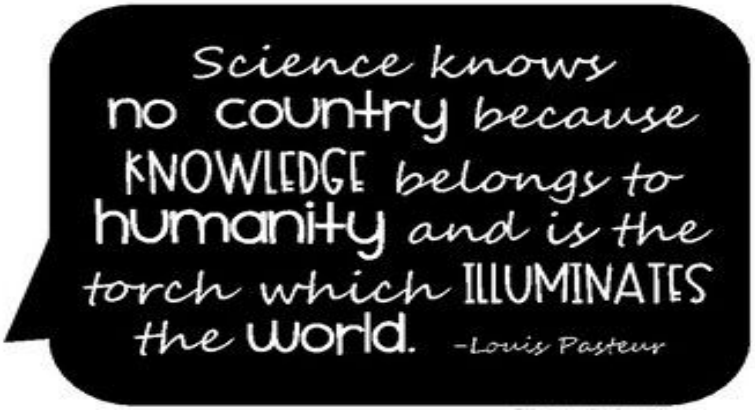
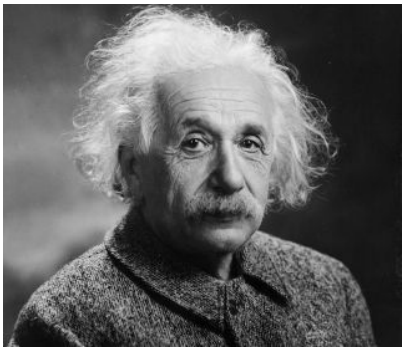
Science


Science knows
no country because
KNOWLEDGE belongs to
humanity and is the
torch which ILLUMINATES
the world. -Louis Pasteur



Subject Overview and Curriculum Intent

Curriculum Intent

Science at Francis Barber PRU extends beyond mere academic study. Our cross-disciplinary approach to curriculum planning ensures a comprehensive and diverse learning experience, fostering students' engagement with the practical applications of the subjects. Our goal is to install in students a sense of curiosity and appreciation for science, inspiring them to explore the subject with enthusiasm and depth. Science plays a pivotal role in shaping our understanding of the world, particularly in a rapidly evolving landscape where scientific advancements drive future progress. Therefore, our curriculum not only emphasises the acquisition of subject knowledge but also prioritises the development of critical skills, processes, and applications. By creating a curriculum rich in relevant content and real-world connections, we aim to provide students with a meaningful and enriching educational experience.

KS3 Science Curriculum

At Francis Barber PRU, our pupils will embark on a dynamic and engaging curriculum designed to ignite curiosity, foster active participation, and highlight the relevance of Science in their everyday lives. Through this curriculum, students will develop the ability to recognise, describe, utilise, and apply fundamental scientific concepts to elucidate abstract phenomena, even when encountered in unfamiliar contexts. By delving into these key ideas, students will be encouraged to explore their curiosity and establish connections between different scientific domains. Scientific enquiry lies at the heart of our curriculum, intertwining direct practical experiences with essential scientific principles. These principles are not confined to specialised "investigative science" lessons but are seamlessly integrated into all aspects of the curriculum, ensuring that every lesson, regardless of practical involvement, promotes inquiry-based learning and critical thinking skills development

KS3 Curriculum Map 2024-25

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
1	1.Energy	3.Particles and Behaviour	6.Ecosystem Processes	7.Adaptation and Inheritance	8.Forces	9.Motion and Pressure
		4.The Earth				
		5.Reactions				
	2. Metals and acids.					
	3.Particles and Behaviour					

2	10.Electricity and Magnetism	12.Periodic Table	13.Elements, Atoms and Compounds	14.Separation Techniques	16.Cells	18.Space
				15.Acid and Alkalis	17.Structure and Function of Body Systems	19. Sound
	11. Reproduction		14.Separation Techniques	16.Health and lifestyles		19.Light

KS4 Science Curriculum

At KS4, pupils at Francis Barber PRU undertake a single award GCSE Biology course following the AQA 8461 specification. This comprehensive course spans two years, encompassing Years 10 and 11, with pupils receiving instruction for two lessons per week. Upon completion, pupils will be entered for the GCSE Biology examination at the end of KS4. The course is structured to provide students with a robust and dynamic learning experience, offering in-depth exploration of scientific theories and their practical applications at GCSE level. Through a differentiated and practical curriculum, students engage with Biology in a manner that caters to their individual learning needs. In instances where pupils have missed topics due to absence or non-engagement prior to joining Francis Barber, provisions are made for them to catch up on missed work. Furthermore, our approach emphasises independent learning and fosters an enjoyment of Science by linking theoretical concepts to real-world contexts. At the culmination of Year 11, students will undertake two examinations in GCSE Biology, assessing their understanding and mastery of the subject matter.

KS4 Biology GCSE Overview

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
10 (Paper 1)	B1 Cell Structure and Transport	B2 Cell Division	B4 Organising Plants and Animals	B6 Preventing and Treating Disease	B8 Photosynthesis	B10 Human Nervous System
					B9 Respiration	
		B3 Organisation and the Digestive System	B5 Communicable Diseases	B7 Non-Communicable Diseases	Mock exams and revision	B11 Hormones

	B2 Cell Division	B4 Organising Plants and Animals		B8 Photosynthesis	Introduction to Paper 2	
11 (Paper 2)	B12 Homeostasis in Action	B14 Variation and Evolution	B16 Adaptation and Interdependence	B18 Biodiversity	Exams	
	B13 Reproduction	B15 Genetics and Evolution	B17 Ecosystems	Revision		
	B14 Variation and Evolution					

Curriculum Implementation

Students at Francis Barber PRU have access to a wide range of top-notch resources throughout their time here. For instance:

• All KS3/4 students can utilise online resources available on Google Classroom, both at school and remotely. These resources include a diverse array of learn screens, topic tools, and activities designed to support all facets of the secondary science curriculum and enhance students' Science learning experiences.

Students are encouraged to explore supplementary materials related to the subject, such as relevant news pages, scientific journals, and websites. This not only fosters increased engagement in the subject but also provides opportunities for students to develop their reading skills.

Assessment plays a crucial role at Francis Barber PRU in ensuring that all students receive the necessary support to reach their full potential. Whether it's providing additional assistance to grasp fundamental curriculum concepts or challenging our most proficient students, a blend of summative and formative assessments, low-scale testing, and skill demonstration opportunities enables us to cater to the diverse needs of our learners effectively. All KS4 assessments are designed to be synoptic, offering students more chances to revisit previously taught concepts and better prepare for their summer examinations. Our curriculum design facilitates this by revisiting key concepts regularly throughout KS3-4, gradually increasing in complexity.

To ensure equitable access to the subject, we offer a variety of course options at KS4, including entry-level assessment and single science. Additionally, all students have full access to our foundation year in the K group, allowing us to identify those in need of additional support or challenge while maintaining high expectations and aspirations for all.

A defining characteristic of the Science curriculum at Francis Barber PRU is its adaptability. The curriculum undergoes regular updates and adjustments to ensure it always meets the current needs of our learners. Combined with high-quality teaching and learning experiences, this approach allows us to effectively implement our vision of a successful knowledge-engaged curriculum.

We strive to cultivate a culture where students are encouraged to critically question content, their understanding, and the purpose of what they are learning. This skill is vital not only for developing as a 'scientist' but also as an active member of our community.

Curriculum Impact

The successful delivery of our curriculum intent will manifest in various ways:

Teaching/Lesson Delivery:

• Lessons will effectively integrate both knowledge and skills, ensuring students consistently engage with all aspects of our curriculum.

• Contextualised teaching methods will be employed whenever feasible, aligning with our department's vision to connect students with Science in real-world contexts.

• Quality assurance procedures will reveal evident cross-curricular links within lesson content.

• Differentiation will be standard practice to ensure all learners actively participate and engage in every aspect of the lesson.

Pupil Work:

• Student work will demonstrate high standards tailored to individual abilities.

• Progress will be evidenced in student work, showcasing a secure understanding of both content and skills, including literacy skills.

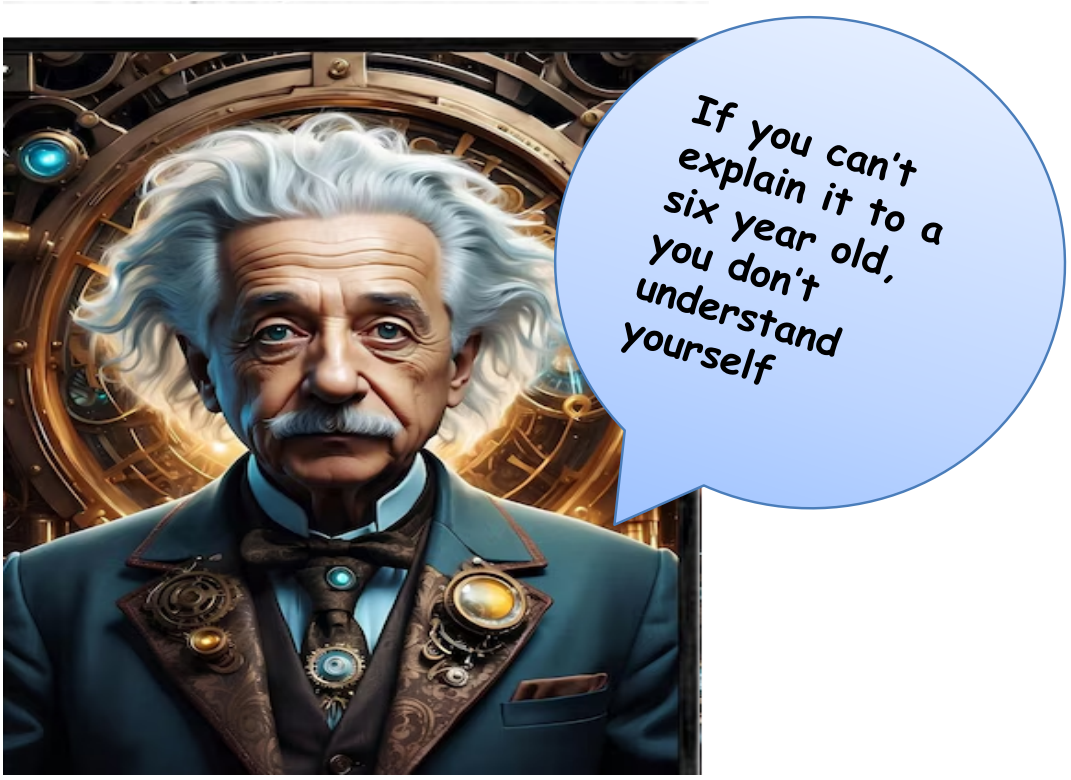
• Student work will reflect active participation and engagement in lessons, with self-assessment opportunities integrated into everyday practice for both students and staff.

• Students will exhibit open-mindedness, perseverance, and accountability in their work.

• Students will demonstrate the ability to make connections between topics and scientific disciplines, indicating the appropriate depth of understanding across the curriculum.

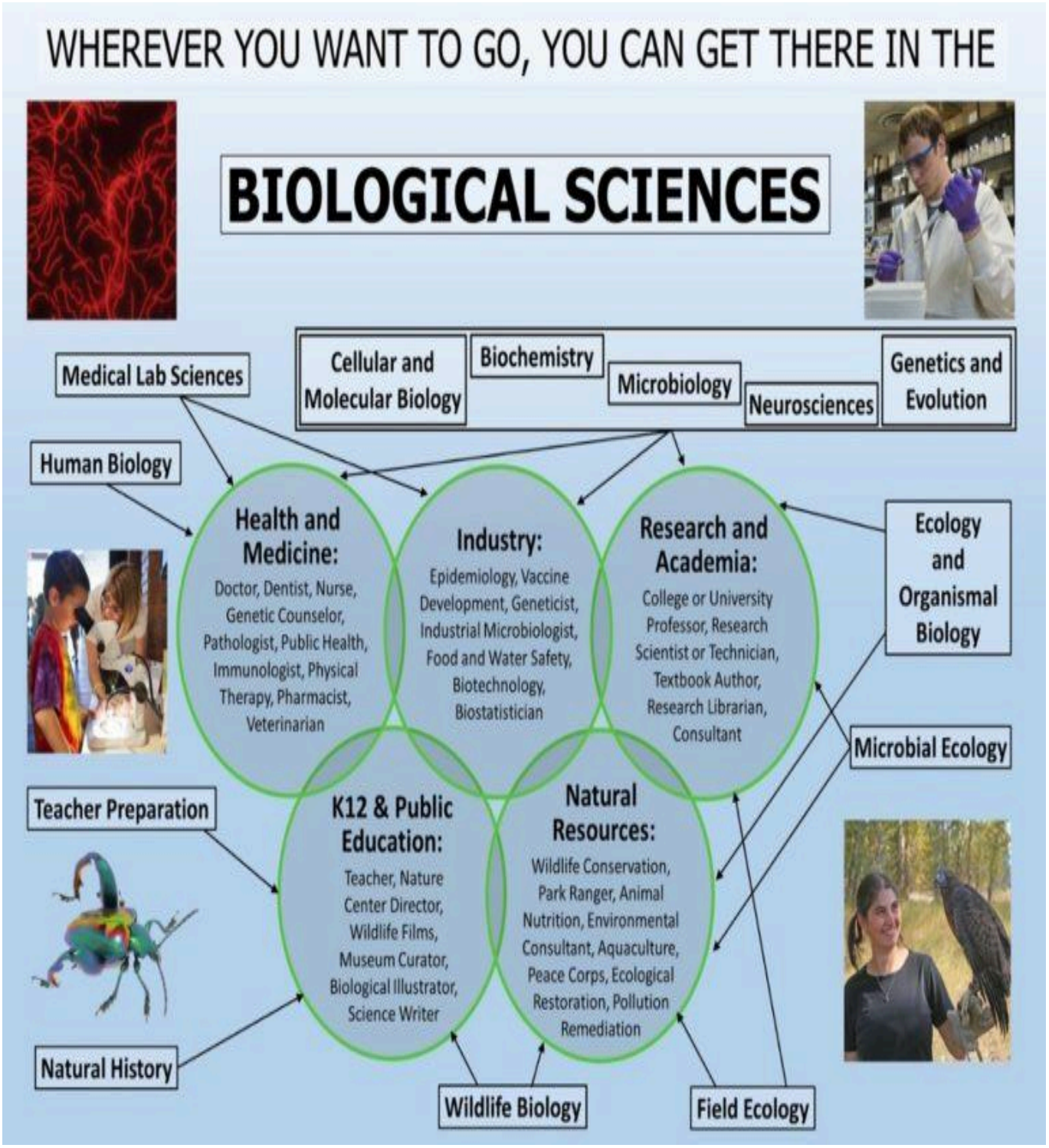
Assessment and progress

In Science, students undergo a comprehensive assessment process, both formally and informally. Their progress is regularly monitored through the marking of their books, accompanied by formative feedback designed to guide them towards improvement in their efforts and attainment. At the conclusion of each unit, students undertake summative assessments, contributing to their overall progress grade in Science. These assessments occur every half term or within the duration of a unit being taught, allowing student's ample opportunities to advance from one grade to the next. Utilising level descriptors for each topic or assessing the skills demonstrated during Science practical, students are empowered to progress steadily along their academic journey.



Careers Link

Each unit of work is linked to careers and their relevance to the students in terms of career progression. The topics are also linked to the real world, making their work more relevant.



Trauma Informed Practice

As trauma-informed Science teachers we ensure we build strong relationships with students. We listen and empathise with pupils; each pupil is dealt with as an individual and we build on their personal strengths in the lessons. We utilise the theories and practice in our school tool kit for education, to provide a safe space for our students to express themselves, using the information that they have learnt and apply it in their daily lives. Improving their welfare in terms of employability, confidence, self esteem/self belief and to motivate them to pursue the careers of their choice, building on their successes in Science and other related subjects.

Literacy

In every Science lesson, we prioritise the promotion of literacy skills as we recognise its paramount importance in our students' success. We meticulously curate the text and language used in our printed and written materials to consistently uphold high standards of literacy. Introducing students to new vocabulary is not only crucial for their comprehension of scientific concepts but also instrumental in preventing misconceptions from arising. We actively collaborate with the English department to establish cross-curricular links, ensuring that literacy development is seamlessly integrated into our science curriculum. Recognising that students have varying literacy levels, we personalise their learning experiences to provide tailored support, thereby enabling all students to access the curriculum effectively. As students prepare for their final exams, we emphasise the significance of Reading for Information (RFI), guiding them to familiarise themselves with key terms and terminologies to enhance their comprehension and performance in both formative assessments and examinations.

Numeracy

At Francis Barber PRU, we recognise numeracy as a vital component of science education and essential for our students' success. Our departments collaborate closely to foster cross-curricular approaches aimed at cultivating effective numeracy skills among learners. From designing and measuring experiments to modelling and communicating ideas, analysing data, and making predictions, numeracy permeates every aspect of scientific inquiry. By emphasising the importance of numeracy skills, we empower our students to not only navigate mathematical concepts within the realm of science but also to draw meaningful conclusions from their findings. Through this integrated approach, we equip our students with the tools they need to excel academically and thrive in their scientific endeavours.

ICT

ICT will be utilised when appropriate to provide additional skills practice and demonstrate the continuous advancement of science.

Equality, Diversity and Inclusion in English, Fundamental British values (FBV) and Social, Moral, Spiritual and Cultural (SMSC)

In the Science curriculum, we integrate Equality, Diversity, and Inclusion (EDI), Fundamental British Values (FBV), and Social, Moral, Spiritual, and Cultural (SMSC) development in the following ways:

- **Equality, Diversity, and Inclusion (EDI)**: Our curriculum ensures that all students, regardless of their background, have equal access to learning opportunities. We explore contributions to Science from diverse cultures and individuals, fostering an inclusive environment that values different perspectives and experiences.
- **Fundamental British Values (FBV)**: The curriculum promotes FBV by encouraging respect for democracy, the rule of law, individual liberty, and mutual respect for different faiths and beliefs. Scientific discussions often touch on ethics, environmental issues, and the impact of scientific advancements on society, reinforcing these values.
- **Social, Moral, Spiritual, and Cultural (SMSC)**: Through science, students develop critical thinking, ethical reasoning, and an understanding of moral implications. We encourage them to reflect on how scientific developments affect society, the environment, and global cultures, fostering a sense of responsibility and cultural awareness.

This approach ensures a well-rounded education that prepares students for life in modern society while encouraging respect and understanding of different viewpoints.

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