Science at SMAB

Intent

Science at St. Michael at Bowes is exciting, engaging and purposeful. Through the topics outlined in the National Curriculum, each year group builds, consolidates and develops their scientific knowledge through practical and invigorating teaching and learning. As well as using 'Snap Science' resources to support with planning, teaching and learning of science, in the 2019-2020 academic year we launched the exciting practical science scheme 'Science Ninjas'. Since then, we have been building on both these schemes to ensure that expectations for science are met effectively.

At St Michael at Bowes, we have been working hard on continuing to raise the profile of science in the school. Our main focuses have been pushing the development, planning, teaching and engagement of practical Science and ensuring a clear focus is placed on key scientific skills in science lessons.

Working Scientifically in Years 3 and 4

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them
- setting up simple practical enquiries, comparative and fair tests
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

Working Scientifically in Years 5 and 6

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

Teaching

- Science lessons are delivered weekly and may vary in length but will usually last for up to two hours. Where appropriate, topics are taught in structured 'blocks' and may form the basis for extended writing in English.
- There are a variety of ways in which the teaching may be effective, and our school aims to encourage learning through investigation, with an emphasis on first-hand experience.
- Science lessons have no imposed formal structure but should typically contain some of the following elements:

A reflective question: A question about the world or a current/previously taught scientific topic to encourage deeper thought and connections.

Discussion: what they already know from experience, what they have learnt so far, what they will be finding out next. Where necessary, mind mapping and chocolate bars are appropriate methods for recording these discussions if desired.

Teaching: directly to the whole class or through group or individual work.

Practical tasks or investigative work: working within groups or individually, practicing scientific skills, finding out answers, being encouraged to think scientifically. Where groups are required, the teacher should consider which type of grouping will best suit the needs of the children.

Recording: writing about what they have found out, drawing charts and tables and diagrams, sometimes using computers and other media to record what they have done or found out.

Measuring and observing: To garner data, while using equipment correctly, by measuring and observing phenomena to clearly state findings in later reports.

Communicating: sharing ideas, predictions, knowledge, and what they have found out with each other, the teacher, other classes and adults as appropriate.

In addition to this, the school uses the **Science Ninja** scheme which encourages and promotes the teaching of practical science and rewards children for demonstrating one of four key practical skills in a practical Science lesson: observing, equipment, measuring and recording. Children receive a sticker if they successfully demonstrate that skill during the lesson. Not only has this scheme raised the profile of practical science in the school, it has encouraged and supported teachers with the teaching of practical science.

Planning

- The **long-term** plans for Science are outlined in the school curriculum map which indicates the topics that are covered throughout the year.
- It is the responsibility of the class teacher/ year group teachers to undertake the Science planning for their class, or oversee it where a student may be taking the class.
- The school uses Snap Science (Collins Connect) to structure the teaching of science but teachers are free to use their flair, enthusiasm and professional judgement to adapt or create their own lessons.
- **Medium term** plans show an overview of what will be covered week by week. The specific

Resources and Working Walls:

- Science wall is kept up to date with current topic being displayed
- Key vocabulary and concepts being taught in Science are displayed
- All classes have a Big Book where there are examples of work carried out in lessons, questions and responses

Resources:

- The school holds a central bank of teachers' resource books, consumable and frequently used resources.
- Children are encouraged to choose from a range of equipment and are trained in the

National Curriculum objective for each week will suffice and specific details do not have to be included. Opportunities for scientific enquiry and formal summative assessment should be included wherever possible.

- **Short term** plans (or weekly plans) should contain more detailed information about what will happen in the lesson. These include: objectives and success criteria (including working scientifically), key questions and scientific vocabulary, resources, differentiated challenges and plenaries. Where there are health and safety issues, these should be clearly shown on the planning and acted upon accordingly.

safe and considerate use of animals, plants and consumable materials.

- Expensive and less frequently used items are also kept within the central resource area.
- The Science lead and team is responsible for maintaining this area and ordering any necessary items that have been identified as a need.
- All staff members should be responsible for collecting and returning necessary items to the correct place to ensure that resources are easy for all staff to find.

Monitoring

Monitoring is carried out by subject leader and SLT during the school year. This will include

- Learning visits during Science lessons
- Book looks
- Pupil voice
- Staff/ parent questionnaire
- Moderation across year groups and phases
- Pupil progress meetings

Marking and feedback

All work should be marked according to the school marking policy by using

- Peer and self-assessment
- Oral feedback
- Children use a **PURPLE PEN** to show response to adult feedback and **GREEN PEN** for self and peer assessment
- Where an adult has provided feedback, the child will respond in **PURPLE PEN**

Assessment:

- Informal assessment is done through observations of the children, looking at their work and questioning children to identify what they have understood.
- Children are encouraged, in line with the school's Fast Feedback policy, to assess their own and each other's' work and identify their own targets for improvement.
- Formal assessment is completed after each unit of Science learning. Teachers use Rising Stars end of unit tests to assess understanding and identify gaps in learning to be addressed through future Big Questions and lesson starters.
- Teacher assessment, informed by these tests, outcomes of scientific enquiries and looking at books, is recorded using the school's Target Tracker program and used to identify if a child is working towards, at or above age- related expectations.