science curriculum, progressively, each and every lesson. For example, In Year 1 children learn to ask questions, to carry out a simple test, to record simple data and then try to answer questions. By Year 6, our children have learnt to plan and carry out a fair test by using equipment accurately and taking exact readings or measurements. They are able to draw conclusions from their results and record them using a range of graphs and charts. The full range of scientific investigative approaches include: pattern seeking, exploring, problem solving, fair testing, and analysing secondary sources. Our children are able to discuss which elements of working scientifically they are focussing on and this is discussed as a class and recorded on a 'working scientifically wheel' on the working wall.

### How the science curriculum meets the needs of children at Yorke Mead

Yorke Mead believes in the importance of developing the whole child. Our school is situated in an area of Hertfordshire that is predominately of low deprivation. However, we are conscious that Yorke Mead supports a number of children who live in families on the edge of deprivation and for whom it is important to facilitate access to experiences that widen and enhance educational opportunities. As well as being thematic, our science curriculum lends itself to children learning through real life, hands on experiences. We use our school grounds wherever possible. Yorke Mead has a generous allotment and large outdoor space including a forest school. We are extremely lucky that we have so much green space on our doorstep including an orchard and the river chess. We strongly believe in the use of Blooms Taxonomy to develop higher order thinking. This feeds into our planning and teaching with our children choosing a suitable level of challenge. Through dialogue and marking, we praise and encourage children to review, question and edit their previous learning, giving them appropriate next steps and challenges.

Pre-teach allows children to be introduced to new scientific vocabulary before the lesson and target time with the teacher allows children to review their science learning. Children with Individual Learning Targets have work differentiated to meet their needs and developmental stage of learning.

### How the science curriculum supports the development of children's reading

Science lends itself to developing children's reading and oracy skills. Through class discussions and debates about scientific concepts, talk partners, questioning and explaining thought processes, knowledge and understanding, children are rehearsing the key skills needed for reading and writing. New vocabulary is introduced frequently and displayed on working walls, along with definitions and models for writing. Children are encouraged to use research when hypothesising and evaluating, justifying and enriching their knowledge and understanding. Word banks and sentence starters are used to support and challenge children of all abilities; these are accessible on working walls and on tables during focussed tasks. Children use 'proof reading before marking' resources at the end of each piece of writing, when appropriate (see appendices). This teaches children to edit and enhance their work and to become effective proof readers. Wherever possible, links are made to other curriculum areas such as guided reading, history, English, maths, D&T etc. whilst also ensuring children value subject areas in their own right.

## How the science curriculum supports children’s spiritual, moral, cultural, social development

**Spiritual** – Class discussions, talk partner time, P4C stimuli based on science and dialogue teach and encourage children to reflect on their thinking and the thoughts of others. Hypothesising, testing and analysing results and causes allow children to naturally reflect on their own learning. However, our children also reflect on the thoughts of great scientists. For example, in year 5, children are asked to consider the theories of Copernicus and Galileo and why Copernicus didn’t reveal his theory to the world until just before he died.

**Moral** –science naturally lends itself to morality. For example, children will learn about animal groups and the food chain considering how all living things are inter-dependable; the impact of human beings on the environment. Class discussions and debates will occur and children can consider what is right and wrong whilst also considering how science has developed and progressed due to some of these concepts. When investigating, deciding on variables to use to make it a fair test.

**Cultural** –We explore and celebrate research and developments with the children that take place in many different cultures, from all over the world, both past and present. For example, learning about famous scientists such as Jane Goodall (living things and their habitats) which encourages comparisons with different life, habitats and biomes; in year 3 when learning about ‘rocks’, understanding the life and work of palaeontologist Mary Anning (an English fossil collector). Throughout the curriculum our children learn about different cultures and ways of life for example, growing food, including looking after and tending to our allotments, and food sampling with strong connections to geography and RE. Our children learn to understand how the different cultures around the world can have different impacts on the planet and what impact more economically developed countries have on poorer areas.

**Social** – Science is a social subject. We work collaboratively, sharing ideas, hypothesis, data and results – to even strengthen reliability. We use our school community to enhance our science learning. For example, through our annual science week, parents are invited into school to share science in their jobs e.g. musical engineers, blood researchers... We encourage parents to accompany us on trips, especially to trips such as pond dipping at the river chess and making use of our aquadrome and Thames Water’s workshops.

## How the science curriculum supports children’s emotional well being

A brief overview of how the science curriculum supports the development of the whole child. Please read this in conjunction with the school document ‘Personal Development at Yorke Mead’.

<b>SMSC</b> Spiritual, Moral, Social & Cultural Development	<b>British Values</b>	<b>Character Education</b>	<b>Cultural Capital</b>	<b>5 Ways to Wellbeing</b>
<p><b>Spiritual</b> - Sometimes science and spiritual ideas do cause conflict but in a modern society it is important to understand why these conflicts arise so we can respect the views of others and move forward.</p> <p><b>Moral</b> - encourages children to become increasingly curious, to develop open mindedness to the suggestions of others and to make judgments on evidence not prejudice.</p> <p><b>Social</b> – asking questions, working collaboratively to sort, group, hypothesise, investigate, analyse and conclude.</p> <p><b>Cultural</b> - scientific development comes from all across the world, from people of all backgrounds and cultures.</p>	<p><b>Democracy</b> – debates, discussions</p> <p><b>the rule of law</b> – what is right and wrong, how science has developed over time.</p> <p><b>individual liberty</b> – having a voice. Making choices and decisions.</p> <p><b>mutual respect</b> and <b>tolerance</b> Listening to others, balanced mind,</p>	<p><b>Social confidence</b></p> <p><b>Developing resilience</b></p> <p><b>Develop positive attributes</b></p> <p><b>Develop/have long term commitments</b></p>	<p><b>Experience of different learning environments</b></p> <p><b>Experience of debate</b></p> <p><b>Appreciate human creativity and achievement</b></p> <p><b>To have a knowledge and understanding of the world.</b></p>	<p><b>Connect</b></p> <p><b>Take notice</b></p> <p><b>Keep learning</b></p> <p><b>Give</b></p>

## Organisation and planning

### Organisation

At Yorke Mead we value the team approach and with this in mind we aim to group subjects together so that consistency across similar subjects is maintained as far as possible. This also means subject leaders are not working in isolation.

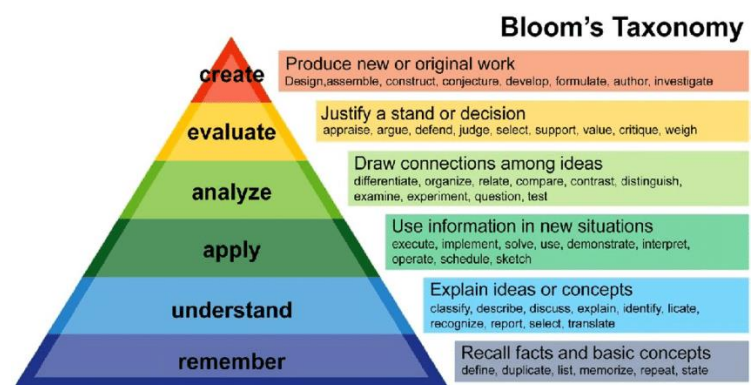
Science is part of the **discover** team along with maths, computing and D&T.

At Yorke Mead we follow the statutory guidance from The National Curriculum, teaching the following units of work: Animals including Humans, Everyday Materials, seasonal changes, plants, Living Things and Their Habitats, Rocks and Fossils, Electricity, Forces and Magnets, Space, Evolution and Inheritance (see science curriculum overview). As mentioned above, units of work are assigned to particular year groups and these will be revisited and built upon with increasing difficulty and with a different focus each time as the children move through the school. We teach with a hands on approach, making the learning as fun and creative as possible, developing the whole child. Our children work scientifically during every lesson, developing their ability of: pattern seeking, exploring, problem solving, fair testing, and analysing secondary sources. They take ownership of their learning and can track exactly how they are working scientifically on their science wheels which each child has in the front of their book and on the working wall. (see science wheels).

Teachers plan for science referring to and using dipping into numerous different schemes including: Twinkl, Hamilton and STEM, selecting, adapting and editing to meet the needs of the children at Yorke Mead.

### Planning –

Teachers at Yorke Mead are provided with a broad long term plan by subject leaders outlining the curriculum content and learning intentions to be covered throughout the year. It is the teacher's job to outline the delivery of this curriculum in a detailed medium term plan, which may be paper format or powerpoint in style depending on the preference of the teacher. There is no need for teachers to produce individual lesson plans for subjects other than English and Maths, which again may be paper or power point format. The purpose of this is to manage workload of the teachers and to ensure that time spent on planning is the most purposeful it can be to meet the needs of the teachers and the children.



In planning units of work teachers are mindful of the **Bloom's Taxonomy**, recognising that we cannot expect children to apply or analyse skills or knowledge unless we have given them time to both remember and understand this. Bloom's also supports differentiation of learning within the curriculum.

### Progression and Sequence of Learning

Time has been spent carefully addressing each unit of work that is taught across the science curriculum. The science lead has worked closely with class teachers to ensure that previous taught knowledge, understanding and skills are reinforced, developed and built upon whilst also considering how to challenge children who are working at greater depth. The long term plan for science clearly maps out prior learning, allowing class teachers to refer to this in their lessons and also as a starting point to address how much the children 'remember' and 'understand'. This begins as a mind-map of knowledge for 'remembering' at the beginning of each unit. The form of a quiz, questioning, and collaborative tasks help teachers to assess the children's 'understanding'. This information is then used to address what needs to be taught next. As already mentioned, units of work are revisited with increasing difficulty and with a different focus each time. For example, the unit of 'plants' is taught in reception, y1, y2, y3 and

y5 (living things and their habitats). We have ensured that not only are the skills, knowledge and understanding progressive but also 'what' they are observing, planting and growing: Reception grow, observe and look after a wide range of plants in their garden as well as visiting the allotment; Year 1 focus on runner beans and broad beans; year 2 focus on sunflowers and red onions; year 3 focus on tomato seedlings and white carnations and finally year 5 dissect Primroses/daffodils and propagate: Basil.

At the end of each taught unit, children revisit their mindmaps that they completed at the beginning of the unit. They add new vocabulary, facts and knowledge that they have learnt using a purple pen. This clearly shows growth.

#### Expectations for each keystage:

##### Key stage 1

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 ask questions about what they notice.

Pupils in KS1 do not necessarily need to use standard units (cm, ml) to measure and record differences and changes. Pupils can use non-standard measurements like the examples given below.

For example:

- Height- strips of paper, height in leaves, height in pens
- Amount of water- photos, strips of paper, a pen to mark on how it changes over time

##### Lower key stage 2

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.

##### Upper key stage 2

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. They should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.

### **Early Years**

All aspects of our curriculum for Key Stage One and Two build from the Early Years curriculum, which is centred around the needs and interests of the Early Years children at Yorke Mead. Whilst this policy is relevant to all stages of education at Yorke Mead it is essential this is read in conjunction with the EYFS policy.

This science curriculum policy should be read in conjunction with the following policies:

- Yorke Mead curriculum policy
- Teaching and Learning Policy
- Early Years Foundation Stage (EYFS) Policy
- Personal development at Yorke Mead

## Assessment for Learning

At Yorke Mead we use HfL working scientifically tracking sheets to help class teachers track the progress of pupils:

- Age related expectations for scientific knowledge for each year group (including working below and above ARE)
- Working scientifically criteria tracking sheets for each key stage (KS1, LKS2, UKS2)
- Science wheels

ARE expectations for scientific knowledge: Each year group has a tracking sheet to match each unit of work that they will teach (one for each class). These tracking sheets are broken down into working below, working at ARE and working above ARE. Statements written in bold are statutory and taken directly from the National Curriculum. Those statements in normal type are taken from the 'Notes and guidance' sections to show the progression in skills and knowledge. Teachers record children's names in the section that best matches their acquired knowledge for each science topic. Evidence will come from observations, verbal responses and written work including: photographs, videos and displays.

**Working Scientifically tracking sheets:** It is expected that pupils develop the skills of working scientifically across the 2 years of each phase. For example, in the first year of this phase (Year 5), children will be beginning to show evidence of the skills (within the context of the topics for that year); in the second year (Year 6) children should be consolidating and securely using those skills (within the context of topics for that year). To be 'securely' showing skills, teachers should consider whether pupils are confidently using the skills with less prompting and across a range of contexts. In the first year of the phase, teachers will use a highlighter to 'hash' what they are beginning to see for each group. In the second year, teachers will fully highlight the statement to show this has been met. At Yorke Mead we group the children according to their level of development. For example, children who are typically working at the Age Related Expectations and children who are working Above Age Related Expectations. For children who are working Below Age Related Expectations we ensure that they have an individual tracking sheet so that we can identify gaps in their learning and address these accordingly. As with the scientific knowledge tracking sheets, bold type statements are taken directly from the primary science National Curriculum; those in normal type are taken from the 'Notes and guidance' sections to show the progression in skills and knowledge.

For all tracking sheets, teachers assess the skills throughout the year (each skill will need to be covered several times throughout the year) and evidence will come from observations, verbal responses and written work. This can then be used to support the judgements made about the pupil progress towards working scientifically skills and make a judgement about attainment overall.

**Science wheels:** working scientifically wheels are completed both as a whole class (KS1) and individually (KS2). All children have a science wheel glued inside the front cover of their science book and a class example is presented on the working wall as a working document. The children date the wheel as they work on each skill area (see appendix). This is a clear way for teachers to see coverage: what has been covered multiple times and where gaps are occurring. For children, this helps facilitate discussion and pupil self- assessment.

In addition to the science wheels, children complete a mindmap at the beginning of each new scientific topic. This is where they 'remember' and recall their knowledge and understanding from previous learning, making brief notes on their mind map. At the end of the topic, the children revisit their mindmap and add new vocabulary, knowledge and skills that they have acquired throughout the topic. This demonstrates growth.

Through learning walks, book scrutinies and pupil voice, the science subject lead keeps track of the curriculum and can identify any gaps that need addressing. We meet as a team to moderate science as a core subject, annually, splitting into key stages: EYFS, KS1, LKS2 and UKS2.

## **Inclusion**

Teachers set high expectations for all pupils. They will use appropriate assessment to set ambitious targets and plan challenging work for all groups, including:

- Currently higher attaining pupils
- Pupils with low prior attainment
- Pupils from disadvantaged backgrounds
- Pupils with SEN
- Pupils with English as an additional language (EAL)

Teachers will plan lessons so that pupils with SEND can study every National Curriculum subject, wherever possible, and ensure that there are no barriers to every pupil achieving.

Teachers will also take account of the needs of pupils whose first language is not English. Lessons will be planned so that teaching opportunities help pupils to develop their English, and to support pupils to take part in all subjects.

Further information can be found in our statement of equality information and objectives, and in our SEN policy and information report.

## **Safeguarding and Safe Practise**

In all areas, at all times, staff at Yorke Mead are aware of safeguarding responsibilities and health and safety. Some aspects of learning naturally require greater need to be aware of planning for safe practise than others. Where there is any form of risk to children staff will have completed a risk assessment to manage this risk and ensure procedures minimise or remove the risk. The school has a number of generic risk assessments to cover those aspects where risk will be evident at all times.

There are times when children may be more likely to disclose a safeguarding concern, for example as part of science the children learn about changes to animals and human bodies, especially in UKS2. Should there be a concern or disclosure from a pupil, staff will always follow the school safeguarding policy.

## **The role of the science subject leader**

Subject Leaders will ensure that the school curriculum is implemented in accordance with this policy and specific subject and that:

- All required elements of the science curriculum have aims and objectives which reflect the aims of the school and indicate how the needs of individual pupils will be met.
- Long term planning is available for science to support individual teachers in their planning
- The amount of time provided for teaching science is adequate and the curriculum meets the aims and objectives for each year group.
- Standards within the science are monitored, meet the expectations and that the head teacher and phase leader is informed of any concerns around this.
- Resources required to deliver the science curriculum are available and accessible to staff.



- The policy and practise within science is updated to reflect current educational research in consultation with the Head teacher, SLT and governors.
- Supporting staff to have the pedagogical understanding necessary to successfully teach the science curriculum, and any required training is brought to the attention of the senior leadership team.
- The school's procedures for assessment meet all legal requirements
- Where appropriate, the individual needs of some pupils are met by permanent or temporary disapplication from all or part of the National Curriculum, allowing the most appropriate individual curriculum needs to be met in consultation with the Head teacher and school SENDCo.
- Proper provision is in place for pupils with different abilities and needs, including children with SEND policies.
- Link governors are kept up to date with policies and procedures linked to science

**This policy should be read in conjunction with the Yorke Mead Curriculum Policy. The following sections are as listed within this policy:**

- **Legislation**
- **Roles and responsibilities**
- **Monitoring, reporting and evaluation**

### **Policy Review**

This policy will be reviewed every three years by the headteacher, senior leadership team and governor curriculum team. At every review, the policy will be shared with the full governing board.

### **Links with other policies**

This policy links to the following policies and procedures:

- Teaching and Learning Policy
- EYFS policy
- Assessment policy
- SEN policy and information report
- Equality information and objectives
- Inclusion Policy
- Relationships Education, Sex and Relationships Education (SRE) and Health Education Policy
- Pupil Premium Policy

### **Appendices**

- Science curriculum overview (long term plan)
- Science curriculum
- Working scientifically wheels
- Age related expectations for scientific knowledge for each year
- Working scientifically criteria tracking sheets for each key stage
- Proof reading before marking' resources