AVANTI COURT
PRIMARY SCHOOL

Science Policy

Ratified: December 2019 Leaders/CLT	To be reviewed on: December 2021

AVANTI COURT POLICY STATEMENT FOR SCIENCE

Introduction

The following reflects our values and philosophy in relation to provision of all subjects including Science at Avanti Court.

***"If we want to attain the sea of our aspiration, we must persevere in our goal and never be discouraged by the inevitable obstacles that come in our path. All impediments are like rocks in the river of life. We should flow with them and never give up. With the Lord's mercy there is always a way.*"**
By HH Radhanath Swami

Our Science Intention

Our intention when planning and delivering the science curriculum at Avanti Court Primary School is to foster and develop our pupils' curiosity in the subject, whilst also helping them to fulfil their potential. Moreover, we aim to prepare our pupils for life in an increasingly scientific and technological world. We intend learning in science to be through systematic investigations of the physical, chemical and biological aspects of their lives that rely mainly on first hand experiences, leading to them being equipped to answer scientific questions about the world around them. It is our intention that, through investigative science, pupils at Avanti Court Primary School will continue to deepen their respect for the natural world and all its phenomena, and increase their care and appreciation of it.

We aim to:

- develop pupils' enjoyment and interest in science.
- develop an appreciation of its contribution to all aspects of everyday life.
- build on pupils' curiosity in, and sense of awe at, the natural world.
- develop skills to allow pupils to explore the world around them.
- equip pupils with the skills and knowledge to use and respect the world around them: both the physical environment and the living organisms.
- use a planned range of investigations and practical activities to give pupils a greater understanding of the concepts and knowledge of science.
- introduce pupils to the language and vocabulary of science.
- develop pupils' basic practical skills and their ability to make accurate and appropriate measurements.
- encourage open-mindedness, self-assessment, perseverance and developing the skills of all investigations – including: observing, measuring, predicting, hypothesising, experimenting, communicating, interpreting, explaining and evaluating.
- develop a respect for the materials and equipment they handle with regard to their own, and other children's safety.
- develop pupils' use of computing in their science studies.
- extend the learning environment for our pupils via environmental areas and the locality.
- promote a 'healthy lifestyle' in our pupils.

Planning

The teaching of Science at Avanti Court is based on the National Curriculum objectives and the Early Years Foundation Stage schemes of work. Avanti Court Primary School are committed to raising the profile of science planning, teaching and learning, assessment and investigative work and therefore have purchased a scheme of work; Collins Snap Science to inform planning and teaching. Each year group has a curriculum overview is available to all year groups to track both coverage of science in both KS1 and KS2 to ensure all national curriculum objectives are met.

Teaching and Learning

Our requirements of Teaching and Learning are encapsulated in our Teaching and Learning policy. However, at Avanti Court Primary we strongly value the practical nature of science and promote scientific learning through play and first-hand experience. Practical science lends itself to the development of investigative skills and draws upon strong mathematical links for example: data handling, measurement and pattern recognition. Pupils where appropriate are given opportunities to develop their computing skills through the study of science.

All lessons have a clear learning objective (WALT), which is shared and reviewed with the pupils. A variety of strategies, including key questioning is used throughout science learning to develop children's understanding.

Differentiation

Every effort is made to ensure that science investigations are accessible to all children within the class. Children will be provided with work, which challenges their thinking to ensure they reach their full potential. This will be reflected in the activity set but also through higher order questioning led by the teacher/TA. Planning should clearly reference how the activity has been amended or extended for children of different experiences. As the school proceeds, we will provide opportunities for more experienced pupils to support children in lower years.

Expectations in science

Below are the milestones we aim for our children to achieve by the end of each key stage:

By the end of EYFS, children will be able to:
(The Foundation Stage delivers science content through the 'Understanding of the World' strand of the EYFS curriculum.)

- explore and understand their physical environment through their five senses.
- develop skills to make simple observations of their physical world including everyday materials, animals and plants.
- develop skills to find some similarities and differences between groups of living things.
- ask simple questions about themselves and things around them.
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By the end of KS1, children will be able to:

- build observational skills by looking more closely at the natural and human-constructed world around them.
- develop curiosity about the physical world and ask questions about what they notice.
- understand how different types of scientific enquiry are needed to answer questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.
- use some simple scientific language to talk about what they have found out and explain their ideas in a variety of ways.
- decide how to gather and record data clearly.
- identify and classify things according to the similarities and differences they observe.
- use simple equipment efficiently.
- perform simple tests by following instructions given.

By the end of KS2, children will be able to:

- understand the five types of scientific enquiries including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.

- Ask relevant questions and make decisions about which types of enquiries will help to answer them.
- choose the most appropriate ways to gather, record, classify and present data including the use of simple scientific language, drawing, labelled diagrams, keys, charts, graphs and tables.
- identify differences, similarities or changes related to simple scientific ideas and processes more confidently.
- make systematic and careful observations and take accurate measurements.
- draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings and suggest improvements.
- Report on findings from enquiries using oral and written explanation, displays, presentations and conclusions
- Set up the right practical enquiries, comparative and fair tests depending on the question they want to investigate.
- Use straightforward scientific evidence to answer questions and support findings.

Curriculum Provision

We teach science in the Foundation stage as an integral part of the topic work covered during the year, which comes under Understanding the World in the EYFS. Children are supported in developing their knowledge, skills and understanding that help them to make sense of the world. Their learning is supported by offering opportunities for them to use a range of tools safely; encounter creatures, people, plants and objects in their natural environments and in real-life situations; undertake practical 'experiments'; and work with a range of materials.

At Avanti Court Primary Science is an important part of the curriculum and pupils across both Key Stages must undertake, a minimum of: Key Stage 1, 1 hour and 30 minutes per week and in Key Stage 2, 2 hours per week. This is non-negotiable. The school will follow the Collins Snap Science scheme of work to enhance the learning experiences for children.

Planning places a high emphasis on the development of pupil's skills of Working scientifically as detailed in the National Curriculum. Each topic allows for the appropriate development of scientific enquiry, through parts of an investigation or the whole process. This will enable pupils to in KS1 and in more depth in KS2 to:

- Ask questions and recognise that they can be answered in a variety of ways
- Predict and consider the appropriate apparatus to be used though close observation
- Observe, measure and undertake tests, simple, comparative, fair and those that involve controlling variables (Upper KS2)
- Identifying and classifying

- Use their observations and understanding to answer questions
- Gather, record and present (KS2) data to support them in answering questions.
- Identify scientific evidence that has been used to support or challenge ideas or arguments (Upper KS2).

The contribution of science to teaching in other curriculum areas

English

Science contributes significantly to the teaching of English at Avanti by actively promoting the skills of thinking, reading, writing, speaking and listening and language/vocabularly acquisition. Children develop speaking skills in science lessons through discussions/debates and through recounting their observations of scientific experiments and justifying their thinking using evidence or contextual knowledge. They develop their writing skills through writing reports, recording observations and by recording information such as their predictions or applying their scientific understanding to a 'bigger question'.

Mathematics:

Science contributes to the teaching of mathematics in a number of ways. Children use resources such as weights, thermometers, scales, stopwatches and measures and learn to use and apply number skills to their scientific learning. Through investigations pupils learn to estimate and predict. They develop the skills of accurate observation and recording of events and use numbers in many of their answers and conclusions. Through science children make sense of the numbers and patterns they see in the world around them, handling data in an increasingly digital world.

ICT

ICT including computers, sensors and cameras play an important role in developing scientific skills. Throughout all key stages pupils will have the opportunity to use ICT for data handling, interpreting results and findings and when collating data. The internet is also used which gives pupils an opportunity to apply research skills.

The Learning Environment

Science displays across the school must include key vocabulary and reflect the importance of science within the curriculum. Books and resources should be easily accessible to pupils to support and extend their learning. During science lessons pupils must be able to access resources related to their science topic and also ask questions in relation to their learning.

Inclusion and Equal Opportunities

Planning and teaching takes into account gender, race and special educational needs. Both human and physical resources are referenced on planning to ensure inclusion. A range of teaching strategies are deployed to ensure all children make progress. At Avanti Court Primary School we ensure that:

- Science is taught within the guidelines of the school's Equal Opportunities Policy and Safeguarding Policy
- All children have the opportunity to gain scientific knowledge and understanding regardless of race, class, gender or ability
- Our expectations as teachers do not limit pupil progress and achievement
- We teach science in a broad global and historical context, using examples and perspectives from people from many different backgrounds (Collins Snap Science)

- We value science as a vehicle for the development of language skills
- In our teaching, science has links to English and Maths
- Pupils learn through first hand experiences as much as possible
- We develop children's understanding through asking and encouraging challenging questions
- We display visuals to support children's understanding e.g. providing a symbol or a diagram to reinforce scientific language.

Teaching Assistants

TA's are directed by the class teacher and are referred to on planning. TA's are able to refer to the teacher's planning which will reference who they will support and how. TA's are encouraged to provide feedback to the class teacher regarding progress to inform future lessons, planning and resources.

Assessment

Each half term, for years 1-6, a science level is recorded on Target Tracker, which allows the subject leader to track age related progress in Science across the school. Formative assessment is ongoing and involves the children. Summative assessment takes place using the: Collins Snap Science and Testbase which is then recorded onto Target Tracker.

The Early Years Foundation Stage class teacher will record progress of pupil's 'Understanding of the World', against the Development Matters and Early Learning Goals criteria, which is then recorded on the Foundation Stage Target Tracker. In the Early Years Foundation Stage Curriculum assessment is ongoing. Observations inform next steps in planning and teaching. Progress over the year is recorded in each child's portfolio. This may include photographs, samples of work and transcriptions of children's learning.

At the end of Key Stage 1 and 2 Teacher Assessment (TA) is reported to the Local Authority (LA). Science and this ensures consistency in TA.

The main reason for assessment is to enable the teacher to match learning to the abilities and needs of all pupils so all pupils make progress.

Assessment and Scientific Enquiry

Scientific Enquiry is excellent for Assessment for Learning (AFL) and speaking and listening opportunities but can be difficult to assess. To ensure children make progress in Working Scientifically (WS) teachers must review and assess what has been learned after every science lesson, not just science procedures but also science ideas and knowledge.

At Avanti Court Primary we promote an AFL approach for Scientific Enquiry. This approach is effective because:

- Teachers use key questions throughout the investigation to gauge children's understanding

- During each unit, teachers plan for different types of scientific enquiry (i.e. observations, investigations or fair testing). This is to be recorded by the children (in most appropriate way to level and age expectations). Scientific enquiries may take over a period of time. Our curriculum has been designed to develop curiosity. Where appropriate, teachers will use Collins Snap Science to ensure that all scientific skills are being met.

- Teachers are aware of what the children are expected to do for each year group/level.

Resources

There is a communal science storage area in the main building with resources and equipment stored in topic boxes. Class teachers and teaching assistants are responsible for the collecting and returning resources. Breakages and shortages of stock must be reported to the Subject Leader. The Subject Leader is responsible for the auditing of resources.

Monitoring

The Subject Leader with support from the Core Leadership Team (CLT) is responsible for monitoring the standards of teaching and learning of science throughout the academic year to raise the overall quality of teaching and levels of pupil attainment. Monitoring will take the form of observations, discussions with children, analysis of pupil data and through the monitoring of planning and children's work. The Subject Leader is responsible for identifying strengths in the area of science and areas for development, which features on the subject's action plan.

INSET and Professional Development

The Subject Leader is a role model for all staff and will provide feedback to teachers on all monitoring and

standards. The needs of the school staff will be collated through monitoring, observations, the analysis of data and through formal and informal discussions. Staff attending CPD in science, are expected to disseminate useful points with the rest of the staff and it is the Subject Leader's responsibility to monitor the impact of such training.

Health and Safety

The safe use of equipment is promoted at all times. The school's Health and Safety policy should be consulted for details regarding: electrical equipment, wet areas, candles and the use of tools. A risk assessment should be carried out before any activity, which may pose a risk to pupils and adults particularly those involving: candles, tools, hot water, chemicals (e.g. washing up solutions), wet areas, foods, use of the environmental area etc. Completed risk assessments must be shared with the Subject Leader and saved onto Teacher Resources, allowing for all staff to access as appropriate. Also, hard copies of risk assessments will be kept in the Science resource cupboard, located in the main building.

Any animals or insects used for study must be treated with respect and returned to their natural habitat as soon as the activity is complete. Leaves and berries of a poisonous nature should be avoided in the classroom.

PSQM

Avanti Court Primary School will take part in the Primary Science Quality Mark (PSQM) over the academic year 2020-2021. The Primary Science Quality Mark is an award scheme to enable primary schools across the UK to evaluate, strengthen and celebrate their science provision. Schools can achieve PSQM award, PSQM GILT award and PSQM OUTREACH award. Avanti Court will work towards achieving the PSQM GILT award.

The purpose of PSQM will be to raise the profile of Science at our school by systematically supporting the evaluating process (self-assess, action planning, tracking and monitoring, implementation and reflection) and developing all aspects of science teaching and learning across the school.

The PSQM programme is also highly recommended by subject leaders in outstanding schools, head teachers, Ofsted, the Royal Society, The CBI and other members of the primary science community.

Role of the Subject Leader

The role of the Science Subject Leader is to:

- Coordinate and implement the school science action plan and review progress against targets – see PSQM
- Monitor planning and assessment to improve the quality of teaching and learning
- Collect and moderate samples of work to ensure consistency and high expectations across the school
- Analyse data and make predictions on expected outcomes and offer support to address areas for development

- Lead INSETs to ensure effective CPD for all staff and monitor the impact
- Support staff with their understanding of scientific concepts
- Order appropriate resources
- Keep up to date with the latest initiatives and feed this into science across the school
- Ensure ICT is being used affectively to enhance the teaching and learning of science across the school
- Encourage creative planning and teaching

Educational Visits and Visitors

The school recognises the importance of curriculum enrichment, which can be provided through educational trips to places such as: The Science Museum and more importantly the natural environment.

Review
The Head Teacher and staff will review this policy during the Autumn term 2021. Any suggested amendments will be presented to the SSC/CLT.

Appendix 1

Practical Investigations

Open ended investigations should be planned and carried out in line with the following criteria:

- Children should feel secure in many aspects of the topic before carrying out an investigation
- Investigations should be planned, the materials selected and the method of recording discussed before starting
- When appropriate children will be encouraged to select their own equipment and justify their choice
- Methods for recording should be as creative as possible and suited to individual pupil's needs

- The teacher must ensure that pupils understand what they are expected to record
- Link investigations to key questions

Planning Stage of Working Scientifically

When planning for Working Scientifically teachers need to think about:

- Giving children the opportunity to predict what might happen and go back to these predictions after the investigation to evaluate and reflect
- Modelling the planning process
- Giving children plenty of opportunities to lead the investigation through discussion and ascertaining the dependent and independent variables.
- Whole investigations or part investigations can be written up using class models, labelled diagrams, pictures, tables, graphs (scatter diagrams, line graphs and bar graphs).
- Reinforcing that different ways can work for the same investigation and that all methods do not have to be exactly the same
- Using the time when children are engaged in planning to question children to assess children's thinking and planning skills
- Ensuring that children have clear understanding of the precise data that they need to collect in order to confirm their prediction.
- Allow children time to evaluate each-other's plans and identify strengths and weaknesses - this demonstrates to children that there is not always one single line of enquiry
- Giving children the opportunity to add and to edit their plans once discussion has taken place

Gathering and interpreting results of Working Scientifically

The teacher needs to think about:

- Allowing time to review data - how would this change the way they planned in the future?
- Allowing time to address misconceptions and discrepancies
- Giving children the opportunity to interpret information presented in tables and a range of graphs and not just creating them
- Reminding children to refer to their results when writing conclusions
- Encouraging children to challenge each other's scientific evidence