



## Great Marsden St. John's Primary - a Church of England Academy. Our Curriculum Statement for Science

### Our Vision

Our children will experience love, respect, faith and success as unique individuals within our school community and the wider world, now and in the future.

### Our Mission

We ask that Christ will live in our hearts through faith making us rooted and grounded in LOVE.

Ephesians 3

### Our Values

LOVING God

LOVING Others

LOVING Ourselves

LOVING Learning

LOVING Life

At GMSJ we believe that the basic principle of an effective curriculum is that learning makes a change to long term memory. The intent is that our Science curriculum facilitates the delivery of this basic principle. In order to do so a strategic approach, based on pedagogical research, must be in place.

### CURRICULUM INTENT

**Our Science Curriculum is broad and ambitious.** It is built upon the National Curriculum coupled with defined development of cultural capital “the knowledge that children need to be effective citizens”. Where possible we expose the children to experiences they are unlikely to encounter in other parts of their lives. To achieve this we have a comprehensive and deep knowledge of our families and community that enables us to strategically plan life enrichment.

**Our Science Curriculum is well planned and sequenced,** it contains the right knowledge in the right order, providing pupils with the building blocks of what they need to know and be able to do to succeed in Science. The Science Curriculum is a spiral curriculum (Jerome Bruner) where subject **big concepts, procedural and declarative knowledge** are reencountered throughout the child's life at GMSJ.

**Procedural Knowledge** refers to the knowledge of **how** to perform a specific skill or task, it is automatic. In Science this refers to the following principles:

- Raising questions
- Observing
- Testing
- Identifying and Classifying
- Gathering and recording data
- Drawing conclusions



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**Procedural Knowledge** in our Science curriculum is based on a practical approach to teaching and on where the children are encouraged to engage in practical activities to develop their **declarative knowledge**.

**Declarative Knowledge** involves “knowing that”. Recalling information from declarative memory involves some degree of conscious effort – information is consciously brought to mind. **It is the Who, what, where, when and why of learning.**

Examples in our curriculum

- What does ‘habitat’ mean?
- Who was Charles Darwin?
- Why do magnets repel?

The two work together. For example, to know the declarative knowledge of ‘why magnets repel?’, the procedural knowledge of how to test, observe and gather data to draw conclusions to answer this question would be necessary.

**Big concepts** are complex and abstract, such as 'place', 'chronology' or 'grammar'. In each discrete subject area **big concepts** are defined. Often, these concepts are complex and abstract.

In Science these big concepts are:

- Living things and their habitats
- Animals inc Humans
- Materials
- Plants
- Light
- Forces
- Electricity
- Earth and Space
- Sound

These **big concepts** hold declarative and procedural knowledge. They tie together subject topics into a cohesive framework. By encountering the same **big concept** over and over children gradually build understanding of them.

**Our Science Curriculum has a coherently planned assessment sequence** to measure the impact of the science curriculum on the outcomes achieved by children. Children should be building a body of science knowledge and we assess learning through an initial assessment at the start of a topic and at the end of a unit of work and throughout each lesson.



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**Our Science Curriculum is inclusive.** We ensure that adjustments are made to the learning environment that allows all pupils to access the learning taking place in the first instance regardless of need whether EAL, SEND or gifted and able.

**Our Science Curriculum ensures that the Golden Thread runs through it.** The Science curriculum provides children with opportunities to develop their reading, writing and speaking and listening skills.

### **CURRICULUM IMPLEMENTATION.**

**How we implement our broad and ambitious Science curriculum.** From entry into school in EYFS, all children experience the Science curriculum.

We weave high quality activities which increase cultural capital throughout the Science curriculum for example:

- Visit the Butterfly House a Williamson Park
- Incubating and rearing chicks from eggs

**Big concepts** are charted on the **Science Curriculum Map**. This careful process ensures that science learning is sequenced to build upon prior knowledge.

This map also identifies which medium term planning resource must be used to inform short term planning. In Science this is Hamilton Trust but can be subsidised with other resources only from other places.

Each Science topic states the number of hours that should be spent delivering that learning. Such rigour ensures that learning is focused and diverse.

The timetabling of Science looks like this:

**In EYFS-** 5 areas predominantly animals and humans and states of matter lasting for approximately half a term, with these different concepts also present in continuous provision areas.

**In KS1-** 4 areas of science between 6 and 8 afternoons on each topic area

**In KS2-** 5 or 6 areas of science between 6 and 8 afternoons on each topic area

For the majority of **science lessons a defined structure is in place**. This is not dictatorial however, it is expected to see some aspects of the outlined framework in each lesson. In **science** the lesson model would be that where appropriate Stem sentences would be learnt, the children would be then introduced to a **Big Question**, they would then be taught how to explore and investigate the question. This may take the form of modelling, practical activities, research, ping/pong teaching and the children will demonstrate their new knowledge through a variety of different assessment opportunities.



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In Science the use of **STEM sentences** are used to hook learning into memory. They are a learning scaffold that can help students respond (orally and through writing) using complete sentences. Where possible scientific vocabulary is included into the **STEM sentences**. In Science this may look like:

- A carnivore is a meat-eating animal that gets its food from killing other animals. **Year 1**
- The longest bone in the human body is the thigh bone called the femur. **Year 3**
- An invertebrate is an animal that does not have a backbone. 97% of all animal species are invertebrates. **Year 6**

**Assessment** sits at the heart of **Science** teaching and learning at GMSJ. Minute by minute assessment of understanding, or indeed misunderstanding, is fundamental to our teaching model. It informs future teaching, identifies starting points and exposes gaps in procedural and declarative knowledge. Adults use a variety of strategies to obtain information. These strategies are not specified but a minimum use of 'hands up' is encouraged.

In **Science** we assess children's declarative and procedural knowledge by an initial assessment in the form of a spider diagram and then completed again at the end of a unit of work to show the progress that they have made throughout the unit.

In EYFS and KS1 initially children will complete this as a group with children's names .

In KS2 this is completed by each child in their books.

The children who are not accessing the curriculum at their year group level or have achieved greater understanding are recorded and sent to the subject leader.

### Pupil Conferences

This will take place termly. Groups of children will be invited to bring their books to a discussion with the subject leader, these books will be used as the basis of a discussion about their learning.

Children are taught to 'self assess' their learning against given criteria or a process. In Science this will take place at the end of a piece of work using self assessment faces and effort meter scores and when appropriate this may be introduced as a marking ladder.

Marking and Feedback is a crucial aspect of assessment but this must be manageable. In Science verbal feedback is given instantly throughout the lesson and children self assess and mark their work against a given criteria or process. This is then marked in accordance with the school's marking and feedback policy. Where appropriate children are given challenges to deepen their understanding of the topic.



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**How we implement an inclusive Science curriculum.** We have high expectations of all our pupils, and although we understand not all children will be working at their age related standard, we do not assume that this applies across all subject areas. We recognise that all pupils have strengths and preferences for learning. We aim to identify and cater to these strengths. All our pupils will experience a curriculum with breadth, however children may not all access an identical curriculum. Learning in all subject areas builds on the knowledge and skills the pupils have already secured.

When planning our inclusive science curriculum, we have intentionally included experiences that reflect the diversity of the community we serve. For example, animals including human, we have planned trips to local habitats, zoos to give children experiences they may not otherwise have.

When working within the classroom children may have access to visual support- enlarged resources and any other provision that they may require in their school day. We aim to identify and challenge those more able students, this may come in the form of directing them to the library to develop their curiosity within a subject area or raise poignant questions so that they can explore their understanding further.

### **How we implement the Literacy Golden Thread through our Science curriculum.**

In recognising that Literacy skills form an essential basis on which the rest of our curriculum is built, it is fed through the **Science** curriculum. This is achieved by:

- Encouraging to develop their speaking and listening skills through group work within investigations and sharing results.
- Providing purposeful opportunities for children to write, this can be done in a variety of different ways and contexts, recording and collecting data, sharing conclusions in a variety of ways.

The Golden Thread emphasizes the teaching of vocabulary. We know that this is often a barrier for our children and therefore requires more input. Technical vocabulary that is essential for the understanding of **Science** and is taught and displayed in each classroom.

We know that access to books is sometimes an issue for our families. To this end we have well stocked classroom libraries so that the children can always read in school and Key Stage libraries which allow children to select books to take home. Books related to Science are available for children to access.

### **CURRICULUM IMPACT**



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To measure the impact of the **Science** curriculum at GMSJ we use qualitative and quantitative information.

What we measure:

- Pupils procedural and declarative knowledge across the curriculum.

How we measure:

- Reviewing and evaluating the work pupils produce.
- Pupil voice via pupil conferencing
- Observation of teaching and learning
- Reviewing progress from the beginning of a unit and at the end of a unit.

Why we measure:

- To identify strengths in our **Science** curriculum delivery and set goals for improvement.