Intent

Science at Oswaldtwistle School is delivered at both Key Stage 3 and Key Stage 4. The KS3 curriculum follows the AQA Activate scheme of work, this allows the KS3 and KS4 courses to complement each other into the AQA GCSE. At KS4 science is delivered in 3 different ways; as a GCSE and through WJEC pathways, which is a selection of modules that are more vocational than academic. The third delivers science through hands on STEM sessions where pupils are given the opportunity to design, research and create a project that will be assess for the Bronze Crest Award.

The AQA Activate course allows younger pupils to access all 3 sciences; biology, chemistry and physics, which is seen in mainstreams settings, enabling them to fit back into mainstream school when they are ready to return. Accessing all the sciences gives pupils the basic knowledge to move onto a triple science course at GCSE on return to mainstream.

Science at Oswaldtwistle is flexible and changes depending on the pupils needs and abilities. Initially, GCSE Biology is delivered to year 10 through to year 11 however, if pupils have already gained a GCSE in biology then either GCSE Chemistry or Physics is taught.

The rationale behind the use of the Pathways programme of study for some pupils, is to allow a wide variety of subjects to be taught so that those with a part time timetable or lower ability can access a science curriculum that may help with vocational courses and BTEC at college level. The content is delivered in a series of modules that are chosen by the teacher with pupil input. The modules chosen are as follows;

- *Science and the human body,*
- *Introduction to animal care,*
- *Science and the Universe,*
- *Plant world,*
- *Making useful compounds,*
- *Food and health,*
- *Introduction to land maintenance,*
- *Electrical circuits.*

These modules incorporate all 3 sciences; biology, chemistry and physics, which gives a range of GCSE topics to be taught in preparation for mainstream GCSE classes. The modules chosen reflect the broad range of science topic seen in the National Curriculum throughout Key Stage 3. They are more practical based to instil a love and enjoyment of the subject. This is also implemented for those of a lower ability that may struggle with the classroom setting. Science is a challenging subject that many pupils fail to fully engage with and a more ‘hands on’ approach is hopefully seen as less challenging as the traditional GCSE science has always been made out to be by pupils. This course has been chosen to allow pupils to appreciate that science influences everyday life in many ways and to open the minds of young people to the vast array of careers science can enable. To do this in a more engaging way, students have access to animals and land to be able to put their plans and ideas into action. Some pupils have access via Harwes Farm with others caring for class pets and maintaining school land. The course has no final exams which also appeals to the nature of the pupils at Oswaldtwistle School. Instead the course is assessed through classwork by the teacher and a sample will be assessed externally. The success criteria can be seen in the form of the I Can statements, academic trackers and exam board criteria. These outline the key ideas the pupils should be able to recall or apply at the end of each module. The National Curriculum aims are to develop scientific knowledge and develop an understanding of the processes and methods of all 3

science disciplines, the use of the pathways enables this by asking scientific questions to help understand the world.
Unlike a mainstream setting, the pupils at Oswaldtwistle School do not have enough time on their timetables to complete a combined science scheme of work as outlined in the kS4 National Curriculum. This is one of several reasons why the science offered in the first instance is AQA single biology. In addition to time, as each new pupil arrives at the school it becomes apparent that, as a majority, science basic knowledge is low and often KS3 science must be covered before the GCSE content can be approached. Pupils tend to have a block on accessing science, possibly as this is one of the first lessons pupils are banned from during their stay at mainstream, possibly also because it is both literacy and numeracy based and does contain challenging concepts. Pupils believe they will find the lesson difficult before learning the subject of the lesson. Due to these barriers, a single science seems the best fit, with biology being the least complex of the three and the most suitable for the pupils of the school. Throughout the learning pupils are expected to reach a set of targeted end points to ensure that the aims of the National Curriculum are met, at both KS3 and KS4.

The intent of the science curriculum is to increase fluency with scientific key word vocabulary and content, to increase ability in evaluation, application and analysis, to introduce pupils to a wider range of 'everyday life' science and the career possibilities for scientists and to also use practical experiments to develop employability skills.

The wider school intent is to develop pupil reading, writing and oracy, and to some extent the use of maths, for example costing and budgeting, conversions and graph skill. As well as literacy and numeracy skills, SMSC is also a large part of the scientific curriculum; looking at the ethics behind cloning and genetic modification, to increase knowledge on science based careers and to see science as an everyday occurrence. The science curriculum, whether Pathways or GCSE, will aid personal development and culturally enrich pupils as they learn about their own bodies, historical developments that propelled the world forward, the interaction and importance of all organisms on our only planet and visit or read about how things are made and how science has shaped that change.

Implementation

Over the last 3 years the science curriculum and how it is delivered has evolved and changed to better suit the need of the pupil; be it a return to mainstream, college or employment. It has changed to increase access to all 3 discipline of science and to aid those that struggle to access academia. With these additions and developments, the science team has increased in number to include several non-specialists, all however, under the direction of the science lead teacher and specialist. The science curriculum is delivered across the school as a core subject utilising 4 teachers. The non-specialists deliver science to a class of their own so as not to mix teaching styles. All classwork is marked and assessed by the specialist teacher. Those that are taught by non-specialists will be completing the lower level Science Today WJEC Pathway at Entry Level 2 with Level 3 available for those that can be pushed, with the specialist taking those capable of reaching GCSE.

AQA Activate, at KS3, is delivered over a 3year period, in line with mainstream schools. This means that pupils that remain at Oswaldtwistle School within KS3, do not repeat the same content but have a broad basis of knowledge to move onto GCSE. It should also allow those that return to a mainstream setting to easily filter back into their KS3 program of study. The outcomes of the KS3 course are measured in a similar way to those at GCSE, using 'I can' end points that are ranked from novice (red) into developing (amber) and secure (green), each unit taught revisited in all 3 years of KS3 to embed and deepen knowledge and achieve mastery in science. To aid fluency in all areas of

the curriculum, content is taught and scaffolded to the pupils own individual needs and is recalled until retained in the long-term memory. Assessment is conducted via verbal questioning, quizzes, games and written end of unit tests.

The GCSE biology is roughly split into one main topic per term over two years. The course is normally a single year course but due to time constraints and the motivation of the pupils it was seen that longer needed to be taken to complete the course in detail. This was also decided due to the lack of basic KS3 knowledge seen within some pupils coming into the school in year 10. Having a second year allowed for more adaptive teaching where the GCSE content is scaffolded with lower school knowledge to embed the theory and create basic fluency before it was implemented in more challenging aspects of the syllabus. The scheme of work has been designed to allow mastery of skill using Rosenshein's' 10 principles of instruction; interleaving, using starters to revise past topics as well as learning from the previous lesson, spacing, modelling and questioning. Lessons are sequenced to allow a natural build-up of information surrounding the main topic that allows a clear and logic pathway for knowledge development. In all classes responsive teaching is utillised to show pupil fact recall and also the understanding of past topics. Fluency, or mastery, can be seen using the end points as pupils move from novice (red) into developing (amber) and secure (green). A topic is continued with until pupils are able to recall information and use it in context in line with the command words used in GCSE questions. Retention of information can be judged summatively using end of topic tests and also formatively through the use of the success criteria of the lesson, also known as the end points.

Similarly, the Pathways topics are developed over a term, or in some cases a half term depending on the length of the topic and the basic knowledge of the pupils. There are no time constraints with the Pathways course as each module is assessed as it is completed, as long as the basic number of credits has been achieved the pupil will gain a qualification. This allows a real mastery of skill and information and empowers the pupils to go at their own pace to gain as much knowledge as is not just needed, but wanted. This course is much more practical and involves the more everyday science, such as food science and animal care, and can help pupils to understand the use of science in careers and its importance in daily life. As with the GCSE lessons are sequenced to aid understanding and make transitions between key information easy and logical. Throughout a module, previous learning will be assessed through the use of questioning and responsive teaching, both verbal and by utilising relevant past exam questions. End points are used as the primary diagnostic tool rather than end of topic testing, scoring the pupils on their ability to recall key information and use the skills learned during the course of the module.

The Pathways modules for those in our KS4 nurture/SEN group are accessed outside of the classroom, at Harwes Farm in Colne. This gives the pupils the chance to carry out hands on science and to link life and vocation to science. This enables the pupils to care for sheep and chickens, plant their own gardens and vegetable plots and design areas for woodland and tree growth and see the benefits the environment will reap. It also provides the opportunity for collaborative work with those that work at the farm and teamwork within the class to encourage personal development and wellbeing.

STEM has been incorporated into the timetable for those that struggle to access science. This is in the hope that pupils will begin to realise and understand science as an everyday event. This course will be delivered through the Crest Award at Bronze level, and will help increase pupil's problem-solving ability, teamwork and increase awareness of the careers that can stem from science.

Impact

The outcomes achieved by the students can be seen in many ways. The main pathway for analysing progress and achievement is through the use of the 'I can' statements or end points. These statements are 'ranked' at either novice, developing or secure at KS4 and emerging, developing, excelling at KS3, depending on the individuals grasp of the knowledge or skill being assessed. This can be altered as pupils' grasp and application of knowledge increases.
Both courses also utilise feedback as a form of assessing progress, teacher marked green questions are asked to increase understanding or to re state learned knowledge. These are answered in purple pen in pupils' books and can influence a change of I can statements and deepen pupil knowledge. This feedback can be seen from teachers, peers and self-assessment. Pupils often have the opportunity to mark their own work, any tests that are completed are revisited by the pupil with a purple pen and textbook to aid the pupil to answer questions that they struggled with on their own.
Each lesson also begins with a responsive teaching session whereby questions are asked of the pupils about previous learning and how it can be linked to other topics. This questioning can be directed towards areas that the pupils seem to struggle with when trying to recall.
Finally, the GCSE course is assessed through end of topic testing, devised by the exam board followed- in this case AQA. These tests are given a grade that would be achieved by the pupils at exam level. The aims of teaching science in this way is to broaden pupils knowledge, deepen scientific knowledge and to help pupils understand more about the word around them. This can be done through questioning and scientific investigation, also increasing pupil skill sets.

Covid 19 Adendum

Although all groups in science are beginning a new curriculum post lockdown, a review of knowledge has shown gaps in previous learning. These gaps will be addressed and learned throughout the new term, scaffolded into the current curriculum teaching.

Long term plans provided are a guise as to where earning should be if engagement and attendance were as they should be. Some classes are slightly behind in their progress through courses.