

# **Southfields Primary School**

# **Science Policy**

#### Date agreed: June 2022 Review Date: June 2024

This policy, having been presented to, and agreed upon by the whole staff and Governors, will be distributed to:

- All teaching staff
- School governors

A copy of the policy will also be available in:

- The Staffroom
- The Head's office
- School web site

This will ensure that the policy is readily available to visiting teachers, support staff and parents.

Southfields Primary is totally committed to social justice and improving life chances for potentially vulnerable children. It is dedicated to sharing its work and findings beyond the school to improve outcomes for as many children as it can reach and has a particular specialism in Speech and Language development.



'Studying science teaches us to be good at analysis and helps us to make complex things simple. It trains minds in a way that industry prizes' Brendan O'Neill, Chief Executive, Imperial Chemical Industries, PLC.

# Vision, Aims and Curriculum Intent

Our children are not statistics: they are the future. We will equip them with the skills and knowledge to shape their world and become happy, confident and productive members of society.

We believe the most effective way of achieving these aims is through the promotion of enquiry and curiosity, enthusiasm and challenge, sharing and learning together, the acceptance and embracing of differences, openness, respect and perseverance.

Our school aims to be an inclusive school where all children are welcome, feel happy and look forward to their school day. Every child is unique and we view those differences as opportunities for adults and children alike to learn more from each other.

# 1. Key Principles

Teaching at Southfields Primary School is 'Learning Centred', meaning that each element of whole school and classroom practice is designed with an understanding of how children learn best at its heart.

At Southfields Primary School we believe children learn science best when:

- Children are asking questions
- Children make real life links with science in their learning
- Children explore and plan their own investigations
- Hands on learning deepens learning and enthuses pupils
- Children gain mastery of scientific knowledge and apply it in a variety of contexts

# 2. Our vision

All children will become enquiring scientists' eager to explore the world around them, through our creative curriculum, hands-on, minds-on, inquiry based approach to science which enables children to ask questions as well as to investigate them.

This document is a statement of the aims and principles for the teaching of Science at Southfields Primary School. Science is a body of knowledge which is built up through experimental testing of ideas and which is organised in a way that makes it easy to use. Science is also a methodology, a practical way of finding reliable answers to questions we may ask about the world around us. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. Science is a systematic investigation of the physical, chemical and biological aspects of the world which relies on first hand experiences and on other sources of information. The scientific process and pupils' problem-solving activities will be used to deepen their understanding of the concepts involved. The main aspects of science to be studied will be determined by the programmes of study of the National Curriculum 2014. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

'Science is valuable because it meshes with all our lives and allows us to channel and use our spontaneous curiosity' Professor Susan Greenfield, Director, Royal Institution

At Southfields, we aim to stimulate the children's curiosity by giving them the knowledge and opportunities to investigate aspects of science and make sense of the things around them.

'Science is not only a disciple of reason but, also, one of romance and passion' Stephen Hawking



#### At Southfields we aim to:

- Prepare our children for life in an increasingly scientific and technological world
- Promote and encourage the enjoyment of science
- Give children opportunities to develop processing, manipulative and social skills by working together in science
- Help children acquire scientific language and knowledge
- Give children the opportunities to work scientifically, using the processing skills of science to find out about themselves and their environment and to encourage them to propose their own scientific investigations

- Give all children equal access to the Science National Curriculum throughout the school
- Develop an understanding of the possible hazards and risks when working scientifically



The children will have opportunity:

- To develop knowledge and understanding of important scientific ideas, processes and skills and relate these to everyday experiences.
- To ask questions, explore and explain causes and relationships and use discussion to probe and remedy misconceptions.
- To encourage responsibility and a willingness to attempt tasks and to overcome difficulties alone, but recognising when to ask for help.
- To develop self- evaluation and be prepared to consider ways of improving their work or modifying their ideas.
- To foster independence and be able to make decisions after due consideration and be prepared to defend opinions and ideas.
- To use, read and spell scientific and mathematical language including technical vocabulary and conventions accurately and precisely, and draw diagrams and charts to communicate scientific ideas.
- To develop the skills of working scientifically including observing over time, measuring, predicting, hypothesising, experimenting, communicating, interpreting, explaining and evaluating.

'Almost everything about our modern world stems from science, technology, engineering or mathematics (STEM). Yet in the UK there is a growing need to reengage children with these subjects to inspire them to become engineers or scientists, whose skills are essential to meeting the world's growing energy demand while reducing carbon emissions. To sustain innovation and growth, the UK needs to double the number of people becoming engineers.'

#### Shell Global

- To develop skills to enable pupils to focus on 'knowing how' as well as 'knowing what'.
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The following thinking skills complement the key skills and are embedded in the science curriculum:

- Information processing skills Locating, identifying, collecting, sorting, classifying, sequencing, comparing, gathering and recording data, contrasting and analysing information.
- Reasoning skills Give reasons for opinions, draw inferences, make deductions, use precise language to explain thinking and make judgements and decisions informed by reasons or evidence. By year 3 and 4 children should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions.
- Enquiry skills Asking relevant questions, pose and define problems, plan what to do and how to research, predict outcomes, anticipate consequences, test conclusions and improve ideas. They should help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.
- **Creative thinking skills** Generating and extending ideas, suggesting hypothesis, applying imagination, looking for alternative innovative outcomes. Children should be looking for naturally occurring patterns and relationships and decide what data to collect to identify them.
- Evaluation skills Judging the value of what they have read, developing criteria for judging the value of their own and others work and ideas, confidence in their judgement.

# 3. Curriculum Organisation

The National Curriculum programme of study 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.

At Southfields, working scientifically will always be taught and embedded within the content of the strands of biology, chemistry and physics. The programme of study for science as set out by the National Curriculum will form the basis for termly planning for each year group.

# 4. Continuity and Progression

Planning at a whole school level ensures continuity and progression within the subject and avoids unnecessary duplication or omission. The programme of study for science allows for pupils to experience, broaden and develop a deeper understanding of a range of scientific ideas and provides a clear framework for continuity and progression.

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Plants	٧	٧	٧	٧		٧	
Animals Including Humans	٧	٧	V	٧	٧	V	V
Living Things and their Habitats	V		V		V	V	V
Everyday Materials / Uses of / Properties and Changes	V	٧	V			V	
Rocks				٧			
Seasonal Changes	٧	٧					
Light				٧			٧
Forces and Magnets				٧		V	
States of Matter					٧		
Sound					٧		
Electricity					٧		V
Earth and Space						V	
Evolution and Inheritance							٧

Biology

Chemistry

# Physics

# 5. Science curriculum planning

Planning for science is a process in which all teachers are involved to ensure that the school gives full coverage of the National Curriculum. Foundation Stage pupils investigate science as part of Understanding of the World. Children are encouraged to investigate through practical experience; teachers guide the children and plan opportunities that allow the children to experience and learn whilst experimenting for themselves. By careful planning, pupils' scientific skills and knowledge gained at Key Stage 1 will be consolidated and developed during Key Stage 2.

We adapt and extend the curriculum to match the unique circumstances of our school, using the local environment where appropriate. Long term planning in Science maps out the areas to be addressed. A separate planning sheet which addresses analysing misconceptions, working scientifically, promoting discussion, examining the work of scientists, scientific vocabulary and cross-curricular links forms the basis of medium term planning as it specifies the skills and tasks that need to be undertaken. Specific learning outcomes have been outlined as part of the Southfields Science curriculum. This ensures comprehensive coverage of the national curriculum statements. The science Coordinator is responsible for monitoring the planning and ensuring that it covers all the statutory requirements of the National Curriculum 2014 programme of study. Short term planning is the responsibility of the class teacher and should be done in year groups.

# 6. Resources

Computer microscope and sensory equipment to be kept in secure cupboard, but useable on laptops. Text books to support topics are kept on the science shelves in the library. Concept cartoons, suitable for introducing, supporting or addressing misconceptions, are available on the shared area of the network. Equipment is kept in labelled trays in the resource cupboards in Key Stage 2 and Key Stage 1. Whole trays must be taken in order to keep the equipment together, but must be returned immediately after use.

Planning resources are provided by Tigtag for KS2 and Tigtag Junior for KS1. This platform provides lesson plans, videos and activities to support teachers with planning and resources. Using a consistent platform for planning will ensure pupils are taught about Science in the real world, making Science relevant and engaging the children in the subject.

# 7. Time Allocation

At Southfields, key stage one teachers should be teaching science for a minimum of one hour each week. Key stage two teachers should be teaching science for a minimum of two hours per week.

# 8. Contribution of Science to other curriculum areas

Science offers an added dimension to the whole school curriculum and the wider life of the school.

#### Maths

Science contributes to the teaching of maths at Southfields by supporting work on reading and drawing graphs tables and charts. Some experiments require accurate measuring which reinforces the use of standard measure and using measuring equipment.

# English

Vocabulary is widened through the teaching of science. Science dictionaries are available in every classroom. Scientific books are stored in the library. Literacy is important in writing instructions for an experiment and for writing explanations. Developing understanding through speaking and listening is of vital importance.

#### Computing

At Southfields there are many opportunities where science can be brought to life and made much more interesting with the use of ICT. At present, we have sensory equipment and a computer microscope that can be used on the laptops. The internet forms an important part of researching and investigating science, especially areas that aren't readily available in the child's experiences, such as micro-organisms and the earth and beyond. Interactive science programmes are used in all year groups at school and are also accessible at home.

#### Oracy

At Southfields children are encouraged to verbalise their thoughts and share these with their peers. The ability to collaborate effectively is an important skill that equips our children to be successful in later life. Our curriculum is based on the sharing of knowledge and expertise and this extends to our children as we aim to build upon the background knowledge that children have gained from experiences gained outside of the classroom. As children move into KS2, they are expected to work collaboratively as part of groups to plan and conduct effective investigations. Teacher's use of oracy strategies within their Science lessons allows our children to express their ideas and deepen their understanding through discussions with others.

Ofsted's Chief Inspector, Sir Michael Wilshaw, commented on the study of science and foreign languages in primary schools. May 16

He believes that compulsory subjects like **science** and modern languages have become the **'poor relations'** of the primary school curriculum. However, these subjects, when taught well, can boost literacy and numeracy skills and raise standards in English and mathematics. Evidence from recent Ofsted inspections and feedback from teachers, parents and pupils have highlighted a number of common concerns surrounding the provision of both science and foreign languages at key stage 2. Sir Michael says that a sharper focus needs to be placed on these subjects to make sure that children leaving primary school are better prepared to meet the more rigorous academic challenges they will face at secondary school.

# 9. Health and Safety

The general teaching requirement for health and safety applies in this subject. The children at Southfields will be made aware of hazards and dangers when using senses (such as tasting unidentified substances), heat (including hot liquids and hot surfaces following the heating of a material), burning (especially when using a candle or match), electricity and equipment made of glass. Class Teachers and Teaching Assistants will check equipment regularly and report any damage, taking defective equipment out of action. A simple risk assessment will be carried out for all practical activities any perceived hazards will be reported to the Head who will determine the appropriateness of said activity.

See whole school Health and Safety Policy for details.

# **10. Equal Opportunities**

All teaching and non- teaching staff at Southfields are responsible for ensuring that all children, irrespective of gender, ability, ethnic origin and social circumstances, have access to the whole curriculum and make the greatest possible progress. All children have equal access to the Science Curriculum, its teaching and learning, throughout any one year. Day to day monitoring of the Science Policy and the provision of equal opportunities in Science is the responsibility of the class teacher. General monitoring is the responsibility of the Headteacher and Deputy Headteacher. See whole school policies on equal opportunities.

**Inclusion statement** We ensure access to the curriculum at an individual level through appropriate differentiated materials to support ability level. Further support is available from classroom assistants and the SEN co-ordinator.

# 11. Teaching Science to children with special needs

All children should have access to a broad balanced curriculum which includes Science. Provision for children with SEN in relation to Science is the responsibility of the class teacher, support staff and SEN co-ordinator as appropriate. At Southfields, we recognise that there are children of widely different scientific abilities in all classes and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways by: Setting common tasks which are open-ended and can have a variety of responses. Setting tasks of increasing difficulty to challenge and extend more able pupils. Grouping children by ability and differentiating the tasks to suit each ability group. Providing resources of different complexity, matched to the ability of the child. Using classroom assistants to support the work of individual children and groups. See SEN policy for further details.

# 12. Community Links

Community links are actively sought through curriculum evenings.

### 13. Assessment and Recording

At Southfields, we assess children's work in science by making informal judgements as we observe and discuss scientific concepts with them during lessons. On completion of a piece of work, the teacher marks a piece of work and comments as necessary, providing a learning question to develop the pupils' thinking. At the end of each topic of study, a summative assessment of the content taught is administered to all pupils. Each assessment provides teachers with an accurate picture of the learning that has been acquired and retained. Pupils at the end of the KS2 programme of study do not routinely sit a science test, as their performance is ordinarily measured using teacher assessment judgements.

Every 2 years however, in order to gauge the overall performance of the national population, a sample of pupils sit tests in science.

Whole cohorts do not take the tests. Instead, DFE select a sample of approximately 1,900 schools to participate. In each of the selected schools we select up to 5 pupils to take the tests, so that approximately 9,500 pupils participate in the sampling tests. The sample is selected in such a way as to ensure it is representative of the population.

The KS2 science sampling tests are not subject to local authority monitoring visits. The tests will be administered in schools by NFER.

Test results will be reported as national data only. No individual school or pupil will be identified within the published data.

Individual pupil and school test results will not be:

- used for school accountability or performance tables
- shared with Ofsted, Regional Schools Commissioners or any other third party
- returned to schools or pupils

Southfields Primary school adheres to the GDPR Principles - data is collected with these principles in mind:

- Lawfulness, fairness and transparency as with Data Protection
- Purpose limitation only collect for specific purposes and then don't use it for other purposes
- Data minimisation only collect the data you need for the purpose you are using it
- Accuracy as now, keep it up to date!
- Storage limitation don't keep it for longer than you need to fulfil the purpose
- Integrity and confidentiality keep it safe and secure e.g. encrypted if on a laptop or mobile phone.
- Accountability you must be able to prove you have complied with the above.

**Data Protection** is about **avoiding harm** to **individuals** by misusing or mismanaging their personal data.

So if you collect, use, or store personal data then the Data Protection Act applies to you. It sets out eight principles you have to adhere to, which include:

- Only collect information for specific purposes and don't then use it for other purposes
- Only collect what you need for the specific purpose
- Keep it accurate and up to date; and safe and secure
- Process information lawfully and allow subject access in line with the Act

It is the **General Data Protection Regulation**, which supersedes the Data Protection Act on 25<sup>th</sup> May 2018. The key changes from the current law are to strengthen rights of individuals and place more obligations on organisations in looking after personal data.

In order to comply with the new law:

- You must have a legitimate reason for processing data this will cover much processing we undertake (see later slide)
- Consent must be freely and unambiguously given and can be just as easily withdrawn
- Data Processing activities must start with "privacy by design and default".

# 14. Review and Monitoring

The monitoring of the standards of children's work and of the quality of teaching in Science is the responsibility of the Science co-ordinator. The work of the co-ordinator also involves supporting colleagues in the teaching of Science, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in Southfields school. The effectiveness of the Science curriculum will be evaluated in discussions with the Head teacher, teaching staff and the Science coordinator. Resources, teaching methods, pupils experience and needs will be identified and priorities for amendments to the policy and in-service support will be established. This annual plan will form the basis for an action plan, which will inform the school improvement plan.

# **15.** Professional Development

INSET needs are identified through:

- School improvement plan
- Curriculum review and evaluation
- Co-ordinator needs Individual needs

These are prioritised by the INSET co-ordinator. A variety of providers and approaches are used.



# Southfields has been awarded the Primary Science Quality Mark



Southfields will continue to develop and showcase the school's science in the following areas:

- Science Learning (L)
- Science Subject Leadership (SL)
- Teaching (T)
- Wider Opportunities (WO)

L1: There is a shared	Children use different enquiry types to answer scientific					
understanding of the	questions about the world around them.					
purpose and process of	Children are developing independence in:					
science enquiry.	asking scientific questions					
	<ul> <li>planning how to investigate them,</li> </ul>					
	<ul> <li>carrying out and evaluating investigations.</li> </ul>					
L2 There is a shared	Teachers use a range of strategies and processes for formative,					
understanding of the	summative and statutory assessment, which reflect the school					
purposes of science	<ul> <li>understanding of the purposes of assessment in science and</li> <li>current best practice.</li> </ul>					
assessment and current						
best practice.	The subject leader develops exercise transition is existent.					
	The subject leader develops assessment practice in science.					
L3 There is a commitment	nitment The subject leader promotes initiatives that encourage all					
to developing all	I children to think that science is relevant and important to their					
children's science capital	lives, now and in the future.					
T1 There is engagement	Staff engage with a sustained programme of relevant internal or					
with professional	external professional development.					
development to improve	Subject leader provides regular, sustained support for					
science teaching and	d colleagues in response to development needs.					
learning.						
T2 There is a range of	Teachers use and evaluate a range of evidenced based strategies					
effective strategies for	for teaching science, which challenge and support the learning					
teaching and learning	needs of all children.					
science which challenge	The subject leader develops existing strategies and introduces					
and support the learning	new ideas for teaching science in response to development					
needs of all children.	needs.					
T3 There is range of up-to-	Children regularly and safely use a wide range of appropriate					
date, quality resources for	practical and digital resources, information texts and the					
teaching and learning	outdoor environment.					
	Teachers make links with outside agencies to borrow or source					
	additional equipment where necessary.					

science which are used regularly and safely	Resources are audited in line with development planning for science, and are well-organised and accessible.		
SL1 There is a clear vision for the teaching and learning of science	A clear vision for science is established. School principles for science teaching and learning have b developed by teachers and children.		
SL2: There is a shared understanding of the importance and value of science	The school community has a developing understanding of the importance and value of science.		
SL3 There are appropriate and active goals for developing science	School strategic planning processes provide effective support for the subject leader's development of science.		
SL4 There is a commitment to the professional development of subject leadership in science	The subject leader engages with professional development and learning. The subject leader is interested in science, and communicates this interest to others.		
SL5 There are monitoring processes to inform the development of science teaching and learning	<ul> <li>The subject leader uses a range of processes to monitor science teaching and learning.</li> <li>The subject leader ensures that pupil voice is valued and responded to.</li> <li>The subject leader shares outcomes with colleagues and implements appropriate actions.</li> </ul>		
WO1Thereareappropriatelinksbetweenscienceandother learning.	Curriculum planning links science to other areas of learning.		
WO2: There are appropriate links with families, other schools, communities and outside organisations to enrich science learning.	<ul> <li>Children take part in some initiatives supported by other organisations to enrich science learning.</li> <li>Children's science learning includes topical science events.</li> <li>Children carry out science activities with their families.</li> </ul>		

# 16. Useful contacts/web sites

Used to:

- To develop pupils' use of ICT in their science studies
- to give pupils opportunities to use ICT (video, digital camera, digital microscopes) to record their work and to store results for future retrieval throughout their science studies
- to give pupils the chance to obtain information using the internet.
- Science Bug <u>https://www.activelearnprimary.co.uk</u> is available through individual Active Learn accounts to teachers and pupils. Please remember to assign relevant resources each term to children. These can be used in school or at home. - *School subscription purchased*
- CLEAPSS resources give teachers ideas for exciting and engaging practical activities that fire pupils' imaginations and then, unlike many other sources of ideas, go on to show teachers in detail how to translate the ideas into safe and exciting experiences in the classroom.- *Individual teacher sign in (no charge)*
- Science The National STEM Centre has developed new materials for teaching the primary science programmes of study. The National Science Learning Centre has a wide range of resources available and more materials to support teaching of the new science curriculum will be available soon. Again, registration is free. In addition, there are resources available from science institutions such as the Royal Society of Chemistry and the Institute of Physics. <u>https://www.stem.org.uk/primary-science</u>.-*Individual teacher sign in (no charge)*
- Discovery Education Espresso <u>https://central.espresso.co.uk/espresso</u> has selected resources, videos, interactive and downloads for each curriculum objective. - *School subscription purchased*
- Explorify -<u>https://explorify.wellcome.ac.uk/en/activities</u> short anytime activities to develop critical thinking skills (Odd one out, Zoom in zoom out, What's going on, Problem solvers, What if, The big question) related to curriculum objectives for specific age groups. - *Individual teacher sign in (no charge)*
- BBC Bitesize <u>https://www.bbc.com/bitesize/subjects/z2pfb9q</u> and BBC Terrific Scientific <u>https://www.bbc.com/teach/terrific-scientific</u> learner guides, classroom presentations and class videos.
- The Association for Science Education (ASE) <u>https://www.ase.org.uk/resources/health-and-safety-resources</u> latest news, policy and research from the sector- *School membership*

Southfields Science Equipment is available in classrooms and the science resource cupboard (KS2).

Specialist pieces of equipment and those posing a potential safety risk will be held centrally and staff access when required.

Current Storage area:	Key Stage 1:	Science Bench	Key Stage 2:	School Garden:	Other areas
Equipment stored:		Bunsen Burners Digital Microscopes	Human Body model Ear Model Cells, wires, bulbs, switches and buzzers Lemon Juice (acid) Bicarbonate of Soda Thermometers Fossils	Common wild and garden plants Flowering plants including trees, fruit and vegetable Seeds Seed trays Watering Cans Soil	Human skeleton model

At the beginning of each year trips, visitors, residentials and visits are agreed as part of the strategic and provision planning.

In the past we have had the visits listed below:

Event	Where	When	Who	Impact
Mad Science –	School hall	Autumn 1	Whole	Enthusiasm and engagement in science
whole school			school	curriculum.
assembly				Children are asking questions.
				Children make real life links with science
				in their learning.
Science club	Classroom	Autumn 1	Year 1/2	Hands on learning deepens learning and
				enthuses pupils
STEM festival	Peterborough	Autumn 1	Year 5/6	Children gain mastery of scientific
	Arena			knowledge and apply it in a variety of
				contexts
Space Centre visit	Leicester	Autumn 1	Year 5	Hands on learning deepens learning and
				enthuses pupils
Zoolab	School	Autumn 2	Year 6	Hands on investigation
Travelling Space	School hall	Autumn 2	Year 5	Hands on learning deepens learning and
Observatory				enthuses pupils
Cadburys World	Cadburys	Autumn 2	Year 6	Hands on investigation
	world			
Roman Day	School	Autumn 2	Year 4	Hands on investigation

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Harvest Assembly	School hall	Autumn 2	Year 3	Children make real life links with science
	Classroom	Coring 1	15	In their learning
	Classroom	Spring 1	15 abilduau	in their learning
			children	In their learning
Jorvik Centre	York	Spring 1	Year 5	Hands on investigation
Stibbington Eco	Stibbington	Spring 1	Year 2	Children make real life links with science
Centre				in their learning
Residential				
Aylmerton	Aylmerton	Spring 2	Year 3	Children make real life links with science
Residential				in their learning
Dinosaur Park	Norwich	Spring 2	Year 1	Hands on learning deepens learning and
				enthuses pupils
Science Week		Spring 2	ALL	Children are asking questions
Sacrewell Farm	Wansford	Spring 2	EYFS	Children make real life links with science
				in their learning
Horstead	Horstead	Spring 2	Year 4	Children make real life links with science
Residential				in their learning
Peterborough	Peterborough	Summer 1	Year 4	Children make real life links with science
Museum	Museum			in their learning
Scarborough	Scarborough	Summer 2	Year 6	Hands on learning deepens learning and
residential				enthuses pupils
Beach Visit / Sea	Hunstanton	Summer 2	EYFS	Hands on learning deepens learning and
life centre				enthuses pupils
SAW week	School	Summer 2	All	Hands on learning deepens learning and
				enthuses pupils