



Science Policy

Pique scientific curiosity

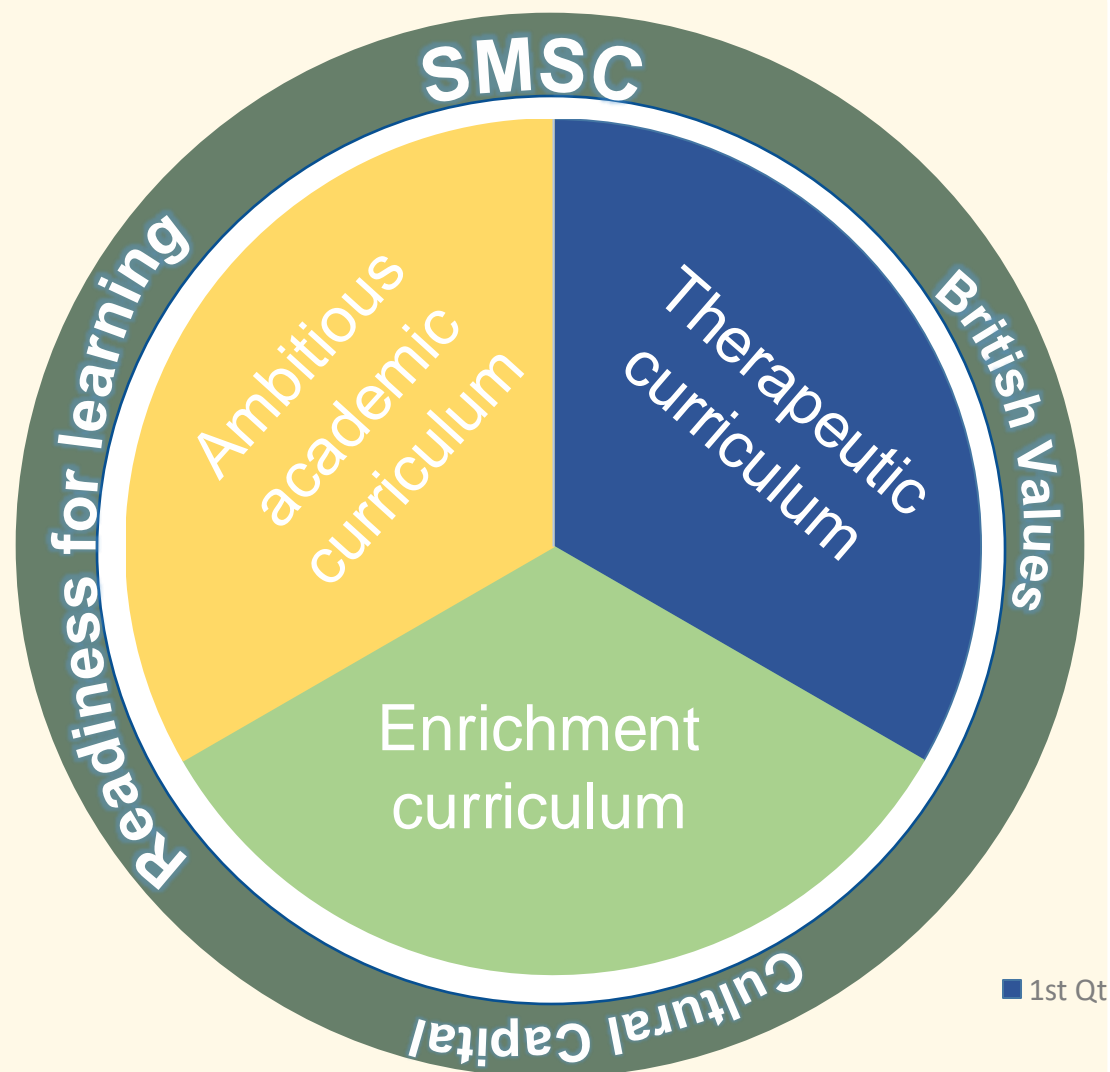
Belonging – Engaging – Compassion – Learning

ARBOUR ACADEMY MISSION STATEMENT

“Caring for young people and their families, providing them with opportunities to learn and flourish.”.

Policy developed by:	Mr J. Carney
Policy to be reviewed:	April 2025
Summary of changes	

Main aims of the Arbour curriculum



Provide an **ambitious academic curriculum** so that students can access a wide range of qualifications and vocational options that can support and impact on their further education and their employability.

To provide wide-ranging out of school opportunities to offer the our students the best understanding of how to be successful in 21st Century Britain. At Arbour Academy we explore and develop all opportunities that allow pupils to experience activities beyond the classroom in line with their more socially advantaged peers

We offer a therapeutic curriculum to support our students' holistic development, fostering emotional well-being alongside academic progress. By integrating therapeutic approaches into our curriculum, we create a nurturing environment where students can thrive socially, emotionally, and academically.

To ensure that our students are in the best position to be ready to access and participate in their acadmic lessons. To develop our students **cultural capital**, for us this is providing students with the opportunities to experience people, places and things that contribute towards the essential knowledge that pupils need in order to be educated citizens. To promote pupils physical health and personal development which includes the spiritual, moral, cultural, mental development of pupils at the school in order to prepare our students for the opportunities, responsibilities and experiences of later life

Science Policy – Rationale

- The rationale of this Science policy is to:
 - introduce the key aims and objectives of the Science department.
 - to explain the curriculum design and coverage.
 - to explain the effective Teaching and Learning strategies involved in Science

■

Arbour's Science Policy Vision (Why)

- To develop pupils' curiosity and excitement about the world around them
- To develop pupil's ability to work scientifically.
- To explore how science is used in real world situations
- To provide opportunities to discuss ethical issues relating to scientific discoveries

Curriculum intent

- The intent for the Science curriculum is laid out in the National Curriculum in the science programme of study for key stage 3 and 4 . These are the things that we intend our students will study over their time at the Arbour Academy. The starting points for our students is varied even within classes. As such we cannot easily define the educational outcomes of all our students by cohort. This has to be very individualised based on their starting points.

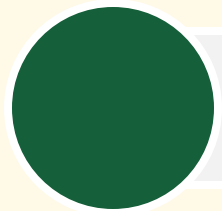
Curriculum Organization

- **National Curriculum** - Our science curriculum is designed to adhere to the national standards, ensuring that all instructional content and learning objectives align with the prescribed guidelines. By following the national curriculum, we guarantee that our students receive a comprehensive, high-quality education.
- **Big Ideas**- In science education, we integrate all our units into overarching big ideas. These central concepts enable students to connect their learning to a broader context, helping them understand how individual lessons fit into the bigger picture. By structuring learning in this way, we facilitate the creation of meaningful connections, which aids in the retention and retrieval of knowledge in the future.
- **Spiralised Design** - Students develop a deeper understanding of big ideas through multiple interactions with the underlying concepts. By connecting smaller, concrete ideas to more abstract ones, students are better equipped to apply these concepts to unfamiliar topics. Our spiralized curriculum ensures that each big idea is broken down into four smaller topics that increase in complexity. For example, in the 'Waves' unit, topics progress from the simpler, more concrete 'Light' and 'Sound' to the more abstract 'Wave Properties' and 'Wave Effects'.

Timetable Allocation

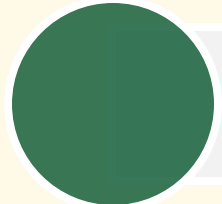
Year Group	Lessons per week
Year 7	4
Year 8	4
Year 9	4
Year 10	4
Year 11	4

The 'Big Ideas' identified in Science



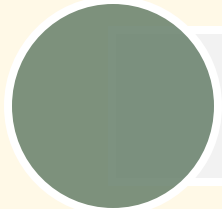
Forces

Including Speed, gravity, Contact Forces, and Pressure.



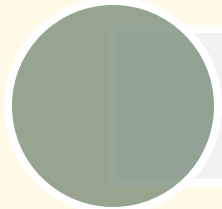
Electromagnets

Including Voltage & Resistance, Current, Electromagnets, Magnetism.



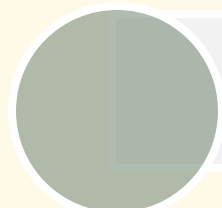
Energy

Including Energy Costs, Energy Transfer, Work, Heating and Cooling.



Waves

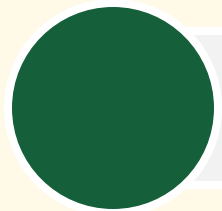
Including Sound, Light, Wave Effects, Wave Properties.



Matter

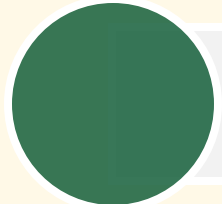
Including Particle Model, Separating Mixtures, Periodic Table, Elements..

The 'Big Ideas' identified in Science



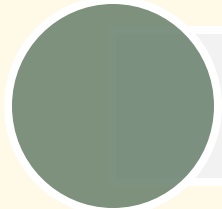
Reactions

Including Metal and Non-Metals, Acids & Alkalis, and Chemical Energy.



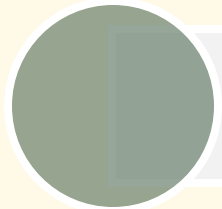
Earth

Including Earth Structure, Universe, Climate, and Resources.



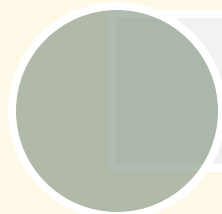
Organisms

Including Movement, Cells, Breathing and Digestion.



Ecosystem

Including Interdependence, Plant Reproduction, Respiration and Photosynthesis.

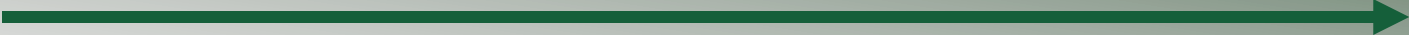


Genes

Including Variation, Human Reproduction, Evolution and Inheritance..

Timetable Allocation

Each big idea topic contains four smaller topics that build in complexity. For example 'Waves', topics are ordered from simpler, more concrete topics to more abstract ones.

Big Idea	Increasing Complexity 			
Waves	Sound	Light	Wave Effects	Wave Properties

Working Scientifically

Working scientifically gets students working in similar ways to scientists.

Similar to the subject content, there are two dimensions for each working scientific process: know and apply.

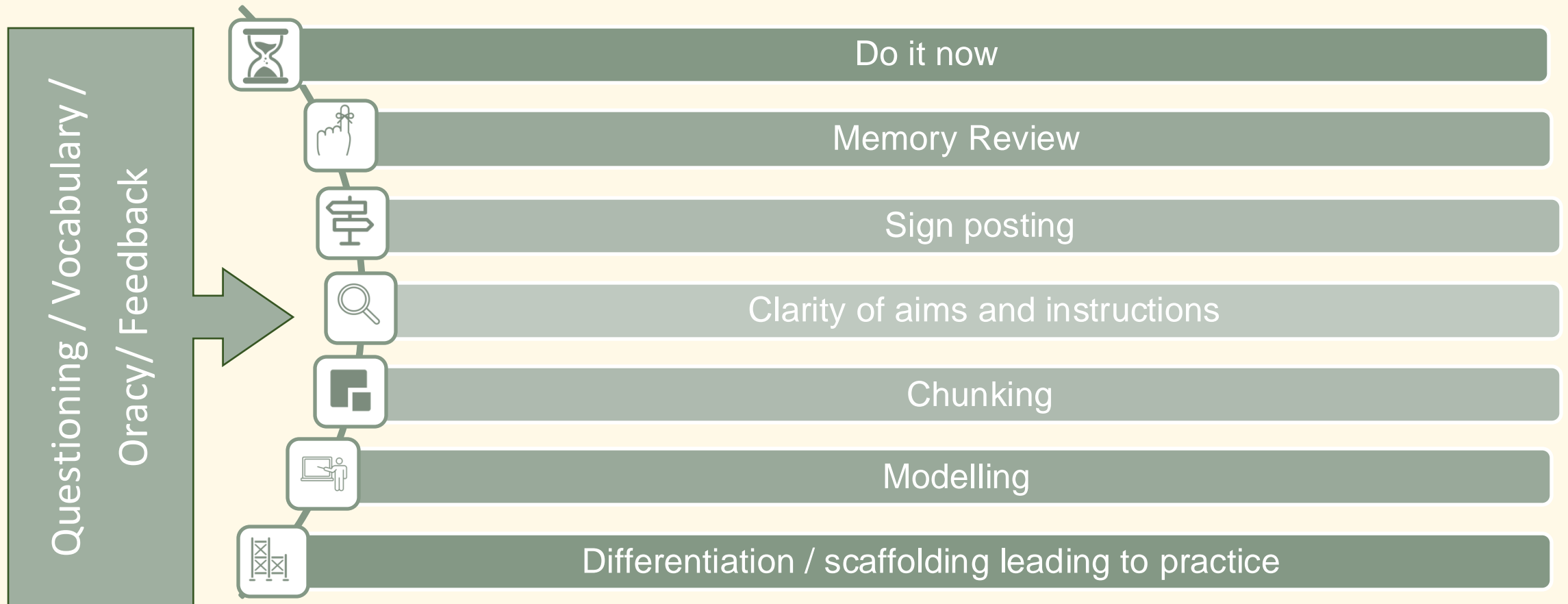
Know is know-how, or being able to carry out the skills accurately and fluently. This has to be taught; pupils are not expected to learn disciplinary knowledge as a by-product of doing an experiment.

Apply the taught skills and knowledge to a range of practical opportunities.

Pupils' disciplinary knowledge advances in four areas throughout the Science curriculum.

1. Methods to answer scientific questions.
2. Apparatus and techniques.
3. Analysing, presenting, and evaluating scientific data to draw valid conclusions.
4. Development of scientific knowledge over time and its implications.

Lesson structure



Assessment

(See Arbour Academy
Assessment, Feedback and Marking Policy)

Arbour Academy's Assessment Policy Intent

Informing classroom practice- curriculum should drive assessment and not the other way round.

Cater to the needs of pupils - pupils will have individualised targets based on their starting points and SEND needs.

Understood by key stakeholders - New data systems will be easy to understand for all parties involved in discussions about pupil progress and attainment (parents/ carers and outside agencies)

Key Stage 3 Assessment and Feedback

During Key Stage 3, teachers will set formal assessments which will measure cumulative knowledge and skills at key points. This will then be used alongside teacher assessments to build an academic picture of the pupil's progress. This information will be shared with parents at the end of term 1 and again at the end of the school year. Pupils will be graded using the following descriptors; Working Towards, Emerging, Developing, Secure and Advanced.

Each year, the curriculum builds and becomes more challenging over time. Therefore, the criteria underpinning each descriptor also becomes more challenging. A pupil who maintains the same descriptor (that is in line with their KS2 data) throughout KS3 is therefore making expected progress.

We put pupils on a specific pathway, we want them to flourish and not feel limited by the grade descriptors. This is complemented by our mixed ability setting at KS3

Underperformance at KS3 is addressed through the feedback model and the intervention cycle.

Progression Pathways at Arbour Academy

Pathway	Working Towards	Emerging	Developing	Secure	Advanced
Exam	GCSE Foundation Level Combined Science	GCSE Foundation Level Combined Science	GCSE Foundation Level Combined Science	GCSE Higher Level Combined Science	GCSE Higher Level Combined Science
Grades	1, 2	2 3	4 5	6 7	8 9

Assessment Type	Details	Frequency
Initial baselining exercise	A test drawing on questions from across the KS3 curriculum to gain a baseline	On entry
End of unit tests	Tests based specifically on the work covered during a topic. These are not always completed at the immediate finish of the topic so that we can test that long-term remembering has been achieved.	Ongoing
Pupil assessment	Self- assessment sheets for pupils to assess their progress against unit objectives	Ongoing
Teacher assessment	Teachers to assess pupils progress against the intended outcomes for a unit.	Ongoing
Low Stake assessments	Ongoing teacher assessment used to direct planning on the outcomes of low stakes testing.	Ongoing
Data capture	Formal data captured across all strands of the curriculum using formative and summative methods.	Once per term baselining new students

Science Qualification Pathways			
Advanced		Combined Science Trilogy Higher	8-9
Secure		Combined Science Trilogy Higher	6-7
Developing		Combined Science Trilogy Foundation	4-5
Emerging		Combined Science Trilogy Foundation	2-3
Working towards		Combined Science Trilogy Foundation	1-2

The table above indicates the intended outcomes for pupils on their pathways.

Cross Curricular links

- Our whole school curriculum has been designed with collaboration between all subject leads at its core. We want students' learning to be joined up and connected where strong links are possible. This will allow our students, many of whom have difficulties with retrieval, the best opportunity to experience content across different specialisms. This repetition and opportunities for retrieval practice will allow for deeper learning.
- Our school skills builders include problem solving and creativity, which are encouraged across the curriculum. Experiments within science lessons embed these values, along with challenges and explorations in science engagement lessons. Lessons are targeted to specific types of learning in order to ignite curiosity and promote scientific thinking

Subject enhancements

At Arbour, we believe in providing a wide reaching science education that goes beyond the classroom. We recognize the value of subject enhancements, such as trips, in-school visits, projects, theme days, and the inclusion of famous scientists throughout the curriculum. These enhancements aim to deepen students' understanding of scientific concepts, foster a love for the subject, and highlight the importance of science in the world around us. By incorporating these activities, we create a holistic learning experience and promote cultural capital among our students.

Trips: Trips offer students the opportunity to witness scientific concepts in real-life situations and develop practical skills. The following table highlights the proposed trips and activities by year group and their focus:

Year	Trip	Focus
KS3/KS4	Chester Zoo	Conservation and biodiversity
KS3/KS4	Jodrell Bank	Space, planets, research
KS3/KS4	Cronkshaw Fold Farm	Sustainability and biodiversity
KS3/KS4	Manchester Museum	Science and culture
KS3/KS4	Manchester Recycling centre	Environment
KS3/KS4	Innovation Centre, Salford	Innovation
KS3/KS4	Cargills	Careers in industry

Year	On site activities	Focus
KS3/KS4	STEM workshop Network rail	Civil Engineering
KS3/KS4	Our World day	Climate debate
KS3/KS4	Science day	Raising profile of science and scientists

Subject enhancements

.Subject enhancement during big theme days The following table shows the days planned for the year:

	Big Theme Day	Big Theme Day
Year KS3/KS4	Exploration	Innovation
Year KS3/KS4	Challenge	Our World
Year KS3/KS4	Power and Authority	Identity

Inclusion and Cultural Capital: We value inclusivity and aim to provide a diverse and representative curriculum. To celebrate inclusivity, we have incorporated the study of famous scientists throughout the curriculum. The following scientists are some of those researched during lessons:

Year	Activity
KS3/4	As part of Science day, there will be a focus on a range of scientists, introducing their profiles, any challenges they have faced and also thinking about students' preconceptions about scientists.
KS3 / 4	Careers inputs will emphasise inclusivity and the range of opportunities that there are in science.
KS3/4	Big theme days will include some aspects of science and allow students to see science in the context of other subjects
KS3/4	As a school we often work with outside providers such as the RHS, Action for Conservation, Network Rail, Cargills. This allows students to get a real-life perspective on the contribution of science to society.

Subject enhancements

Cultural Capital

Sustainability runs through the science curriculum, including the energy topic in Physics and Chemistry and the Ecology section of Biology. It also features in our Big Theme days such as 'Our World' .

In our school garden we have tried to increase the biodiversity of the lawn by keeping some areas free of mowing and introducing Yellow Rattle to help open up the lawn. We have also built a pond and introduced some aquatic plants.

Our Science day programme will include inclusivity in our consideration of scientists.

We hold a steadfast commitment to developing our pupils' environmental understanding as a long-term aim. This commitment is reflected in our curriculum, where topics related to environmental issues and sustainability are covered every year, with each year building upon the previous one. This intentional and approach not only fosters environmental literacy but also significantly contributes to developing our pupils' cultural capital.

Why It Matters:

Developing pupils' environmental understanding is a journey that unfolds over time, offering several key benefits for enhancing cultural capital:

Cultural Sensitivity: Learning about environmental issues exposes our pupils to diverse cultural perspectives and practices related to sustainability. They gain an appreciation for how different cultures value and interact with the environment, fostering cultural sensitivity and respect.

Global Awareness: Our curriculum's consistent focus on environmental topics nurtures global awareness. Pupils become attuned to the interconnectedness of environmental challenges across the world, broadening their horizons and enhancing their cultural capital.

Social Responsibility: As pupils deepen their understanding of environmental issues, they develop a sense of social responsibility. They recognize the importance of sustainable practices and ethical decision-making, reflecting values and norms that contribute to cultural capital.

Informed Citizenship: An environmentally informed citizenry is integral to a thriving society. By engaging with environmental topics consistently throughout their education, our pupils are better prepared to participate in informed civic discussions and advocate for positive change.

British Values & SMSC

- **Extremism and radicalization** - All teachers in the science department are familiar with the indicators of vulnerability to extremism and radicalisation and the procedures for dealing with concerns. When delivering lessons in science we look out for indicators and report any concerns. We work to prevent pupils from developing extreme and radical views by embedding SMSC principles throughout the science curriculum.
- **Promoting values** - During lessons in science we strive to create a learning environment which promotes respect, diversity and self-awareness and equips all of our pupils with the knowledge, skills, attitudes and values they will need to succeed in their future lives.
- **Planning for British Values** – we have looked at all areas of our science curriculum and have identified the coverage of the British values through the topics that we have selected. This is detailed on our scheme of work.
- British Value and SMSC coverage is considered throughout the planning stages of the curriculum and plotted in our coverage grids. Examples of this can be seen on the next slide.

British Values and SMSC

British Values and SMSC and identified and planned for through the Scheme of work.

Strand	Unit:
Social	Collaborative activities, such as bridge -building and conducting food tests in groups, encourage teamwork and effective communication.
Moral	Moral development is addressed through discussions about the use of stem cells, climate change and vaccinations. Students engage in conversations about responsibility, both personal and societal, concerning the impact of life decisions on individual health and broader public health.
Spiritual	Spiritual development is fostered through an exploration of the solar system and how life evolved. Students may develop a sense of awe and wonder as they delve into the complexities of how well adapted organisms are. Additionally, discussions on the interconnectedness of life choices with overall well-being may encourage reflection on the importance of maintaining a harmonious relationship between physical health and spiritual well-being.
Cultural	Students consider how cultural beliefs may affect their choices in areas such as assisted reproduction and use of stem cells.
British Values	Scientific study aligns with British values by emphasizing democratic principles through discussions on laws surrounding assisted reproduction. The rule of law is evident in the exploration of established guidelines, promoting an understanding that adherence to rules contributes to public health. Individual liberty is central to the unit as students contemplate their life choices, recognizing the balance between personal freedom and responsibility for one's health and well being.

British Values and SMSC

In order to promote spiritual, moral, social and cultural values, we use examples of different points of view that are widely held. One way of doing this is to present cartoon style profiles as shown here:

What's the big deal? It's just advertising. Kids can make their own choices.

But they're too young to understand. Marketing makes unhealthy food look fun and cool.

Advertisers shouldn't promote unhealthy snacks at children.

Invented for KIDS
APPROVED by MUMS

It's the parents' job to control what their kids eat, not the ads.

Yeah, but ads make it harder for parents. They're everywhere!

Staff CPD

J. Carney	CLEAPSS H&S	October 2023
R. Hassan		
C. Wood	Laboratory Health and Safety First Aid at Work Science engagement	2020 November 2023 July 2024