Raedwald Trust KS4 Science Curriculum Policy

When setting out the science curriculum, our objectives are to encourage and support students to enjoy science as a subject, to take an interest in the topics they are learning and to be inspired to seek out scientific opportunities in their own time. Curiosity is a wonderful characteristic to keep hold of and we hope our students manage to do this whilst with us and into the wider world. After following our science curriculum, students will be well prepared to continue to study science for further education and pursue a science-based career.

Once students are settled with us, our main aim is for them to progress well in Science and achieve a qualification/s that can be used for further education or the workplace. At KS4, this is the penultimate aim and so students will be entered for either an Entry Level Certificate in Science or for GCSEs in Biology, Chemistry and/or Physics. We aspire for students to gain a qualification in more than one science to give them the best opportunities. The programme of study then derives from the qualification specification, which is modified to suit each individual student's interests and abilities. Alongside this, we have STEAM groups, fun practical science and science events. This provides a broad and balanced curriculum, combined with aiming for exam success

Once on a pathway, the curriculum is sequentially organised; working through the topics in order building from tiny cells up to giant ecosystems. This helps students to build up their knowledge and understanding as the many topics build on top of each other and are linked to other topics that are taught further on. Within a topic, the scientific vocabulary is repeated and used in a variety of activities to aid retention and understanding. At the beginning of each lesson, the previous lesson's learning is re-capped and checked. Our science curriculum also has a concentric nature as many topics are taught at KS3 and repeated with more detail at KS4. If a student attended school quite regularly at KS3 or, indeed, joined the trust at KS3, they will be building up their knowledge before joining the pathways outlined in this KS4 policy.

The key areas in our Science curriculum are;

- Developing scientific knowledge and conceptual understanding.
- Developing an understanding of the nature, processes and methods of science, through different types of scientific enquiry that help them to answer scientific questions about the world around them.
- Learning to apply observational, practical, modelling, enquiry, problem-solving and mathematical skills, both in the laboratory, in the field and in other environments
- Developing students' ability to evaluate claims based on science through critical analysis of the methodology, evidence available and source of information.

Content and sequencing

Our fundamental curriculum for KS4 science is to offer all three sciences and make sure every student has access to learning in the three sciences through their science lessons, STEAM groups, science week activities and regular fun practical activities. The core qualifications offered at The Raedwald Trust for science are either an AQA Entry Level Certificate in science or hopefully more than one single GCSE (AQA GCSE Biology, Chemistry or Physics). Single science GCSEs are taken because all three sciences can no longer be taken as a single GCSE qualification. With the gaps in

knowledge that students arrive to our Trust with, due to behavioural, SEMH, Health or undiagnosed SEND difficulties, the priority is to provide the most suitable science qualifications to re-engage and inspire students or to support students to not suffer from a gap in knowledge when they are not attending their home school (if they are at our hospital school). A single GCSE has historically had the best outcomes for students' confidence, well-being and engagement in science at The Raedwald Trust, along with providing the qualification most students require for their next steps. We aspire to students completing extra single GCSEs if they are committed to extra lessons and exams in science. This happens particularly if a student has the hope to pursue science into Further Education or employment and/or a keen interest in science. AQA Biology GCSE is taught to most students as the subject content is more relevant and relatable to students and, therefore, increases engagement and understanding. If a student has a preference for Physics or Chemistry, then they will be taught and entered for their preference instead.

The pathways below are based on a full time offer. On a temporary basis, some students need to be on a reduced timetable to re-integrate them into a school setting. Such students receive a bespoke pathway to make sure they still have access to as much science education as possible and can still gain a qualification.

Teaching is extremely bespoke across the Trust. Lessons are always in smaller groups than in mainstream settings, with a more relaxed environment and tailored to each individual's interests and abilities. This further supports the students to re-engage with the subject and be able to close the attainment gaps they have suffered before arriving with us.

Overview of units of study across KS4

Below details the National Curriculum Units of Study for KS4 Science. These are then tailored to the relevant qualification/s, depending on which one/s each student is taking. Please refer to the Trust Programmes of Study for each qualification in more detail.

KS4 National Curriculum Overview - Biology

	Topics to be covered
Year 10	Cell Biology Transport Systems Health, Disease and the development of medicines
Year 11	Photosynthesis Co-ordination and control Evolution, Inheritance and Variation Ecosystems
Throughout the whole course of study – Working Scientifically	The development of scientific thinking Experimental skills and strategies Analysis and evaluation Vocabulary units, symbols and nomenclature

KS4 National Curriculum Overview – Chemistry

	Topics to be covered
Year 10	Atom structure and the Periodic Table Structure, bonding and the properties of matter Chemical changes Energy changes in Chemistry

Year 11	Rate and extent of chemical change Chemical analysis Chemical and allied industries Earth and atmospheric science
Throughout the whole course of study – Working Scientifically	The development of scientific thinking Experimental skills and strategies Analysis and Evaluation Vocabulary units, symbols and nomenclature

KS4 National Curriculum Overview - Physics

	Topics to be covered
Year 10	Energy Forces Forces and motion Wave motion
Year 11	Electricity Magnetism and electromagnetism The structure of matter Atomic structure Space Physics
Throughout the whole course of study – Working Scientifically	The development of scientific thinking Experimental skills and strategies Analysis and Evaluation Vocabulary units, symbols and nomenclature

Assessment and outcomes

The curriculum is what we teach pupils and the assessment outcomes are how they show us that they have learnt this.

It is important that we assess students to identify what has been learnt, the skills that have been mastered and what needs to improve further. Most importantly, it guides and supports students with the next steps in their learning.

The primary aim when meeting students is to re-engage and raise aspirations whilst also completing baseline assessments to make sure each student is put onto the most appropriate pathway.

Baseline assessments are in two parts;

1. Moderated written assessments created from Entry Level Certificate and GCSE past papers
2. Practical assessment to assess students' observational, problem solving and practical skills.

Throughout the course, two forms of assessment are used to track progress and inform practice;

Macro assessments take place at the end of a unit of learning, in the form of a written test/assignment, a selection of past paper questions or a practical assignment. The assessments are awarded an Entry Level Certificate or GCSE level to track progress from the baseline.

Ongoing (micro) assessments take place every lesson either through immediate verbal feedback, written feedback on students' work and through self-reflection. Students' acquisition and understanding of new information and retention in the longer term are key foci when completing these assessments.

Both of the above are used to regularly inform the practice of Science teachers and support staff across the Trust. Different learning styles, adapted resources, the use of more links to students' lives and a plethora of other teaching techniques can be used to aid student's progress when any problems are quickly identified due to the robust assessment process detailed above.

Science and the wider curriculum

The Raedwald Trust Science Curriculum supports the teaching of British Values, SMSC and cultural capital along with supporting a Trust-Wide priority to raise the profile of reading skills and linking to careers and the understanding of life beyond education.

British Values and SMSC

The Science Curriculum at The Raedwald Trust is packed with strands of SMSC and British Values, here are some examples;

- Role modelling respect and tolerance between staff and students.
- Clear rules for lab practical's and classroom behaviour.
- Listening to others' opinions.
- Learning to be responsible for our own health.
- Learning about vaccinations and how they protect the vulnerable.
- Discussing the barriers to exercise and how people with existing health conditions can access exercise.
- Researching the organ donation procedure in the UK and the organ donor register.
- Learning to be environmentally aware and responsible.
- Discussing whether medicinal drugs or cosmetic products should be tested on animals.
- Fostering a pride for all the scientific advancements, discoveries or breakthroughs that Britain is responsible for but also respect for amazing work in countries around the world.

All of the above is also factored into the **Unicef Rights Respecting Schools Programme** being run across the Trust, aimed at all staff members and students knowing their rights and how to respect the rights of others.

Sometimes, a natural conflict between Science and spirituality can occur and is dealt with sensitively with the neutral stance that we need to respect all others' views.

Cultural Capital

As a Trust, we feel it is extremely important to raise our students' cultural capital in order to help them overcome any social disadvantage or adversity that they come up against. This will also widen their horizons and raise their aspirations to have a bright and positive future. Within the science curriculum, there are ample opportunities to do this, such as going on school trips to the Zoo, the Science Museum in London, BT Martlesham and the Energy from Waste site. Also, in lessons, continuous links to the wider world, discussion every lesson on how the science topic can be related to the students' lives and the use of a wide range of information sources.

Reading skills

Reading skills are consistently used and improved within the science curriculum as detailed below;

- Researching online and reading a variety of information sources.
- New scientific vocabulary and definitions used repeatedly within lessons, questions asked about them and activities using them to aid retention.
- Reading and comprehension of practice exam questions and written exam style work.
- Reading topic fact sheets to answer questions.
- Reading scientific magazines and comics.
- Scan games, finding key information in a text.
- Word Walls for each year group, rotated to display all the current terminology for the topic being taught.

Links to Careers

Every topic within the science curriculum can be linked to careers and this is done in a variety of ways, such as watching documentaries, discussing job roles, online research, reading magazines and newspaper articles and school trips as mentioned in the Cultural Capital section above. Some examples of careers that can be linked in Biology alone are below, but there are many, many more!

- Health visitors
- Dieticians
- Surgeons and people who assist surgeons
- Genetic engineers
- Lab technicians
- Nurses
- GPs
- Consultants
- Paramedics
- Forensic Science
- Pharmacists
- Sports Coaches

Strong links can also be made to careers in the Trust-wide STEAM groups, that take the love of learning STEAM subjects and harness it into completing a wide variety of projects with aspirational outcomes.