

## Curriculum Intent Statement - Science

Science (from the Latin word *scientia*, meaning "knowledge") is a systematic enterprise that builds and organises knowledge in the form of testable explanations and predictions about the universe.

The science curriculum for the students of The Vale Academy has been designed to provide students with a deep understanding of the scientific knowledge and ideas that impact them as individuals within a local and globalised context. As they move through the curriculum, students will be increasingly made to develop their curiosity, provide insight into working scientifically and appreciate the value of science in their everyday lives. Our curriculum provides a platform for more advanced science based study, providing a gateway into a wide range of career opportunities. It also delivers a framework for understanding the natural world and supporting students to become scientifically literate participants in society.

After consideration of the Education Endowment Foundation (EEF) report 'Improving Secondary Science' in 2018 and recent research developments in science curriculum design, a full review of the curriculum was undertaken, establishing a number of key principles.

*E.D. Hirsch argues "only a well-rounded, knowledge-specific curriculum can impart needed knowledge to all children and overcome inequality of opportunity". This is something supported by the Department for Education (DfE) who write that the curriculum should emphasise that knowledge should be something "to be remembered and constantly built upon, not merely encountered and fleetingly experienced" (DfE, 2018: 5).*

The key principles used when designing the new curriculum were:

- To develop a knowledge rich curriculum, supported by high quality teacher instruction, collaborative learning and the opportunity for students to demonstrate understanding.
- Effective use of models to explain concepts and critical evaluation of these models.
- Development, understanding and use of scientific language and commonalities in language between other curriculum areas.
- The sequence of learning, including prior knowledge and next steps.
- Retrieval of information over time.
- Reduction of a topic/end of term test, more frequent 'low stakes' checkpoints that feedback in to classroom planning.
- Links to other subjects as well as local and social context.

Our curriculum is split into 11 strands (see Strands KS2-4), which flow through from KS1 to KS4. When students revisit each strand, the opportunity is taken to revisit prior knowledge, provide intervention where appropriate and deepen students understanding and scientific skills within the strand.

Students follow the National Curriculum at Key Stage 3, which is currently (in 2019) Year 7 and Year 8, and move to GCSE in Year 9. As a result of the curriculum review, this has been changed with students now spending more time developing a broad understanding of the national curriculum content in Year 9 before commencing GCSE in Year 10.

Our approach allows students to progress through the Key Stage 3 curriculum at a personalised pace, again allowing more time to deepen students understanding and develop language skills in each strand.

### **Key Stage 3**

The intent was to create an overarching narrative for our curriculum strands. The rationale was to allow students to understand 'what they are learning, why they are learning this now, what does this build on and where does it lead'.

*Willingham wrote 'The human mind seems exquisitely tuned to understand and remember stories – so much so that psychologists sometimes refer to stories as 'psychologically privileged', in that stories are treated differently in the memory compared with other types of material' (2018).*

*Myatt identifies three necessary stages in producing successful student outcomes through cognitive science: 'we need to find the stories in the curriculum, we need to think about how we ensure that information moves from the short-term into the long-term memory and we need to provide opportunities for pupils to revisit the key concepts' (2018).*

Practical skills are modelled for students with opportunities for students to develop the skills of enquiry and working scientifically.

During Key Stage 3 students will also have the opportunity to experience areas of science beyond the National Curriculum, these are planned to include subjects such as astronomy, psychology, marine biology, geology. Using the expertise of the wider trust, we are able to offer our students the opportunity to experience short programs of study in these areas with links to science and possible careers.

#### **Key Stage 4**

Students experience a wide range of new topics and skills at KS4 whilst following the AQA Trilogy or Triple science specifications. Each topic strand is linked intrinsically to prior knowledge and skills from KS3 and builds in terms of complexity, skills and application. Our aim is that all students should leave (Delta Academy) able to understand and explain the scientific world around them but more importantly are equipped with the skills to problem solve and critically evaluate the 'big' moral questions.

To support this, the design of **Knowledge Organisers (KOs)** has been carefully planned and aligned to the curriculum narrative. KOs are carefully embedded into the curriculum structure to ensure that this meets the need for improving literacy and provide opportunities for retrieval practice. This also ensures that new key language is introduced, explained and modelled when building on prior learning within each strand.

Assessment of students' understanding of the curriculum is constant and low stake. This is done through multiple-choice checkpoints and demonstrate tasks. The aim of this assessment is to feed directly into planning so that lessons are personalised to meet the needs of all students.