Oak Meadow Primary School

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Policy: Science

From tiny acorns mighty oaks grow.

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Curriculum Statement - Science

Intent

At Oak Meadow Primary School, we believe that a high quality science education provides the foundations for understanding the world through the three key areas of biology, chemistry and physics. We strive to allow our pupils to acquire specific skills and knowledge to enable them to think scientifically, to gain an understanding of scientific processes and also provide them with an understanding of the uses of science for both today and in the future. Through our curriculum provision, we endeavour to embrace a child's natural curiosity about the universe around them, whilst simultaneously promoting a respect for all living organisms and the environment.

At Oak Meadow Primary School, in line with the aims of the National Curriculum, our science teaching offers opportunities for children to –

- Develop scientific knowledge and understanding within the three disciplines of biology, chemistry and physics.
- Develop an understanding of the nature, processes and methods of science through different types of enquiries that enable them to answer scientific questions about the world around them.
- Be equipped with the scientific knowledge required to understand the different uses of science.
- Develop essential scientific enquiry skills to deepen their scientific understanding.
- Use a range of methods to present scientific information, for example ICT, diagrams, graphs, tables etc.
- Develop a respect for the materials and equipment they handle with regard for their own, and other children's safety.
- Develop an enthusiasm and enjoyment of scientific learning and discovery.

Within school, we have designed a creative curriculum that allows us to make cross-curricular links between science and the wider curriculum. Where the science curriculum allows, we have linked our science work to our overarching topics for each term in order to create an engaging science curriculum for all and promote a love of learning within the science subject area. We aspire to ensure that our science curriculum provides children with the confidence and ambition to develop their skills within the subsequent stages of their education and forthcoming life experiences.

Implementation

At Oak Meadow Primary School, within Key Stage One and Key Stage Two, children have weekly science lessons over one afternoon, allowing them the required time to develop their scientific skills and build upon their prior knowledge. Within the Early Years Foundation Stage, science is taught through 'Understanding the World', allowing all pupils to start gaining scientific experiences from the beginning of their school journey. This allows children to consistently experience high quality science lessons, which advance their expertise and understanding throughout the entirety of their primary school education.

Across Years 1-6, Science is taught in explicit units, in line with the National Curriculum. Where feasible, cross-curricular links are made to the year group's topic for each term and staff have created their own medium term plans to match their children's interests and abilities, as well as to incorporate a wide range of investigative activities. At Oak Meadow Primary School, science is also taught discretely throughout other aspects of the curriculum allowing children to access a broader curriculum, with examples of this including biographies about famous scientists in English, as well as sketching and observing plants in Art.

Our science curriculum is designed to provide children with the opportunity to work scientifically and acquire the necessary skills to problem solve and work collaboratively to conduct a range of investigative activities. When conducting investigations, children are encouraged to think like scientists and make predictions using their previous knowledge and experiences to support their theologies. Teachers model the use of vocabulary, various scientific equipment and the scientific skills needed in order to embed scientific understanding. To underpin this, scientific vocabulary is enhanced through the introduction of a 'Science Word of the Week.' The word is defined and displayed within the classroom and children are encouraged to incorporate the word of the week into their discussions and independent work.

Throughout the school year, regular events such as Science Week and STEM days are implemented across the school in order to broaden the provision pupils receive to allow them to gain more and apply scientific skills within a new context. These events have previously involved the wider community through the implementation of parent workshops and forming external links with the University of Wolverhampton. Children also have the opportunity to attend a STEM club as an extra-curricular activity and some children have been elected to be a part of the Junior STEM Team, giving pupils a voice within their science education.

To monitor the progress made within science lessons, all teachers are required to assess the units taught in line with the moderation materials provided by the Wolverhampton Authority. Each unit covered within science is summatively assessed to ascertain each individual child's progress and formative assessment is used during and at the end of each individual lesson taught. The science co-ordinator is responsible for monitoring the subject, including the development of medium term and short term planning, as well as the standards within the science books. Throughout the year, regular INSET training is provided in order to disseminate new information, ensuring all staff are updated with relevant changes within science, resulting in teachers delivering the best science provision for all pupils in their care.

Impact

Our science curriculum is carefully planned by our staff, in line with our skills progression and it is tailored to suit the individual needs of each year group. This allows us to ensure that all children are keeping up with the curriculum, therefore making good progress. We measure the impact of our science curriculum through rigorous assessment, keeping track of all children's progress across each scientific unit as they move throughout the school. Our skills progression enables us to ensure that children's scientific understanding is consistently being built upon, as it provides clear, differentiated structure for our science curriculum. At Oak Meadow Primary School, our curriculum is fun and engaging to encourage all learners to gain the foundations they require to better their understanding of the world around them and by implementing a range of investigative activities, children are learning through first hand experiences. Children are able to learn about the career opportunities science encompasses through the links made with the wider community and the opportunities given to them at school.

As a school, we want to ensure that all our children are equipped with the following from our progressive science curriculum –

- A wider variety of skills linked to both scientific knowledge and understanding, as well as scientific enquiry and investigative skills.
- A rich vocabulary that will enable all children to articulate their understanding of taught concepts.
- High aspirations which will see them through to further study and a successful adult life.

Skills Progression

Teachers have identified the key knowledge and skills of each scientific unit and consideration has been given to ensure progression across topics throughout each year group across the school to build upon the knowledge acquired by children throughout their time at Oak Meadow, with a particular focus on providing children with the opportunity to develop their scientific enquiry skills from EYFS to the end of Key Stage 2. See Appendix 1 for KS1 and KS2 Science Skills Progression.

Assessment

Assessment for learning is continuous throughout the planning, teaching and learning cycle. Key scientific knowledge is taught to enable and promote the development of children's scientific skills. Assessment is supported by use of the following strategies:

● Observing children at work, individually, in pairs, in a group and in class during whole class teaching.
● Scientific discussion during investigations that promote children to apply their own thinking and reasoning skills.
● The use of floor books to evidence various stages of investigative work.
● Using differentiated, open-ended questions that require children to explain and unpick their understanding.
● Providing effective feedback, including interactive marking through green pen questions where appropriate, to engage children with their learning and to provide opportunities for self-assessment, consolidation, depth and target setting.
● Book moderation and monitoring of outcomes of work, to evaluate the range and balance of work and to ensure that tasks meet the needs of different learners, with the acquisition of the pre-identified key knowledge of each topic being evidenced through the outcomes.
● Use of the 'what I know already, what I want to know and what I have learnt' (KWL) strategy throughout a unit, alongside specific and measurable WALTs for each lesson with child and teacher review of the agreed success criteria.

At the end of each topic, the acquisition of skills are evidenced by the class teacher on a foundation subject tracker. Target sheets are completed summatively at the end of each scientific topic taught to assess whether each individual pupil is working towards, at or above age related expectations. Throughout the year, progress towards working scientifically is evidenced on a target sheet within the front of each pupil's book. End of term data is also entered to match the assessment requirements for the other core subjects within school. Each child's attainment and progress in science is reported to parents in the end of year report.

Early Years

Early Years explore scientific themes and content through the Understanding of the World strand of the EYFS curriculum. This involves guiding the children to develop sense of their physical world, as well as their community, through opportunities to explore, observe and find out about people, places, technology and the environment. They are assessed according to the Development Matters Attainment targets. Working scientifically is a significant element of the science curriculum and children have the opportunity to develop and apply these skills from the beginning of their school journey in Reception. The requirements for working scientifically within Reception have been included in our school's science skills progression.

Cross – Curricular Links

Science is a subject that touches on many other areas taught in schools, from Mathematics and English to Art and Reading. For example, when presenting data from investigations in bar charts or tables, both scientific and mathematical skills are required. Cross curricular outcomes are also identified prior to teaching and these are evidenced through outcomes of work, as well as being stated explicitly in planning. Each half-term, every year group is required to complete a cross-curricular Guided Reading lesson to promote a love of reading around science and books of a scientific nature are also incorporated into the daily three o'clock read. Teachers also endeavour to link their science lessons to the overarching topic for each term where feasible.

SMSC Development

Spiritual education in Science inspires awe and wonder of the natural world: encompassing the three scientific disciplines of biology, chemistry and physics. Spiritually, Science is using evidence to make sense of the world, helping children to understand their relationship with the world around them. Morally, we teach our children how to use scientific equipment responsibly, whilst considering the impact that different discoveries/inventions have had on the world around them and whether they have made a positive or negative impact. The subject of Science allows pupils to develop socially through the use of collaborative work. Whilst completing investigative activities, our children share ideas, data and results and working together is greatly encouraged at Oak Meadow. Within science lessons, children look at how different discoveries over time have impacted the world around them and they understand that research and discoveries have shaped some beliefs of the modern world. In order to make science relevant to our pupils, teachers discuss modern day scientists from a range of cultures and backgrounds, another way in which SMSC is developed within the subject area of science.

Diversity

Innovations from science have positively touched nearly every aspect of human life. Through science, children understand that scientific developments do not arise of their own accord and that each ideology is brought forward by an individual scientist and that these scientists come from a range of gender, race, religion, culture and backgrounds. Children understand that science has no limitations and that discoveries can come from a wide range of sources if perseverance and hard work are applied rigorously.

Planning and Resources

Science resources are stored centrally in the Science Resource Area and are clearly labelled and organised. The library contains an extensive supply of science topic books to support children's individual research. Children can also use ICT resources. In addition to this, class teachers develop a 'working wall' for each of the scientific topics where books and other artefacts are displayed and are easily accessible for children. Planning is achieved collaboratively with parallel-class teachers and plans are saved electronically for ease of access. Teachers have identified the key knowledge and key vocabulary that is being taught, as well as the skills that are being developed across each topic. These are also explicitly outlined on each topic medium term plan, which makes explicit links to the National Curriculum 2014.

Subject Essentials

Each term children will have completed all objectives linked to their science topic. Work will be differentiated to ensure support and challenge for all pupils. All lessons will be evidenced in individual pupil books or a whole class floor book which may include a variety of recording methods such as written work, QR codes etc. All work will be marked and children will be expected to have spelt key scientific vocabulary accurately. The work produced in science lessons will be expected to be of the same quality as that presented in other core curriculum lessons.

Role of the Subject Leader

The subject leader's responsibilities are:
● To ensure a high profile of science across school.
● To ensure a full range of relevant and effective resources are available to enhance and support learning.
● To model the teaching of science.
● To ensure progression of the key knowledge and skills identified within each unit and that these are integral to the programme of study and secure at the end of each age phase.
● To monitor books and ensure that key knowledge is evidenced in outcomes, alongside and as supported, by SLT.
● To monitor planning, ensuring weekly coverage and to oversee the teaching of science.
● To lead further improvements in and development of the subject as informed by effective subject overview.
● To ensure that the science curriculum has a positive effect on all pupils, including those who are disadvantaged or have low attainment.
● To ensure that the science curriculum takes account of the school's context, promotes children's pride in the local area and provides access to positive role models from the local area to enhance the science curriculum.
● To ensure that approaches are informed by and in line with current identified good practice and pedagogy.
● To attend any relevant training and disseminate information back to staff.
● To monitor and analyse science data at the end of each term.

Equal Opportunities

At Oak Meadow, we are committed to providing a teaching environment which ensures all children are provided with the same learning opportunities regardless of social class, gender, culture, race, special educational need or disability. Teachers use a range of strategies to ensure inclusion and also to maintain a positive ethos where children demonstrate positive attitudes towards others. Support for specific individuals is well considered and planned for, with consideration given to how greater depth and further challenge can be provided for and demonstrated by children who require further challenge.

Inclusion

All pupils are entitled to access the science curriculum at a level appropriate to their needs. To ensure inclusion, teachers use a range of strategies. Independent tasks, as well as teaching, are also well adapted to ensure full accessibility, as well as to provide appropriate challenge to different groups of learners. The school makes full use of additional adults who are deployed effectively to ensure that identified children are able to make progress in each curriculum area, according to their full potential. Through establishing what the children already know and what they wish to find out prior to each topic, teaching takes account of children's own interests to ensure topic relevance to all individual learners and promote pupil engagement, enabling all pupils to be immersed within an exciting scientific curriculum.

Role of the Governors

Governors are responsible for ensuring the effective delivery of the National Curriculum in science. The subject leader will ensure that the Governing Body is kept up to date with the actions and initiatives which are relevant to the subject. Regular reviews of action plans are sent to the governors throughout the year and the governors meet with the subject leads and provide link governor reports to the governing body annually.

Health and Safety

The curriculum will be delivered in a safe and healthy manner and every effort will be taken to identify risks associated with the teaching and learning of Science (such as field trips) and the appropriate control measures will be implemented. Pupils will be educated about health and safety issues as and when the opportunity arises throughout the course of normal teaching. Risk assessments will be submitted for all educational off site visits with a Science link via the Evolve system at least 5 days prior to the visit taking place.