Stanborough

Est. Grow and Succeed 1939

Curriculum Intent and vision for Science

Our vision for the Science Curriculum at Stanborough is:

- **To encourage curiosity about science and the natural world.**
- **To support students to obtain knowledge, understanding and skills to solve problems and make informed decisions in scientific contexts.**
- **To encourage students to advance in scientific inquiry, to plan and carry out practical tasks using a variety of different apparatus and draw relevant conclusions.**
- **To present scientific ideas, arguments and practical experiences accurately in a variety of ways.**
- **To think analytically, critically and creatively to solve problems, judge arguments and make decisions in scientific and other contexts**

Key Stage 3

What is your curriculum intent for Key Stage 3?

- To strengthen student confidence in applying their knowledge to new situations and being sufficiently adept in transferring of those skills that adequately reflects their understanding of subject and topic content.
- To deliver a three-year KS3 science course that that prepares students for KS4, but also enthuses and motivates them to want to study science further.
- Introduce and develop the Big Ideas, working scientifically – practical skills and the scientific method, scientific vocabulary and writing

What have students been taught at Key Stage 2 to prepare them for Key Stage 3?

Often this is extremely variable, depending on the primary setting students transfer from to secondary KS3 science. Students often do not have the practical skills, through a lack exposure to laboratory work. They do have some familiarity with some concepts in science, such as Photosynthesis.

How are any gaps in student knowledge addressed to enable them to access the curriculum at Key Stage 3?

- A focus on practical work (science experiments) to build interest in science and a strengthening of Math and English skills to help students make sense of the concepts in science that they are learning. Particularly in drawing conclusion and learning how to evaluate their work. KS3 science emphasises these skills by design of a curriculum that creates multiple opportunities to practice these science skills. JL
- Using the new skills booklet to address basic skills which are not always embedded at KS2 at the start of year 7. Using "what do you know" quizzes at the start of each topic to highlight gaps in student knowledge.

What do students cover in Key Stage 3? When do they study it?

Year 7	Year 8	Year 9
Laboratory safety/Skills Cells Structure & function of body systems Health and lifestyle Particles & their behaviour Elements, atoms & compounds Reactions Acids and Alkalis Physics topics - Forces Space The Earth Separation techniques	Ecosystems Adaptation & inheritance responses to it The Periodic table Metals & acids Reproduction Motion and pressure Sound Light -Electricity and magnetism.	New technology Turning points in physics Detection Detection in chemistry Energy New technology Turning points in chemistry New technology Disease & body

Why do they study it in that order?

- Topics taught in year 7, Cells, Particles and Forces are the building blocks in each discipline serve provide students with sufficient knowledge and depth of understanding to challenge concepts learned later in KS3 (year 8). The content has a lot of the experimental work that students enjoy and consequently enthuse about.
- Lab safety must come first on H & S grounds. Then the skills booklet as the skills are used throughout all the other topics. Easier topics are covered in year 7 and the Electricity and magnetism topic is left until the end of year 8.

Does the Key Stage 3 coverage reflect the content in the national curriculum?

Completely.

How do you ensure students embed knowledge? What do you revisit? When do you revisit it?

Students are challenged with regular assessment and feedback through homework, testing and project work. Additionally, the teaching has embedded skills areas, such as answering 6-mark questions. These are assessed and students have the expectation on them to respond to the feedback provided.

How do your curriculum choices contribute to the student's cultural capital?

History, development and use of scientific technology:
Biology: microscope – Hooke, van Leeuwenhoek.
Physics: Hubble telescope, Voyager 1&2; Space exploration – astronaut stories, diversity (e.g. Helen Sharman, Hidden Figures)
Radioactivity: discoveries, dangers – Curie, Radium girls
Chemistry: Mendeleev's Periodic Table; International collaboration.
application of laboratory techniques in forensic investigations
Nanotechnology: e.g. gold particles - stained glass to Antibody testing

- Scientific literacy – using the language of science
- Relevance to everyday life
- Range of jobs using scientific skills – transferability
- Links to science in the media
- Out of school science events
- Local people/organisations who use science.

Key Stage 4

What is your curriculum intent for Key Stage 4?

- To make sure students learn subject content relevant to their GCSE exams and community life. To strengthen student confidence in applying their knowledge to exam questions and new situations and being sufficiently adept in transferring of those skills that adequately reflects their understanding of subject and topic content.
- The Key Stage 4 Science curriculum has been structured for the purpose of reinforcing and building upon vocabulary, concepts and visual models studied in the Key Stage 3 Science Curriculum.

How does Key Stage 3 prepare students for Key Stage 4?

KS3 covers similar topics to KS4 allowing students to revisit the very basic ideas. KS4 builds on the ideas and topics from KS3 adding detail or greater depth as required for GCSE and provide greater understanding in preparation for KS5.

What do students cover in Key Stage 4? When do they study it? " 2 year KS4?

Year 9	Year 10	Year 11
Detection	Electrolysis	Ecosystems
New Technology	Energy Changes	Biodiversity
Cells	Rates and Equilibrium	Human Impact on Environment
Cell Division	Crude Oil	Chemical Analysis
Organisation in plants and animals	Disease Prevention	Atmosphere
Diseases	Photosynthesis	Earths Resources
Atoms	Respiration	Light
Periodic Table	Nervous System	Electromagnetism
Structure and Bonding	Hormones	Space
Chemical Calculations	Homeostasis	
Chemical Changes	Reproduction	
Energy	Variation	
Energy transfer	Evolution	
Energy Resources	Genetics	
Electricity	Molecules and Matter	
	Radioactivity	
	Forces	
	Motion	
	Pressure	

	Waves	

Why do they study it in that order?

Students need to start with topics covering basic understanding, eg atoms in chemistry, cells in biology and energy in physics are fundamental ideas that work through the rest of the topics. Then they move onto the more specialised topics that build on the ideas from the basic topics.

Beginning after Christmas holiday in year 9, the students are taught the first three chapters in each of the three main science fields (Biology 1-3, Chemistry 1-3 and Physics 1-3). In these nine chapters, students are re-exposed to many basic concepts that they had experienced in KS3. However, the rigour and depth of the material runs deeper than in prior years.

For example, in our Physics course, students are not only taught the definition and conservation of energy, but they are taught the methods whereby energy is transferred within and across a system. Moving beyond the conceptual nature of this subject, students are also taught the Specific Heat Capacity equation and how to apply it using the correct units and mathematical skills.

Given the appropriate information, students can determine how much energy is transferred in a system, as well as what type of temperature change will be exhibited by the objects in question. Students can also align their conceptual understanding of specific heat capacity with determining whether the object in question is likely to be used as an insulator or a conductor within a given system. This content knowledge will come relevant to the students when they study Electricity in the Home during year 10.

In our Chemistry course, year 9 students begin their studies by recapping the three subatomic particles and identifying their natural locations in an atomic diagram. Extending beyond these basic KS3 concepts, student move onto identifying how electronic shells are filled, one energy level at a time. Students are exposed to the concept of the valence shell and its relevance as it pertains to the number of potential chemical bonds possible for a given element.

Students are also expected the write the electronic configuration of most elements. They must observe a periodic table and determine which elements are likely to react more easily. In this fashion, students build upon their KS3 understanding of chemical reactivity, this time associating it with electronic configuration and periodic trends.

In our Biology course, year 9 students must recall basic cell structure, identify the correct locations for genetic material and protein synthesis. However, students will also learn to observe cell diagrams and determine cell type (prokaryotic vs. eukaryotic). Students will also learn to differentiate between haploid and diploid cells, extending into the intricate mechanisms of meiosis and mitosis. Students will be able to observe meiotic and mitotic diagrams and determine which mechanisms are taking place at any given stage of these processes. They will also determine the ploidy of the daughter cells, which is crucial information that they will require in order to understand future topics, such as human reproduction.

In this fashion, our year 9 curriculum provides fertile ground to help set the stage for future learning. Our Year 10's and year 11's are expected to harken back to the essentials of Energy, Cell Structure and Atomic Structure as they move to more rigourous topics, such as Electromagnetism, Communicable and Non-communicable diseases and Organic Reactions, respectively in the three subjects.

How do you ensure students embed knowledge? What do you revisit? When do you revisit it?

Retrieval practice at start of every lesson based on knowledge organisers

Combination of no-stakes questions and formal assessment in class and for homework:
questioning in class, retrieval practice as starter tasks, Kerboodle online quizzes for homework, Seneca Learning for review and preparation for assessments.

Revisit key concepts at every opportunity:

make clear links between topics within subjects for example

- B1 plant cell structure, B4 plant transport, B8 photosynthesis, later genetics, evolution, adaptations and ecology topics.
- C9 covalent compounds, C10 the reactions in which those compounds participate and C11 the carbon-based covalent structures known as polymers
- P12, parts of a wave, P13 varying wavelengths and frequencies across the Electromagnetic spectrum, P14 differing wavelengths and frequencies between the colours of light

make links across subjects

- atomic structure C1, P7 radioactivity; pollution P3 energy resources, C9 crude oil & fuels, C13 C14 Earth's atmosphere and resources, B18 Effects on ecosystems

How do your curriculum choices contribute to the student's cultural capital?

We structure our curriculum in such a fashion where students develop cultural capital in the embodied and emerging states. In other terms, students are expected to expand and deepen their understanding of Science content by connecting the curriculum topics to phenomena and mechanisms already observed in their lives. Among these connections include topics involving energy efficiency in the home, communicable and non-communicable diseases in the community, genetics as pertains to the students' families and other such topics.

Key Stage 5 Biology

What is your curriculum intent for Key Stage 5?

To encourage students to question and develop themselves beyond simply being able to answer exam questions in the subject. The Biology course uses the principles in science to build student's wider subject knowledge and understanding thereby helping them create the appropriate links across the discipline to better articulate their understanding.

Students find that the course offers them an insight to professions open to them as careers as well providing other opportunities to develop their interest for the subject. This is incorporated into the course through trips/visits and collaborative work with external institutions such as GlaxoSmithKline (GSK) and other schools within the consortium.

Students' deepen their knowledge and understanding of the core skill areas (Math & English), but focus is also paid to planning, analytical and evaluative skills. These are the set of skills Stanborough school's scientist began imparting to these students at the start of their KS3 science experience. It is the intention within the subject to restore the Royal Society of Biology Olympiad to the curriculum, where recognition of the students' ability is awarded via certification. This greatly enhances student's confidence and desire to succeed in biology.

Our curriculum in Biology forms a backbone to our Stanborough Principles. Examples of how our curriculum supports the Stanborough Principles are:

Mutual respect - Enthusiastic and motivated teachers give up their own time to go above and beyond for students. Teachers build positive relationships with students that last beyond their time at school. Enquiring and motivated students attend sessions provided by teachers to prepare for external Biology competitions. The department, including the technical support staff, is co-operative and works as a team with discussions every day sharing ideas and offering each other help and advice.
High expectations – Our students are expected to spend at least one hour a day outside of lessons studying Biology, adding to lesson notes, completing wider research and reading. We are setting a weekly homework task that consolidates learning and requires students to apply and practice prior learning. Folders are checked on a weekly basis to ensure students are developing the organisational skills required for working in the scientific field.
Quality learning - As a knowledge engaged curriculum, we believe that knowledge underpins and enables the application of skills; both are entwined. As a department we define the powerful knowledge our students need and help them recall it by providing detailed knowledge organisers for each of the topics we teach. Teachers ask questions to check for students' understanding. Models and scaffolds are provided to obtain a high success rate during independent practice that follows. Monthly reviews are carried out to check for understanding and to help students retain prior knowledge.
Success for all - A resource bank is accessible throughout the academic year and features tutorials, accessible online, knowledge organisers, exercises and links to additional resource sites. All these resources allow students to review content or work more independently.

How does Key Stage 4 prepare students for Key Stage 5?

Students will have received teaching in a wide range of topics that are revisited at A level but in greater depth. Mathematical skills mastered at GCSE are used to process data that is analysed and evaluated. The practical

elements of the GCSE, referred to as required practical's, are again met at A level. They are now referred to as Practical Activity Groups (PAG's) and bring significantly greater challenge than the students encountered at GCSE. Students at GCSE receive talks and literature about the course as well bridging material designed to extend students learning and prepare them for the type of work, they are likely to encounter as an A level Biologist.

What do students cover in Key Stage 5? When do they study it?

Year 12	Year 13
Foundations in Biology Exchange & Transport Biodiversity and Evolution	Communications, homeostasis & energy Genetics and ecosystems

Why do they study it in that order?

The units of study at AS level provide a wide and varied subject content which provides a broad overview of Biological sciences. The second year of the programme requires that the understanding of the underpinning knowledge gained at AS level is applied and built on as the subject content could not be tackled otherwise. There is a substantial emphasis on synoptic application of knowledge within the year 13 subject content in Biology.

How do you ensure students embed knowledge? What do you revisit? When do you revisit it?

Students are given the opportunity each lesson to recap, through quizzes or written exercises, such as past exam questions. Students are verbally questioned and asked to recall knowledge from previous topics. Students are set work that requires recall of the subject material learned at GCSE and in the Foundations in Biology. Additionally, students receive assessments and project work at the end of each topic completed and during the topic that requires synoptic application of knowledge, encouraging the students to become familiar with the repetitive elements of the A level Biology subject material.

How do your curriculum choices contribute to the student's cultural capital?

Students are actively stretched and challenged. Following key assessments, the students receive one-to-one interviews with their teachers to challenge misconceptions and create the strategies for improvements. In addition, the subject material is often delivered providing practical illustrations of applications of a topic. Students are encouraged to use Unifrog and to plan how A level Biology can be used to aid planning for a career in science. Current affairs with a science emphasis are discussed in lessons and links to the scientific content of the course are made, thereby inspiring students to seek more knowledge and exposing students to the importance of science in their lives. The scientific magazine, Biological Science Review, is given to the students and the articles which are designed to capture students interest and help them see the practical applications of the material they learn about in Biology.

How do you prepare students for learning beyond Key Stage 5?

Encouraging wider reading
university

Students receive reading material (Biological Sciences Review) and discussion about what career they want to pursue post A level. Training for university interviews is given. Students are actively encouraged to attend many of the talks/seminars given by working professionals in specialised fields to help create aspiration and inform decision making. Unifrog is also advertised and personalised support toward preparation for each student's chosen post sixth form career are provided by the Biology teachers.

Key Stage 5 Chemistry

What is your curriculum intent for Key Stage 5?

We aim to create the very best scientists and have students appreciate that chemistry is fundamental to our world and touches almost every aspect of our existence. We challenge students to think, act and speak like those working in a scientific field would. We do this by using effective questioning techniques in each lesson to push our students to think beyond their first response.

Students are expected to carry out practical work in each topic, where it is appropriate, in a responsible manner and record data effectively in order to be able to analyse it and draw conclusions from it. During practical work,

students are expected to select the most appropriate apparatus and justify the choices that they make, thus demonstrating that they are thinking through a problem rather than simply following instructions. Students are expected to consider their own and others' safety and independently carry out risk assessments.

Keywords and key facts are vital in Chemistry and are provided on each topic knowledge organiser. Teachers use these words during lessons and expect verbal responses from students to include appropriate scientific language.

Our curriculum at Stanborough School goes far beyond what is taught in lessons, for whilst we want students to achieve the very best examination results possible, we believe the curriculum should go beyond what is examinable. As a department we put lessons into real-life context. We provide after school sessions to prepare Year 12 students for the Cambridge Chemistry Challenge competition and, once they are in Year 13, for the RSC Chemistry Olympiad. We provide personalised mock interviews for those applying to universities where interviews play an important role in the application process. We encourage wider reading and incorporate infographics, articles and book extracts into lessons.

Our curriculum in Chemistry forms a backbone to our Stanborough Principles. Examples of how our curriculum supports the Stanborough Principles are:

Mutual respect - Enthusiastic and motivated teachers give up their own time to go above and beyond for students. Teachers build positive relationships with students that last beyond their time at school. Enquiring and motivated students attend sessions provided by teachers to prepare for external Chemistry competitions. The department, including the technical support staff, is co-operative and works as a team with discussions every day sharing ideas and offering each other help and advice.
High expectations – Our students are expected to spend at least one hour a day outside of lessons studying Chemistry, adding to lesson notes, completing wider research and reading. We are setting a weekly homework task that consolidates learning and requires students to apply and practice prior learning. Folders are checked on a weekly basis to ensure students are developing the organisational skills required for working in the scientific field.
Quality learning - As a knowledge engaged curriculum, we believe that knowledge underpins and enables the application of skills; both are entwined. As a department we define the powerful knowledge our students need and help them recall it by providing detailed knowledge organisers for each of the topics we teach. Lessons are built on Rosenshine's Principles: Each lesson begins with a quick quiz which helps the students to recall key knowledge from previous topics as well as from the previous lesson. New material is put in context and presented in small steps. Teachers ask questions to check for students' understanding. Models and scaffolds are provided to obtain a high success rate during independent practice that follows. Monthly reviews are carried out to check for understanding and help students retain prior knowledge.
Success for all - Lessons are pre-recorded and shared with students. A resource bank is accessible throughout the academic year and features lesson videos, knowledge organisers, exercises and links to additional resource sites. All of these resources allow students to review content or work more independently.

How does Key Stage 4 prepare students for Key Stage 5?

Schemes of work at KS4 are focused on embedding challenge, metacognition, memory techniques and literacy into our departmental curriculum. Alongside our schemes of work, we have developed knowledge organisers at KS4. This is enabling us to define the core knowledge our students need to master. In Chemistry we also mirror working the way we expect student to work at A level by implementing a variety of teaching approaches and tasks such as practical work, weekly quizzes, collaborative working and teaching concepts in context. Greater emphasis is placed on fundamental concepts such as moles, balancing equations, ionic equations, structure and bonding, energy changes, equilibria, testing for ions, organic chemistry. Attention is paid to students using correct terminology to describe these concepts.
Between KS4 and KS5 question level analyses are used to determine the focus of transition work set.

What do students cover in Key Stage 5? When do they study it?

Year 12	Year 13
Stoichiometry Atomic structure Groups 2 and 7 and redox reactions Period 3 elements Energetics and entropy Equilibria Rate of reaction Alkanes, alkenes, alcohols, haloalkanes, Organic analysis	Isomerism Carbonyl groups Amines, amino acids, polymers, DNA Spectroscopy Transition elements

Why do they study it in that order?

Further rationale behind our curriculum design includes choosing to teach certain topics in an order which provides students with the opportunity to practice their skills alongside the knowledge they are gaining. Topics have been chosen to interleave practical/skills-based topics with more theoretical ones where possible. Students begin with the stoichiometry topic as calculations feature in every aspect of chemistry. This is then followed by the structure of the atom and electron configurations which are fundamental to understanding why and how chemical reactions happen and what types of bonds form between atoms. We then move on to specific periods and groups to look at concrete bonding examples. From the specific we move on to the more abstract: how is bonding linked to energy changes in chemical reactions. Whether a chemical reaction is feasible depends on the overall enthalpy and entropy change but also on the activation energy. For this reason, we then move on to study rates of reactions. As this includes higher mathematical skills, the topic is taught in the second half of year 12. In industry, whether a chemical reaction is chosen as the most appropriate synthesis route also depends on the equilibrium constant and for this reason, we conclude physical chemistry with equilibrium constants, acids, bases and buffers. We teach organic chemistry as one complete unit building on each concept and deepening students' knowledge and understanding. Finally, we round off with Transition metals to complete Inorganic chemistry drawing on students' understanding of both physical and organic chemistry. To ensure that students do not forget other aspects of the course, weekly interleaved knowledge tests, weekly interleaved homework tasks and monthly interleaved assessments take place to ensure students are continually reviewing all concepts taught to date.

How do you ensure students embed knowledge? What do you revisit? When do you revisit it?

As a knowledge engaged curriculum we believe that knowledge underpins and enables the application of skills; both are entwined. As a department we define the powerful knowledge our students need and help them recall it by providing detailed knowledge organisers for each of the topics we teach. Lessons are built on Rosenshine's Principles: Each lesson begins with a quick quiz which helps the students to recall key knowledge from previous topics as well as from the previous lesson. New material is put in context and presented in small steps. Teachers ask questions to check for students' understanding. Models and scaffolds are provided to obtain a high success rate during independent practice that follows. Monthly reviews are carried out to check for understanding and help students retain prior knowledge.

Lessons are pre-recorded and shared with students. A resource bank is accessible throughout the academic year and features lesson videos, knowledge organisers, exercises and links to additional resource sites. All of these resources allow students to review content or work more independently.

How do your curriculum choices contribute to the student's cultural capital?

We build the Cultural Capital of our students by putting topics into context and providing examples of the implications of the chemical changes we, as a human race, are causing in our world. Examples include how equilibria and feasibility of reactions link to global warming, the overuse of batteries and plastics, the fact that some raw materials are running out and that techniques for crude oil extraction have an impact on the environment. We teach a topic about the synthesis (ancient and modern) of Aspirin and other drugs which leads to a discussion on the overuse of drugs versus the need to develop new drugs to fight unknown diseases. During the rate of reaction topic, we discuss the accuracy of forensic television programmes and the determination of time of death. When studying Period 3 elements we teach about the use of phosphorus bombs during the war and how phosphorus lead to 'phossy jaw' in match-stick factory girls. We discuss why radium deposits in the bones and lead to bone cancer in radium dial factories at the beginning of the 20th century. During the transition metal topic, we discuss the history of paint and art restauration work. Chemistry Review articles, extracts from popular science fiction and science documentaries are incorporated into the curriculum.

How do you prepare students for learning beyond Key Stage 5?

Students are encouraged to be curious, to ask questions and to have high expectations of themselves. We teach students study habits that they can apply beyond KS5. We treat each student as an individual, and recognise that we have a responsibility to develop them not only academically but socially and morally. Our curriculum and high expectations will allow students to become compassionate, resilient and committed individuals. We will measure this through their general attitudes, interactions and behaviours in their learning environment.

We introduce students to a variety of related careers through our displays, the use of Unifrog and career talks held in the school hall.

Students are also encouraged to apply for taster courses during the summer holidays between year 12 and 13.

Key Stage 5 Physics

What is your curriculum intent for Key Stage 5?

The curriculum intent of the Physics course is to inspire students to develop an interest in and enthusiasm for the subject, including developing an interest in further study and careers associated with Physics. The course will prepare students to progress into further education, to follow courses in physics, engineering, one of the other sciences or related subjects, or to enter employment where a knowledge of physics would be useful. It will encourage learners to:

• develop essential knowledge and understanding of different areas of the subject and how they relate to each other
• develop and demonstrate a deep appreciation of the skills, knowledge and understanding of scientific methods
• develop competence and confidence in a variety of practical, mathematical and problem solving skills
• develop their interest in and enthusiasm for the subject, including developing an interest in further study and careers associated with the subject
• understand how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society (as exemplified in 'How Science Works' (HSW)).

The OCR Physics syllabus A course that we use has an excellent balance of core and applied physics like Astrophysics and Medical physics. The practical tracker is a very good way to build a record for the practical endorsement in Physics.

How does Key Stage 4 prepare students for Key Stage 5?

The new AQA Physics course is an excellent preparation for A-level. It includes progression in the subject content and consistency in the exam questions, so that the students have the best preparation for A-level. The level of material has increased, some previously A-level content is now in the GCSE syllabus. The exam style questions are much closer to those at A-level particularly at higher tier. GCSE physics topics feed directly into those at KS5, with increased use of equations including those formerly only taught at A-level.

What do students cover in Key Stage 5? When do they study it?

Year 12	Year 13
Physics - • Development of practical skills, foundations of physics, Forces and motion (Autumn term) • Electrons, waves, and photons (Spring term) Thermal physics, circular motion, oscillations (Summer term)	Physics - • Gravitational fields, astrophysics and cosmology, nuclear and particle physics (Autumn term) • Capacitors, electric fields, electromagnetism (spring term) • Revision program (spring/summer term)

Why do they study it in that order?

Year 12- Practical skills and foundations must be taught first as they are needed throughout the other the course. Forces and motion are easier topics and link directly to GCSE. Electricity, waves and photons are more difficult topics so are left until students have had time to adjust to the standard required at A-level. Year 13 – Topics become more difficult and more applied so must be left until the students have developed their physics skills sufficiently.

How do you ensure students embed knowledge? What do you revisit? When do you revisit it?

To embed students' knowledge and allow for revisiting of content:

- The regular use of exam style questions in class
- Regular use of A-level questions for homework
- Practical work to support and enhance theoretical topics
- Regular assessment tasks
- The research report on an area in the syllabus
- Revision for mock exams
- Mock exams and feedback
- The extended revision program in year 13

How do your curriculum choices contribute to the student's cultural capital?

It is not the choice of physics course that increases a student's cultural capital, but how the physics curriculum is delivered. We try and increase student's cultural capital by focusing on the following points throughout the course:

- **Physics literacy:** a young person's knowledge and understanding about physics and how physics works. This also includes their confidence in feeling that they know about physics.
- **Dispositions:** this refers to the extent to which a young person sees physics as relevant to everyday life (for instance, the view that physics is 'everywhere').
- **Knowledge about the transferability of physics:** understanding the utility and broad application of physics qualifications, knowledge and skills used in physics (e.g. that these can lead to a wide range of jobs beyond, not just in, physics fields).
- **Physics media consumption:** the extent to which a person, for example, watches physics-related television, reads physics related books, magazines and engages with physics-related internet content
- **Participation in out-of-school physics learning contexts:** how often a young person participates in informal physics learning contexts, such as science museums, science clubs, fairs, trips, lectures etc.
- **Family physics skills, knowledge, and qualifications:** the extent to which a young person's family have physics-related skills, qualifications, jobs and interests which can be discussed in lessons at appropriate times
- **Knowing people in physics-related roles:** the people a young person knows (in a meaningful way) in their family, friends, peer, and community circles who work in physics-related roles.
- **Talking about physics in everyday life:** how often a young person talks about physics out of school with key people in their lives (e.g. friends, siblings, parents, neighbours, community members) and the extent to which a young person is encouraged to continue with physics by key people in their lives.

How do you prepare students for learning beyond Key Stage 5?

The A-level physics course is delivered with an emphasis on thinking skills and problem solving, encouraging students to question and not just accept explanations. Students are encouraged to

- Be self-motivated
- Be prepared to take the initiative
- Be an independent learner
- Have a genuine interest in the subject
- Reading articles in newspapers, magazines or on the internet which contain physics
- Reading magazines like the New Scientist, Physics Review, Physics World etc…
- Reading books/lectures by physicists like Albert Einstein, Stephen Hawking, Richard Feynman, Robert Gilmore, Carlo Rovelli, Steven Weinberg, Tasneem Zehra, Lisa Randall
- Visiting websites that have general knowledge on Physics in everyday life situations like www.iop.org, www.physicsweb.org, www.physics.org,