SCIENCE 2024-25

It is important to view knowledge as sort of a semantic tree – make sure you understand the fundamental principles, i.e. the trunk and big branches, before you get into the leaves/details or there is nothing for them to hang on to.' Elon Musk

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Great are the works of the Lord, studied by all who delight in them." – Psalm 111

Intent statement

Our vision is to foster a deep, long-lasting understanding of scientific principles and their applications in the world. Through a spiralling curriculum, we aim to build a foundation of knowledge that evolves and strengthens as students' progress, promoting curiosity, critical thinking, and a lifelong passion for science.
Objectives:

- Concept Mastery: Ensure students achieve a thorough understanding of core scientific concepts by revisiting and expanding on them over time.
- Skill Development: Develop scientific inquiry and problem-solving skills progressively, preparing students for higher-level thinking and applications.
- Interdisciplinary Connections: Highlight the interconnectedness of scientific disciplines, demonstrating how concepts in biology, chemistry, and physics overlap and influence each other.
- Real-World Application: Encourage students to apply scientific knowledge to real-world problems, fostering a sense of relevance and purpose in their learning.
- Equity and Inclusion: Provide a curriculum that is accessible and engaging for all students, recognizing and valuing diverse backgrounds and perspectives.

Research the curriculum is based on

Our Science spiralling curriculum is an educational approach where key concepts are revisited and built upon over time at increasing levels of complexity. This method contrasts with traditional curricula that cover topics sequentially without planned revisits. Research into spiralling curricula suggests several benefits, particularly in enhancing understanding and retention of material. Here are some key points from research on spiralling curricula:

Key Principles of a Spiralling Curriculum

Reinforcement and Retention: Repeatedly revisiting topics helps reinforce learning and aids long-term retention. Each revisit allows students to deepen their understanding and integrate new knowledge with prior learning.

Increasing Complexity: With each revisit, the complexity and depth of the material increase, which aligns with students' growing cognitive abilities. This gradual increase in difficulty helps prevent students from becoming overwhelmed.

Building Connections: A spiralling curriculum highlights the interconnectedness of concepts across different subjects and over time, fostering a more holistic understanding.

Benefits of a Spiralling Curriculum

- Enhanced Understanding: By revisiting concepts regularly, students can develop a deeper and more comprehensive understanding. Bruner (1960), a key proponent of the spiralling curriculum, argued that returning to topics allows students to refine and expand their understanding.

- Improved Retention: Studies show that spaced repetition, a core component of spiralling curricula, significantly improves memory retention. This is supported by cognitive science research on the spacing effect (Ebbinghaus, 1885; Cepeda et al., 2006).

- Greater Student Engagement: Revisiting topics in varied contexts can keep the material fresh and engaging for students. This approach also allows for differentiated instruction, as students can access content at different levels of complexity.

- Better Skill Development: A spiralling approach helps in the incremental development of skills, particularly in subjects like mathematics and science. Each iteration allows students to apply and hone skills in increasingly complex scenarios.

A study by Harlen and Holroyd (1997) highlighted the effectiveness of a spiralling curriculum in science education. They found that students who experienced a spiralling curriculum had a more integrated understanding of scientific concepts and were better able to apply their knowledge to new situations.

Powerful knowledge

Powerful knowledge refers to the essential knowledge and cultural capital that students may not typically acquire from everyday life. It requires expert teaching and explicit content delivery to prepare students for adulthood and life beyond education. It introduces them to the best that has been thought and said and will help engender an appreciation of human creativity and achievement. Students acquire bespoke and targeted powerful knowledge based on their pathway or personalised curriculum. Below is the powerful knowledge needed at St Cuthberts,

Physics	Chemistry	Biology
Waves To include the definitions of waves, wavelength, frequency and amplitude and mode of transmissions. **Conservation of energy** To include the links to stores, transfers and formula. **Potential difference and current.** To include models and application in electricity. **Force** To include force arrows, motion and Newton's laws. **Atomic Structure (As Chem) Without links to the periodic table** **Particle model (As Chem)** **Manipulation of equations** To include changing the subject and conversion of units. **Earth/Moon/Sun System** The Earth rotates on a tilted axis and orbits the sun. **Magnetism** Opposite poles attracting/likes repelling and use of field lines	**Particle model** To include how particles behave in solids, liquids and gases. How particles behave in chemical and physical changes leading to collision theory. **Atoms, Compounds, Mixtures** To include the difference between these and common examples. **General Equations** To include conservation of mass, balancing equations, Neutralisation, combustion, oxidation, displacement (KS4). **Atomic Structure** To include the location, charge and relative mass of sub-atomic particles in addition to links to the periodic table. **Periodic Table** To include the use of symbols and formula and the varying properties. **Energy in chemical reactions** To include the concepts of exo/endothermic reactions **Opposites attract** Referring to ions.	**Cells and the cell cycle** To include the differences between animal, plant and bacterial cells and examples of specialised cells. **Respiration** All living things need to respire and products and reactants of this. **Photosynthesis** Plants need to photosynthesise to make glucose. **Proteins** To include enzymes in digestion and defence. **DNA** To include the structure of DNA, inheritance, protein synthesis and the importance of mutation in variation. **Particle model and transport** To include how particles move across membranes via osmosis, diffusion and active transport. **Homeostasis** To include how organisms maintain constant internal conditions. **Ecology** To include interactions and interdependence between organisms.

KS3 Curriculum Rationale and Sequencing

Year 7: There are six units of work in year 7, with the opportunity for students to learn equal units of Biology, Chemistry and Physics over the year.

The units are taught in the following order:
1. Introduction to a lab & acids and alkalis (Chemistry)
2. Energy & Electricity (Physics)
3. Cells to systems (Biology)
4. Particle theory (chemistry)
5. Forces and magnetism (Physics)
6. Ecosystems and Feeding Relationships (Biology)

In year 7, students have the opportunity to develop all of the key skills across Biology, Chemistry and Physics for the first time. The units are taught in a way so that students are inspired by Science from the very beginning, with opportunities to develop practical skills right from the offset in unit 1. This is why acids and alkalis is the first unit- it gives lots of opportunities to use a variety of scientific equipment, allowing students to develop confidence working in a lab quickly. In unit 2, students will be able to practice skills they have learnt in unit 1 whilst applying them to theory. For example, developing their practical skills and evaluation skills for more complex practical activities. This links to the work they started with acids and alkalis in unit 1 because they'll rely on their foundation practical skills to use more complex equipment in unit 2. In unit 3, students will study Biology for the first time, so by the end of the first three units, they have had the opportunity to acquire knowledge across all three subject disciplines in science. Students will use their developed practical skills from units 1 and 2 to be introduced to using a microscope for the first time correctly. In unit 4, students revisit a Chemistry topic again, they will use Curriculum Rationale Science 2023-2024 Page 2 of 13 their skills and knowledge from unit 1 and apply them to develop their practical skills in work that is more intricate than before (eg- making accurate measurements to produce a compound- this is theory that they learnt in unit 1). In Unit 5, students will build upon their Physics knowledge with their second Physics unit. They will be developing maths in science skills in this unit, whilst continuing to embed practical skills and learning how to apply their knowledge to new and unfamiliar situations. They will need their understanding of the particle model to consider how forces cause interactions between objects. (For example, they will learn about how magnets work and explore their applications in our world). In unit 6, students study their second Biology unit. Whilst using their knowledge from the first biology unit (unit 3) earlier in the year, they will use their understanding of plants and photosynthesis to learn how energy is transferred through food chains.

Year 8 There are six units of work in year 8, taught in the following order:
1. Chemical Reactions (Chemistry)
2. Organ Systems (Biology) 3
3. Energy (Physics)
4. Health, Fitness and Disease (Biology)
5. Atoms, elements and the periodic table (Chemistry)
6. Earth, Space and Cycles (Physics/Chemistry)

The subject disciplines are taught in this order based on a variety of reasons. Although the sequence in year 7 was Chemistry, Physics, Biology- it is slightly different in year 8. There isn't a reliance on the use of plants and the outdoors so much in 'Organ systems', so it doesn't need to be saved until later in the year (as was the case in year 7). Also, units 1 and 3 are practical heavy subjects, with more theory focus in unit 2, so it lends itself to interleave practical based units with more theory based units to keep students engaged throughout their learning, rather than having all practical work weighted towards one end of the year. Unit 5 is also practical heavy, and so is taught after the second biology unit. Unit 6 again relies on exploring the world around us and so is best taught in the summer term where use of outdoors can be relied on. In year 8, the students will move their learning on from year 7 and the spiral nature of the science curriculum becomes more apparent. There are still 2 units from each subject discipline. In unit 1, students consolidate their knowledge from unit 4 in year 7 and build upon their knowledge of the particle model from year 7 to collect data to further prove the theories they have learnt in year 7 (for example, collecting changing state data). In unit 2, students learn about organ systems in detail, relying on their knowledge of cells from year 7. They will develop explanation skills of how organ systems work, whereas in year 7 they could describe the parts of general animal and plant cells, they will now learn to explain the function of specialised cells within organ systems. In unit 3, students will apply their understanding of energy stores in year 7 to explain different forms of heat transfer (conduction, convection and radiation). They will then use their knowledge of energy transfer from year 7 to learn about energy efficiency. In unit 4, students will use their knowledge and understanding of cells from year 7 to learn about different pathogens and the effects they have on the body. They will further develop their investigation skills of using a microscope from the cells to system unit in year 7 too. In unit 5, students will build upon their chemistry knowledge on elements from year 7 to learn about the periodic table in more detail and to identify patterns and trends from data based on this.

Year 9: In year 9, there are six units. The 4th unit is a scientific skills unit, which assimilates all of the scientific skills that students have built throughout their KS3 studies in Science. Units 5 and 6 are units for extending knowledge and broadening students cultural capital beyond the scope of the KS3 NC, whilst instilling intellectual curiosity and passion for science. The units are:

1. Inheritance, Genetics and evolution (Biology)
2. Reactivity Series (Chemistry)
3. Waves (Physics)
4. Scientific Skills
5. Extending knowledge-Earth’s resources
6. Extending knowledge- Transport in animals and plants (Biology)

In unit 1, students will use their knowledge from the Biology units they have learnt in years 7 and 8 to learn about what is inside the nucleus of our cells and how this information is used for inheritance and genetics. They will also build upon their current Biology knowledge further to explain how adaptations affect organisms in the process of natural selection. In unit 2, students will consolidate and build upon all of their chemistry knowledge from years 7 and 8 on particle theory, atoms, elements and the periodic table. They will start to explain the properties and relationships in certain groups of the periodic table in more detail. They will also build upon their knowledge of properties of materials from year 8 to explain how metals react to form metal compounds. In unit 3, students will consolidate their physics learning from years 7 and 8 to learn about waves. They need their knowledge of energy transfer to explain the properties of different waves and then learn about their applications to every day uses. In unit 4, students will begin to bridge the gap between KS3 and GCSE. They will develop their scientific enquiry skills to support them in preparation for required practical activities that will come in year 10. They will fine tune all of their skills thus far throughout all of the units they have learnt in KS3 to consolidate knowledge of units and measurements and will begin to learn the importance of converting between units in more detail. They will practice measuring values accurately in smaller increments. They will master their skills in analysing data and consider errors in investigations. They will master describing trends in results from graph data and will demonstrate mastery in following and constructing methods for scientific experiments. In unit 5, students will build upon their KS3 knowledge to deepen their understanding of the world around them. They will develop problem solving skills as they use their science knowledge to consider how scientists address challenges on how we might use our resources effectively (for example how we can extract metals efficiently, how we can utilise carbon resources on earth, how scientists can operate sustainably to minimise the use of the Earth’s limited resources and how manufacturing processes are made more efficient in industry). In unit 6, students will deepen their understanding from year 7 and 8 on cells and organ systems to further learn about and master transport systems for multicellular organisms. They will use their knowledge of the function of organ systems (in both plants and animals) to explain and evaluate their effectiveness

Key Stage 4 Rationale and Sequencing

Examination Rational

AQA GCSE Combined Science (Trilogy) is a double GCSE taken by the majority of students. It builds on the Key Stage 3 curriculum and covers the National Curriculum Programme of Study for Science at Key Stage 4. It encourages students to explore, explain, theorise and model in science and develops a critical approach to scientific evidence. At St Cuthberts High School students start studying towards their GCSE Combined Science at the start of Year 10. We have chosen to take this qualification because we feel it delivers the best quality of key concepts for the students. It teaches the subject in three discrete sections and students can understand the differences between Biology, Physics and Chemistry. GCSE Core Science gives you a good grounding in Science. Success in Combined Science can provide access to AS/A2 Science courses, including Applied Science and Psychology. In the long term, if you decide to pursue your scientific studies, it can lead to an almost limitless number of job opportunities. Highly qualified scientists are very much in demand and their skills are required in many jobs.

The exam board is AQA. More details including the full draft specification for GCSE Combined Science (Trilogy) is available at: http://www.aqa.org.uk/subjects/science/gcse

Across KS4 the following content is taught.

In Year 10 students study the following,

Biology Paper 1

- Written exam: 1 hour 15 minutes.
- 70 marks
- 16.7% of GCSE
- Foundation and Higher tiers available
- Units covered:
  - Cell Biology
  - Organisation
  - Infection and response
  - Bioenergetics

Chemistry Paper 1

- Written exam: 1 hour 15 minutes.
- 70 marks
- 16.7% of GCSE
- Foundation and Higher tiers available
- Units covered:
  - Atomic structure and the periodic table
  - Bonding, structure, and the properties of matter
  - Quantitative chemistry
  - Chemical changes
  - Energy changes

Physics Paper 1

- Written exam: 1 hour 15 minutes.
- 70 marks
- 16.7% of GCSE

- Foundation and Higher tiers available
- Units covered:
    - Energy
    - Electricity
    - Particle model of matter
    - Atomic structure

In Year 11 students study the following,

Biology Paper 2

- Written exam: 1 hour 15 minutes.
- 70 marks
- 16.7% of GCSE
- Foundation and Higher tiers available
- Units covered:
    - Homeostasis and response
    - Inheritance, variation and evolution
    - Ecology

Chemistry Paper 2

- Written exam: 1 hour 15 minutes.
- 70 marks
- 16.7% of GCSE
- Foundation and Higher tiers available
- Units covered:
    - The rate and extent of chemical change
    - Organic chemistry
    - Chemical analysis
    - Chemistry of the atmosphere
    - Using resources
    - (Fundamental concepts and principles from whole course)

Physics Paper 2

- Written exam: 1 hour 15 minutes.
- 70 marks
- 16.7% of GCSE
- Foundation and Higher tiers available
- Units covered:
    - Forces
    - Waves
    - Magnetism and electromagnetism
    -

Teaching and Learning

Every teacher needs to improve, not because they are not good enough, but because

they can be even better."

(Professor Dylan Wiliam)

A great teacher is one who is willing to do what it takes to be demonstrably more effective next year than this: it is not about how good you are today, but the journey you are on and the commitment to relentless improvement".

(Professor Rob Coe)

All Curriculum Leaders will:

- Oversee and ensure the creation of high quality, well-sequenced, broad and balanced teaching and learning resources that builds knowledge and skills.
- Ensure all curriculum documentation is available to all teachers to plan teaching and learning
- Sequence teaching and learning in a way that allows students to know more and remember more over time
- Use their budget effectively to resource their curriculum area, providing teachers with the necessary resources for teaching and learning
- Drive improvement in teaching and learning, working with teachers to identify any challenges or barriers
- Timetable their subject to allocate time for students to achieve breadth and depth in teaching and learning
- Understand their subject fully and demonstrate excellence in their own teaching and learning
- Monitor progress in teaching and learning across their curriculum area by systematically reviewing a range of evidence, such as curriculum reviews, outcomes/assessment data, lesson observations, work scrutiny and student voice
- Improve on areas for development identified in their monitoring activities
- Create and communicate clear aims and intentions for teaching and learning in their curriculum area
- Create a culture of teacher development and improvement where all teachers are encouraged to share ideas, resources and good practice.
- Ensure all teachers in their curriculum area are engaged in T&L CPL activities such as subject knowledge development, T&L information briefings, instructional coaching programme and Steplab learning resources

All Teachers will:

Understand the content they are teaching

- Have a deep and fluent knowledge and flexible understanding of the curriculum content they are teaching
- Be clear and precise about the knowledge and skills they want students to learn in every lesson. *What will students know, understand or be able to do by the end of the learning sequence?*
- Make Key Learning explicit to students in every lesson

- Be clear and precise about the subject specific vocabulary that students will need to know and understand to access the learning, and plan to pre-teach where necessary
- Ask themselves questions when planning effective implementation of the curriculum content, such as:

1. Where are the students starting from?

2. Where do I want them to get to?

3. How will I know when they are all there?

4. How can I best help them all to get there?

5. What may be the common sticking points in this content?

Maximise opportunities for all students to learn all of the content

- Know students; their prior attainment, gaps in knowledge and specific needs, and use this as key part of planning.
- Demonstrate quality first teaching as the first wave of intervention for meeting the needs of SEND students
- Consider the different pedagogical approaches used to engage, motivate and challenge all learners in *subject*
- Aim for all students to access learning and succeed with even the most challenging content if scaffolded appropriately

Activate hard thinking for all students through a range of high quality teaching and learning strategies

What a “typical lesson” will look like in *subject* will vary depending on the individual teacher and students .Teachers will utilise a variety of their own teaching and learning strategies based upon their professional judgement and their knowledge of students and classes. However, it is expected that the following high-quality teaching strategies are used effectively in the majority of lessons. “All knowing all” is the explicit goal in all lessons.

Structuring

- Ensure learning activities are appropriately sequenced; signalling Key Learning, Review of Learning, overview and key vocabulary from the outset
- Have high expectations of all students all of the time, regardless of their prior attainment, SEND need, disposition or background.
- Make learning accessible to all by matching tasks to learners needs
- Ensure that learning activities and outcomes focus on what students know and understand rather than what tasks they have completed.
- Aim to remove scaffolds over time and gradually increase independent practice for all students.
- Limit the amount of material students receive at one time, and then check that they have understood it before moving on
- Aim to provide students with time and opportunities to think, respond, make meaning and practice in every lesson.

Explaining

- Plan instruction and exposition with awareness of demands on students' cognitive load, by presenting new material in small step
- Give clear and simple instructions and explanations
- Model steps and procedures during explanations
- Provide many examples (and non examples)
- Use worked examples and part worked examples in explanations
- Connect new ideas to prior learning and knowledge in explanations to help students build schema
- Check for listening and check for understanding during explanations

Modelling

- Teach to the top with expert instruction, explanation, exposition and modelling
- Understand students need to watch and listen to experts guide them through the process, step by step, before they attempt it themselves.
- May demonstrate the worked activity in front of students, eg using a visualiser or live on the board
- Think aloud to narrate their thought process.
- Show it is ok to make a mistake and empathy, e.g. I found this bit challenging too.
- Integrate quick fire questioning e.g. why am I doing this now?
- Provide a range of models
- Guide practice with scaffolding (we do)
- Use examples and scaffolding to support students to demonstrate their learning. eg. sentence starters, key word definitions, procedural steps visible etc.
- Encourage effective class discussion
- Guide Independent, deliberate practice (you do)
- Provide the time they need to practise new material in a number of ways in order to master it.
- Aim to ensure scaffolding is reduced or removed for majority of students over time

Responsive Teaching

- Ensure that learning has stuck by checking for understanding of all students
- Confidently and accurately use teaching techniques to gather a secure overview about whether the key learning has actually been learnt.
- Ensure that If learning is not yet secure for most students the lesson should be adapted or retaught differently
- Ask lots of questions, to lots of students, and then use what they learn from this process to adapt and reshape teaching within and between lessons

Accountable Questioning

- Plan and ask a large number of questions to a large number of students skilfully, as the main tool to probe, check and extend all students' understanding
- Ensure that the majority of questions are asked through cold calling, with targeted questioning used to support and challenge students.
- Ensure that whole class responses to questioning can be done effectively with mini whiteboards and other similar strategies.

- Use a wide range and combination of questioning such as cold calling, process questions, probing questions, elaborate interrogation, think pair share, show me, affirmative checking, multiple choice, convergent, divergent, hinge and stretch it questions.
- Focus as much on error as on correctness when asking questions
- Focus on ‘who still *doesn’t* know’ instead of ‘who knows..’
- Ensure that all questioning is accountable and encourages all students to think
- Ensure no opt out for students by using ‘I’ll come back to you’

Retrieval Practice

- Ensure there is a review of learning (ROL) activity at the start of each lesson.
- Use retrieval practice regularly in lessons to support students with retrieving material that they have previously learnt from their long-term memory.
- Ensure retrieval practice is low stakes, completed without access to notes and used in a spaced manner

Effective feedback

Feedback exists in many forms (e.g. Key assessed task marking, teacher live marking of exercise books, whole class marking and feedback, verbal feedback, peer and self-assessment), but what matters is what students do with it.

Teachers will ensure that effective feedback in lessons:

- Is frequent and timely
- Informs their future planning and teaching
- Generates action and should be more work for the recipient than the donor.
- Is specific and focused on the most prominent areas to improve.
- Is accompanied by support in how to be successful with the next steps
- Allows appropriate time to make it better (MIB)

Creating a supportive learning environment so that all students can learn

Teachers know that in order for there to be excellent learning behaviours there needs to be the right classroom conditions, where all students feel safe, supported, appropriately challenged and valued. Teachers will ensure all students are confident in knowing what is expected of them in terms of learning and behaviour. Clear rules, routines and expectations are in place in all *subject* lessons.

All teachers are expected to:

- Have high expectations of all students
- Teach to the top, with necessary scaffolds to support those who need it
- Have clear and consistent routines and procedures so there is a safe, orderly environment, transitions are smooth and learning time is maximised
- Promote active engagement not just compliance
- Establish a growth mindset culture, mistakes are celebrated, use language such as “not there yet”, “Who still doesn’t understand?”
- Aim to build positive interactions and relationships with all students through positive behaviour management, mutual respect and professionalism at all times.

- Model the manners, warmth, kindness and calmness that they expect from students
- Welcome all students into your class by greeting them at the door
  Use positive framing to remind students of expectations and learning routines
  Use meaningful praise and rewards as much as possible
- Provide students with the opportunity to adapt their behaviour before consequences are implemented
- Demonstrate that consequences are temporary, eg new lesson, fresh start approach
- Ensure that learning begins immediately and is sustained for the absolute maximum time in lessons
- Students sit in a seating plan that has been strategically thought out by teachers to maximise learning and support all students most effectively
- Have consistent classroom rules and expectations which are fair and reasonable, so that all students know exactly what is expected of them.
- Aim to use the least invasive behaviour correction strategies such as: Non Verbal Intervention **(NVI)** Anonymous Individual Correction **(AIC)** Positive Group Correction **(PGC)** Private Individual Correction **(PIC)** Lightening Quick Public Correction **(LQPC)**

Assessment in Science.

Assessment Rationale: Spiralling assessments in science are designed to revisit key concepts and skills at increasing levels of complexity over time. This was discussed by R.M. HARDEN & N. STAMPER 1999 and Shiela L. Tirol 2022. This approach ensures that students continually build on their prior knowledge, deepening their understanding and enhancing their ability to apply what they've learned in new contexts. Students at St Cuthbert's will complete multiple choice knowledge tests and varying points of the curriculum. This is to improve recall of the key subject knowledge enabling students to dig deeper into the Science. At the end of each half term we carry out a knowledge test which is based around the KS4 summer examinations papers, we use past paper questions to asses the spiralling knowledge the students have attained. This allows students to come into contact with key language and assessment terminology ready for the summer exams.

KS3 Within each unit of work at KS3, there are three formative assessment tasks. This means that students will have the opportunity to demonstrate the skills they have mastered 3 times per half term. There is a literacy themed task (this will be the 'Big Write' task for that half term), a numeracy themed task and a scientific skills task (based on the WS strands of the NC). Students also complete knowledge tests that test their recall of knowledge through retrieval practice and complete a summative KAT once per half term.

KS4 Within each unit of work at KS4, there are three formative assessment tasks. This means that students will have the opportunity to demonstrate the skills they have mastered 3 times per half term. There are four opportunities throughout the KS4 curriculum to sit mock examinations. Full past papers are used to asses the knowledge the students have acquired against real life exams. This equips the students with the skills they need to answer exam questions and understand the language the examiners use.

Assessment Strategies in Science. In Science we use live feedback sessions to develop students understanding of assessments and how to gain the best marks possible. This is a teacher led exam where the students work through the questions – at the pace set by the teacher (normally a mark a minute). Each question is put up on the board and the teacher highlights the key parts of the question, not giving any answers, just 'unpicking' the question with them. This is usually done via a visualiser and uses the key subject knowledge from the teacher. We also use MIB activities where bey the teacher diagnoses poorly understood concepts and re deploys this in a different way after going through the pain pitfalls of the answers. Then, students answers a very similar question to see if they have understood the key powerful knowledge needed to succeed.

Cultural Capital

Our Science curriculum can significantly contribute to the development of cultural capital in students. Cultural capital refers to the accumulation of knowledge, skills, education, and other cultural assets that enable individuals to gain social mobility and participate fully in society. Here's how our well-designed science curriculum enhances cultural capital:
Cultural Capital is seen in the way we incorporate our drivers of Possibilities, Environment, Community and Well-Being, into all of our areas of learning and by striving to provide the students with the opportunities to experience and develop understanding of different cultural genres which may not be readily accessible to them outside of School.

Science at St Cuthberts offers a wide variety of experiences outside of the curriculum that provides our children with a rich, purposeful cultural capital. We realise that science is involved in every aspect of our lives and, as such, we offer the children at St Cuthberts opportunities that inspire and educate, whilst also improving children's possibilities, well-being, understanding of the environment and community involvement.

As part of our curriculum offer, children have enhancements such as educational visits, speakers, workshops etc. whilst engaging with the local community and their environment on targeted projects, they are able to develop a stronger sense of identity and become educated citizens who learn from the events, people, ideas they study. We also drop the curriculum during Science week to deliver bespoke opportunities that link to the British Science week theme, this has included looking to the future of Science and what a Scientist actually looks like. We also plan trips to Science Live and The Big Bang fair.

Catholic Social Teachings

Within the St Cuthbert's science curriculum, we provide a holistic educational experience that aligns scientific knowledge with ethical and moral principles

The key principles are,

Dignity of the Human Person

- Bioethics: Discuss ethical implications in areas such as genetics, stem cell research, and medical advancements, emphasizing respect for human life and dignity.
- Health Sciences: Explore how scientific advancements in healthcare can improve human well-being and access to medical care.

Call to Family, Community, and Participation

- Community Health: Study the impact of public health initiatives and the role of science in supporting healthy communities.
- Collaborative Projects: Encourage group work and community-based projects that promote collective problem-solving and the application of scientific knowledge for communal benefit.

Rights and Responsibilities

- Environmental Justice: Examine the responsibility of individuals and societies to protect the environment, focusing on sustainable practices and policies.
- Scientific Responsibility: Teach the ethical responsibilities of scientists in conducting research and sharing findings honestly and transparently.

Option for the Poor and Vulnerable

- Access to Technology: Discuss how science and technology can be used to address issues of poverty and inequality, ensuring equitable access to scientific advancements.
- Global Health: Focus on diseases that predominantly affect poorer communities and the role of scientific research in addressing these health disparities.

Dignity of Work and Rights of Workers

- Ethical Labor Practices: Study how scientific and technological advancements can improve working conditions and uphold the dignity of workers.
- Innovations for Good: Highlight careers in science that contribute positively to society, such as renewable energy, sustainable agriculture, and public health.

Solidarity

- Global Challenges: Address global scientific challenges like climate change, pandemics, and resource depletion, emphasizing the need for international cooperation and solidarity.
- Humanitarian Engineering: Explore engineering and technological solutions designed to improve living conditions in developing countries.

Care for God’s Creation

- Environmental Science: Integrate studies on ecosystems, biodiversity, and conservation, stressing the importance of stewardship of the Earth.
- Sustainability Projects: Engage students in projects that promote sustainability, such as recycling programs, energy conservation, and habitat restoration.