How we teach Science at Tudor Primary School

TUDOR PRIMARY SCHOOL

Summer 2020

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Mission Statement

Together we create a happy and caring community where all our children love to learn and want to achieve

Intent

Through our thematic teaching of Science, we aim for all pupils to develop a secure scientific knowledge and conceptual understanding across all areas of Science. We also want learners to be able to ask and answer scientific questions confidently, using a wide range of enquiry skills.

In line with the National Curriculum we aim to ensure that all pupils:
• Develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics (within the general subject 'Science').
• 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 in the future.
(National Curriculum – Science Programmes of Study updated 2015)

Implementation

Planning

Science at Tudor Primary School is taught as a core subject within the thematic curriculum. The aim of this curriculum is to inspire pupils and to provide them with a stimulating and contextual focus within which to develop their knowledge, skills and understanding in Science.

In the Early Years, themes are developed over the course of each year and are based upon key events that year, along with the interests of the cohort. Learning within Science largely falls within 'understanding the world'. The children are encouraged to ask and answer questions and to explore the world around them first-hand.

In Key Stages 1 and 2, the programme of study for each age phase is organised so that learning links to the theme for the term. There are 6 themes for each phase which follow a 2-year cycle.

In Key Stage 1, coverage is based on the programme of study for each year group. Each area is taught in full each year within the themes in that part of the cycle.

In Key Stage 2, the programmes of study for each phase (lower Key Stage 2 and upper Key Stage 2) are taught across the phase as part of the thematic two-year cycle. For example, the topic 'Rocks' is taught within the Spring term of cycle B and so, whilst technically a Year 3 topic, will be taught at this point of the cycle to both Year 3 and Year 4. By the end of the full cycle, the full Science curriculum will have been covered by the two year groups within the phase.

Working scientifically is a key part of our Science teaching. We teach this within the context of the themes and each Science lesson contains elements of this.

The Tudor Approach – A long-term curriculum overview

Early Years Foundation Stage

In Nursery and Reception, Science is taught within the areas of learning, largely within 'understanding the world'. Scientific enquiry is a key part of this both within adult-directed activities and through activities set up for children to explore during their child-initiated play. Activities are provided within each theme. Themes are planned as the year progresses based on the interests of the cohort of children and on key current events.

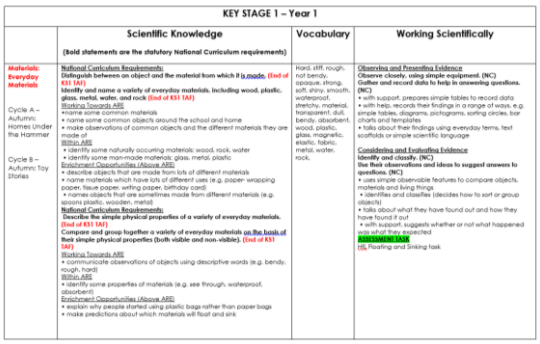
Key Stage 1 and Key Stage 2

	Autumn Cycle A	Spring Cycle A	Summer Cycle A	Autumn Cycle B	Spring Cycle B	Summer Cycle B
THEME	Homes under the Hammer	Field to Fork	Seaside Rescue	Toy Stories	Wings, Waves and Wheels	Turrets and Tiaras
Year 1	Everyday Materials Seasonal Change	Plants, Animals Seasonal Change	Animals, including Humans Seasonal Change	Everyday Materials Seasonal Change	Animals, including Humans Seasonal Change	Animals, including Humans Plants Seasonal Change
Year 2	Uses of Materials	Living Things and Their Habitats Plants and Animals	Animals, including Humans Living Things and Their Habitats	Uses of Materials	Animals, including Humans Living Things and Their Habitats	Animals, including Humans Plants
THEME	Buried Treasure	Crimebusters	What a Wonderful World	Is It Right To Fight?	Up Pompeii	Tomb Raiders
Year 3	Animals Including Humans Forces	Forces and Magnets Electricity	Plants. Living Things and Their Habitats	Animals including Humans Light	Rocks Sound	States of Matter Light
Year 4	Animals Including Humans Forces	Forces and Magnets Electricity	Plants. Living Things and Their Habitats	Animals including Humans Light	Rocks Sound	States of Matter Light
THEME	Raiders and Traders	Extreme Environments	Step Back in Time	A Whole New World	Spaceship Earth	It's All Greek to Me
Year 5	Properties and Changes of Materials Forces	Living Things and Their Habitats Evolution and Inheritance	Animals including Humans Electricity	Living Things and Their Habitats Evolution and Inheritance	Earth and Space Properties and Changes of Materials	Light Forces
Year 6	Properties and Changes of Materials Forces	Living Things and Their Habitats Evolution and Inheritance	Animals including Humans Electricity	Living Things and Their Habitats Evolution and Inheritance	Earth and Space Properties and Changes of Materials	Light Forces

Ensuring Continuity and Progression

Our 'Progression in Science at Tudor Primary School' document plays a key part in our planning, teaching and assessment of Science (see staff drive – Science at Tudor – Progression in Science). The document is organised in line with our thematic curriculum and incorporates resources produced by Herts for Learning. It clearly outlines the statutory requirements for each year group/phase and breaks these down into smaller steps in relation to both scientific knowledge and working scientifically. By following this, teachers ensure that lessons are appropriately pitched and that they enable progression from previous learning.

When producing medium-term thematic plans, teachers use this document and ensure that all steps and statutory requirements are covered within the theme for the term. This is reflected in weekly planning and teaching.



KEY STAGE 1 – Year 1

	Scientific Knowledge (Bold statements are the statutory National Curriculum requirements)	Vocabulary	Working Scientifically
Materials: Everyday Materials Cycle A – Autumn: Homes Under the Hammer Cycle B – Autumn: Toy Stories	National Curriculum Requirements: **Distinguish between an object and the material from which it is made. (End of KS1 TA?)** **Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock (End of KS1 TA?)** Working Towards ARE • name some common materials • name some common objects around the school and home • make observations of common objects and the different materials they are made of Within ARE • identify some naturally occurring materials: wood, rock, water • identify some man-made materials: glass, metal, plastic Enrichment Opportunities (Above ARE) • describe objects that are made from lots of different materials • name materials which have lots of different uses (e.g. paper- wrapping paper, tissue paper, writing paper, birthday card) • names objects that are sometimes made from different materials (e.g. spoons plastic, wooden, metal) National Curriculum Requirements: **Describe the simple physical properties of a variety of everyday materials. (End of KS1 TA?)** **Compare and group together a variety of everyday materials on the basis of their simple physical properties (both visible and non-visible). (End of KS1 TA?)** Working Towards ARE • communicate observations of objects using descriptive words (e.g. bendy, rough, hard) Within ARE • identify some properties of materials (e.g. see through, waterproof, absorbent) Enrichment Opportunities (Above ARE) • explain why people started using plastic bags rather than paper bags • make predictions about which materials will float and sink	Hard, stiff, rough, not bendy, opaque, strong, soft, shiny, smooth, waterproof, stretchy, material, transparent, dull, bendy, absorbent, wood, plastic, glass, magnetic, elastic, fabric, metal, water, rock.	Observing and Presenting Evidence **Observe closely, using simple equipment. (NC)** **Gather and record data to help in answering questions. (NC)** • with support, prepares simple tables to record data • with help, records their findings in a range of ways, e.g. simple tables, diagrams, pictograms, sorting circles, bar charts and templates • talks about their findings using everyday terms, text scaffolds or simple scientific language Considering and Evaluating Evidence **Identify and classify. (NC)** **Use their observations and ideas to suggest answers to questions. (NC)** • uses simple observable features to compare objects, materials and living things • identifies and classifies (decides how to sort or group objects) • talks about what they have found out and how they have found it out • with support, suggests whether or not what happened was what they expected ASSESSMENT TASK HfL Floating and Sinking task

Scientific Vocabulary

Using scientific language is key, particularly when considering and evaluating evidence and explaining ideas. The 'Progression in Science' document lists vocabulary to be taught and used in each year group/phase. In line with the National Curriculum, children should be able to read, spell and understand the meaning of these words. The key vocabulary for each topic is clearly displayed in each classroom. Children are encouraged to use the vocabulary in their work through clear adult modelling. Work or scaffolding provided by the teacher uses this appropriate, age-related vocabulary.

Working Scientifically

Elements of working scientifically are incorporated into each lesson. The key steps and statutory requirements are given in the 'Progression in Science' document. These are included in thematic planning to ensure full coverage of the National Curriculum. These objectives will be covered alongside those for scientific knowledge.

A Herts for Learning 'working scientifically wheel' (staff drive – Science at Tudor – working scientifically wheels) is on display in each classroom. Teachers may also choose to stick these inside children's Science books. The wheel is referred to regularly, drawing the children's attention to what kind of enquiry they are carrying out. Teachers ensure that a wide range of enquiry skills are used each term.

Assessment and Pupil Attainment

Providing Appropriate Levels of Challenge

The 'Progression in Science' document provides guidance for teachers about the appropriate pitch of their lessons. It shows the steps that are needed to achieve the statutory requirements and whether these are working towards or working at age-related expectations. Teachers use this document to plan appropriately pitched lessons with clear differentiation.

The document also outlines enrichment opportunities. As with all areas of the curriculum, we focus on broadening the children's learning rather than moving on to the content for the next year group. Teachers ensure that these opportunities are provided across the themes to extend and enhance children's learning.

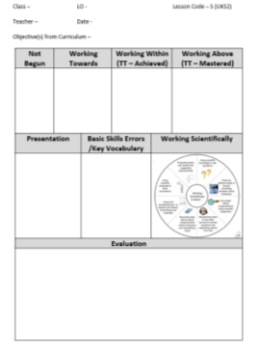
Exemplification of Standards

An exemplification of standards in Science for each year group/phase can be found on the staff drive (staff drive – Science at Tudor – Exemplifications) and can also be reached through hyperlinks in the 'Progression in Science document'. The exemplifications give ideas for how to deliver the curriculum and also show what pupils should be able to achieve if they are working at age-related standards. These help teachers to assess Science with greater understanding and confidence. For years 2 and 6, these include the government exemplifications for the end of each key stage.

During the course of each year, teacher's take photographs of children's work which matches these standards. The photographs are added to the exemplification folders to provide future guidance and evidence of attainment.

Feedback and Formative Assessment

Feedback in Science is given in accordance with the document 'How We Give Feedback' (see staff drive). There is a specific feedback sheet for Science (as there is for English and Maths) as this is a core subject. During each lesson, children are given verbal feedback and teachers/teaching assistants model in their Science books. Adults add notes to the feedback sheet during the lesson.



During/after each Science lesson, teachers assess the level of attainment of the class, using the 'Progression in Science' document as a guide. They also make assessment notes in the 'evaluation' section, pick out key areas of presentation that need to be addressed and any misconceptions or areas for development. Teachers indicate on each feedback form which elements of 'working scientifically' were addressed within the lesson, allowing them to monitor the breadth of coverage within this area. Each feedback form is used to guide teachers in providing praise and support and to inform subsequent planning.

Herts for Learning Assessment Tasks

These tasks are integrated into our planning and are completed at least once a term. The assessment focus for each term through the tasks is on 'working scientifically'. Teachers are able to choose a more specific focus from the programme of study for the term (see 'Progression in Science' document). These tasks provide another opportunity for class teachers to make assessments which can then inform future planning.

Summative Assessment

After each Science lesson, teachers select statements on Target Tracker. These statements are the statutory objectives from the National Curriculum (shown in bold in the 'Progression in Science' document). For each statement they select 'working towards', 'achieved' or 'mastered' depending on their assessment from that week's lesson(s). This links directly to the first section on the feedback form and also to the 'Progression in Science' document. Statements are highlighted each week for both scientific knowledge and for working scientifically.

At the end of each term, the highlighted statements are used to make a judgement about the current level of attainment of each pupil. This is assessed as 'steps' on Target Tracker. Early Years teachers make ongoing assessments based on the Early Learning Goals.

At the end of each year, Year 2 and 6 teachers complete the teacher assessment framework for the end of their key stage. This is based on learning across the whole key stage and so is also informed by the assessments across the preceding year group(s). Where statements in the programmes of study link directly to the TAFs, this is clearly shown in the 'Progression in Science' document.

Health and Safety in Science

For Science lessons, we adhere to school policies regarding safeguarding and health and safety. For specific guidance linked to the topics within each theme, we regularly refer to the ASE document 'Be Safe' (need to purchase resource and put link here).

Science on Display

As a core subject, Science is on display in each classroom within every theme. The aim of this is to support learning, embed scientific skills and knowledge and also to celebrate the children's achievements within the subject.

Key vocabulary related to the theme is displayed to support children with their use of scientific language and their spelling. The 'working scientifically wheel' for the phase is also on display in each classroom and is referred to regularly within lessons, making children more aware of the nature of their learning.

Children's work is displayed in accordance with the school display guidelines. Science work is displayed alongside work from other curriculum areas as part of our thematic curriculum.

Resources

The Science subject leader regularly updates a record of available resources and introduces any new resources to staff. Science resources are stored in two cupboards. These can be found in the corridor of the Key Stage 2 building. All resources are clearly organised in labelled drawers. It is everyone's responsibility to make sure that resources are returned to the correct space in the cupboards and that any new resources are put in the appropriate drawer. Further guidance is given on the door of each cupboard to support this. Resources should not be left on the top shelves of the cupboards unless this is where they are stored.

When writing medium term thematic plans, teachers check that all of the resources that they need are available. Teachers should therefore, have checked at least two weeks in advance of a lesson to make sure that they have all of the equipment needed. If more resources are needed or if something needs replacing then a list of requirements is emailed to the subject leader.

As several classes may need the same resources during a theme, teachers liaise with each other to ensure that they are not teaching Science at the same time. Once any resources have been used within a lesson they are either passed on to the next class who needs them or put straight back in the resources cupboard that they came from. This makes them easy to locate for the next class using them.

Impact

Monitoring Teaching and Learning in Science

It is the job of the Science subject leader, alongside the leadership team, to monitor the teaching and learning of Science (see 'Subject Leadership' document). The Science subject leader's action plan identifies the key priorities for each academic year and provides targets for the end of the year.

Every year, the subject leader keeps a record of curriculum overviews to show the planned delivery of Science. Book scrutiny and other monitoring activities (e.g. learning walks) focus on how effective teaching and learning is in practice. Pupil voice questionnaires/meetings with pupils help to gather further evidence of the impact of Science teaching.

Staff questionnaires and discussions help to identify training needs, which are then addressed as a whole staff through staff development meetings, or through sharing good practice between members of teaching staff, led by the subject leader.

Attainment and progress data (from Target Tracker and teacher assessment frameworks) in Science is analysed by the Science subject leader. This is further supported by the KS1 and upper KS2 phase leaders. Assessment data is explored more closely within a broader context and is linked to evidence from observations, book scrutinies and other monitoring activities.

All class teachers add to the Science exemplification folders through the year so that good practice and high quality outcomes are shared.