Willow Bank School
Learn Grow Achieve Together

Science

At Willow Bank School we provide an ambitious curriculum in a nurturing and safe environment for pupils to develop:

- Independence
- Emotional intelligence and resilience
- Appropriate communication skills
- The ability to contribute to society through good citizenship skills and preparedness for work

Intent

The Science Department hosts a variety of knowledge rich subjects which are taught as separate subjects but interweave at all levels and spiralise across key stages. Through the various disciplines, students are able to develop a deeper understanding of themselves and the world around them. The study of Science is essential to be able to flourish in life.

At Willow Bank School our aim is to encourage pupils to recognise the presence of Science in the world around them and its significance in their daily lives. Pupils will be supported with their learning whilst also being equipped to develop as independent learners.

We aim to provoke and nurture curiosity and promote a lifelong interest and awareness of how science can be used to understand and explain natural phenomena, and recognition of the potential for human impact within this.

We aim to show pupils how science is intrinsically linked with knowledge gained in other curriculum areas to maintain their inquisitiveness and reinforce their understanding of scientific phenomena and advancements in the world around them.

We want our pupils to foster an appreciation and understanding of the responsibilities of individuals to play their part in respecting the planet by living sustainably.

Specialist staff at Willow Bank are aware of local, regional and national initiatives which provide opportunities for pupils to get involved in and utilise their knowledge and embed learning. Pupils will be instructed on how to communicate their findings from scientific research and investigation and will be encouraged to form their own opinions and respect the opinions of others.

By the end of Year 11, our intention is that pupils will have developed an enthusiasm for learning about scientific phenomena with an appreciation of how accreditation for their learning is relevant in securing employment, including an awareness of the range of careers which having a science education can be the starting point for.

Implementation

Curriculum Overview:

Our Science curriculum has been designed to provide a coherent learning journey from KS2 through to KS4 which identifies the important concepts and procedures for pupils to learn and allows pupils to build on and develop their knowledge of these over time. The curriculum is organised so that pupils' knowledge of concepts develops from component knowledge that is sequenced according to the logical structure of the scientific disciplines.

As an SEMH specialist provision, we often find that our pupils have gaps in their knowledge and understanding of prior learning: when planning lessons, we ensure that curriculum content is secure before more demanding content is taught. In this way, personalised planning ensures that pupils learn how knowledge connects in science by having the opportunity to 'see' how it builds on an underlying conceptual structure.

Curriculum sequencing pays careful attention to when and how disciplinary knowledge is paired with substantive knowledge, so that disciplinary knowledge is always learned within the most appropriate substantive contexts. We address gaps in disciplinary knowledge in the same way as substantive knowledge – we provide opportunities for pupils to fill 'gaps' in prior learning through personalised planning and support. As pupils' confidence and disciplinary knowledge grows over time, they are encouraged to use and develop it in a range of different substantive contexts.

We have four specialist science teachers at Willow Bank School, one primary trained and three secondary. Additional learning support is provided by a dedicated science teaching assistant – we liaise with our teaching assistant prior to the start of a new topic to discuss the learning route through the topic each pupil will need and to cover any common misconceptions which pupils may present.

Topics requiring certain mathematical skills are planned in coherence with the maths curriculum and we make any similarities and differences between the two subject areas explicit to pupils. Our mathematics teachers are aware of how Maths is applied within the Science curriculum and highlight similarities and differences between the two subject areas within maths lessons where appropriate.

Pedagogical approach in Science lessons at Willow Bank is underpinned by Rosenshine's Principles of Instruction (Rosenshine, 2012). EHCP documentation is used to inform planning within Science, and we are flexible in our approach to content coverage and delivery. Small class sizes allow for 1:1 verbal feedback each lesson and effective direct questioning of each pupil so that we can check understanding before progressing through the curriculum.

At KS2, pupils have two discrete Science lessons each week and an afternoon dedicated to Forest School. Our primary Science specialist is also our Forest School Lead and opportunities to study Science outside of the classroom form part of our science curriculum delivery. This gives pupils the opportunity to gain experiences in a natural environment and thus provides context for their learning.

At present, KS3 pupils have 3 lessons per week, which increases to 4 lessons per week in KS4. The ambition is that every pupil will achieve a Combined Science GCSE (Edexcel) qualification at either foundation or higher tier. All GCSE topics are taught

alongside the Edexcel Entry Level and Further Entry Level Certificates so that progress can be recognised as pupils achieve these qualifications as 'stepping-stones' to GCSE.

External visits to a range of venues are planned at each key stage to coincide with relevant learning in a bid to enhance subject knowledge and maximise scientific understanding whilst providing cultural excursions for our pupils and staff to experience together and subsequently build on in the classroom.

Assessment:

- **KS2**: Assertive Mentoring assessment is utilised in KS2, to track understanding and progression through 'stages' of learning. With a focus on point of learning verbal feedback, pupils receive individual support and guidance each lesson. Time is allocated at the start of lesson for retrieval exercises – either directed or whole class activities led by teachers to 'warm up' pupils for the session, or low stakes quizzes to recap prior learning before introducing new content. Written feedback is provided each topic on independent knowledge application questions.

- **KS3**: With a focus on point of learning verbal feedback, pupils receive individual support and guidance each lesson. Baseline topic knowledge assessments are designed using TestBase and End of Topic assessments are used to check knowledge and end point progression. Time is allocated at the start of lesson for retrieval exercises – either directed or whole class activities led by teachers to 'warm up' pupils for the session, or low stakes quizzes to recap prior learning before introducing new content. Written feedback is provided each topic on independent knowledge application questions.

- **KS4**: Standardised baseline assessments from Edexcel are used to ascertain starting points for pupils as they begin their GCSE studies. Regular, low stakes quizzing is planned throughout each topic – both individual and whole class – to inform verbal feedback and personalised instruction and support within lessons. Point of learning feedback is provided each lesson; pupils regularly self-assess their understanding.

Opportunities to answer exam style questions are planned in each topic to familiarise pupils with the format and command words; written feedback is provided for these pieces of work. Pupils are then given the opportunity to develop and demonstrate their further understanding using the feedback provided. Mock examinations take place in January of the academic year to inform planning and support in subsequent lessons.

In all three key stages, Topic Sheets are used to provide pupils with an overview of their learning journey through the present topic and guide self-assessment of understanding at the end of each session. 'I can' statements are used to demonstrate to pupils the learning intentions of their Science sessions.

How do we ensure effective feedback in Science?

Learners will receive regular, accessible feedback. This will take place during every lesson as part of high-quality inclusive teaching. This feedback, within lessons, can take place in a variety of forms:

- **Self-assessment** of work in lessons e.g. checking classwork, setting own targets or WINK.

- **Peer assessment** of work in lessons e.g. checking classwork or reviewing other students' work.

- **Personalised live marking.** In addition to the other types of feedback, detailed above, teachers could provide verbal or written feedback to students which they can act on in their books as they circulate in the lesson.

- **Live class feedback using the visualiser.** The visualiser can be used during lessons, where appropriate, to enhance teaching and learning in a variety of ways e.g. critical evaluation of pupils' answers, modelling answers, walking talking mocks etc.

- **Literacy feedback.** Literacy needs to also be a focus for at least one piece of work per half term –this could be for feedback from an assessment or additional feedback task for a task of the teacher's choice. It could be completed during live marking or done during a 'Do It Now' task e.g. a spelling/keyword task.

- **Collective Feedback.** This could be following an end of topic assessment or after a key piece of work. A collective response can be used to identify and address whole class misconceptions.

Where feedback is following on from an end of/mid topic test or a key piece of work, learners should be given specific time to read, reflect and respond to feedback as detailed in the whole school policy. The teacher could use pre-prepared **End of topic assessment feedback** sheets which incorporate question level analysis to direct the pupil response. Alternatively, teachers could use **Collective Feedback** sheets to support both whole class and individual learner feedback if this is more appropriate.

Impact

- Pupils will have developed an understanding of how to work scientifically and safely.
- Progress will be seen within pupil workbooks and within the results of assessments taken, showing that over time, pupils know more, remember more and are accessing increasingly sophisticated topics.
- Pupils will leave Willow Bank School with the skills necessary to appreciate that there are still questions that Science cannot yet answer.
- Pupils will transfer knowledge and understanding of the world around them to real life situations so that they can make informed decisions.
- Pupils will leave Willow Bank School with a qualification at the appropriate level.