Promoting SMSC and British Values in Science lessons

Year	Social	Moral	Spiritual	Cultural	British Values
Year 7	Planning and carrying out investigations as part of a team. Group work and sharing learning of skills such as microscope work. Sexual reproduction education, gestation and birth. The changes that take place during puberty, Respiration and Exercise – this is made practical which allows students to develop knowledge in a hands-on and fun way. It allows the application of science to everyday events and increases students understanding of what is happening in their bodies during exercise. Hazards and safety in work. Highlighted possible scientific career choices.	Need for conservation of the environment local and world-wide, also learning about endangered species. Health and safety – how to be safe using chemicals. Ethics in science – the importance of peer reviewed scientific research. STEM Cells. How do we get our energy? What are the implications of our ever-increasing need for energy? Global warming. Air pollution. Harvesting of mineral resources from the earth.	Use of imagination and creativity e.g. building cells and planning investigations. Cell theory. Reflecting on their learning through evaluating investigations. Awe and wonder – e.g. how science in the lab relates to the outside world. Big questions: where does the Sun get its energy from? Particles and the LHC - The Big Picture Gravity and space and the forces around us.	Acids and alkalis in the real world. Provision of clean water through purification. How is energy produced around the world? Studying of Scientists from different cultures.	Inspire debate about individuals right to belief and how science and religion can co-exist. Challenge pupils who express extreme views and/or are intolerant and unaccepting of others points of view.

Year	Social	Moral	Spiritual	Cultural	British Values
Year 8	Group planning of investigations. Creative problem solving. Evaluation of investigations. Application of Key skills in investigations; team work, problem solving, evaluating own progress, peer work. Healthy diet. The dangers of EM Radiation and in particular UV. Highlighted possible scientific career choices.	Food chain and the disruption to ecosystems through over hunting and fishing and damage to the environment dur to pollution. Looking in more detail at the carbon cycle and Climate change.	Awe and wonder – atoms and atomic structure. Use of imagination and creativity e.g. building atomic models and planning investigations. Reflecting on their learning through evaluating investigations.	Diet - how do the diets that are particular to different cultures affect people? Western diets vs More healthy choices. Food availability and the effects on health. Differences in diet across different cultures. Wealth and lifestyle and human's contribution to air pollution and climate change.	Debate issues in lessons with mutual resect of other points of view and understanding whilst perhaps not choosing to agree with those points of view.

Year	Social	Moral	Spiritual	Cultural	British Values
Year 9	Application of key skills in investigations; teamwork, planning, problem solving, evaluating own progress, peer work and assessment. Growth and the use of growth charts and why we record national statistics. Highlighted possible scientific career and further education choices,	Ethics involved in the use of stem cells for research and medicine. Problems with eh the eyes and brain and surgery. Growth and the use of growth charts. Genetic disorders. The potential of scientific techniques – what can be done vs. should be done. Energy efficiency of our homes. What can be done to better insulate our homes to reduce energy consumption and so the use of fossil fuels and our carbon footprint. Ammonia production and fertilizers and food production.	Evolution and the impact on religious thought at the time and in the modern world. Awe and wonder – atoms and atomic structure. Religious impact of Darwin's theories. Use of imagination and creativity e.g. building cells and planning investigations. Cell theory. Reflecting on their learning through evaluating investigations. The discovery of DNA, and how it controls our characteristics. Space and the wonder of the universe.	Historical development of the periodic table – Mendeleev's work and why he wasn't accepted during his time. The real-world applications of purifying water and chromatography in crime and drug productions. The discovery of DNA and the role of Rosalind Franklin, and the acknowledgement of her work. The Haber Process and the background of Fritz Haber and the impact on modern society. Food security of developing countries and cost of intensive farming.	Inspire debate about individuals right to belief and how science and religion can co-exist. Disposal of waste and the laws regarding the environment. Laws around fishing and hunting, Euthanasia and prolife/freedom of choice. Speed limits and the laws and reasons for imposing safety regulations and speed limits in society. Differing theories of the creation and development of the universe. Differing theories on Matter and Particles and the right to believe one theory whilst still being understanding of the others.

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Year 10	Application of key skills in investigations; team work, problem solving, evaluating own progress, peer work. The collaborative natureof science as a subject discipline. Opportunities for creativity. Student enjoyment of the subject through practicals such as flame testing. Safe use of electricity at home and in society. Highlighted possible scientific career and further education choices.	Evolution and Selective Breeding and Genetic engineering. Use of intensive farming techniques to provide food security. Heath and disease including Malaria, Factorsaffecting non-infectious diseases,obesity and cancer etc. Engineering - to what extent should it be encouraged? Genetically modified crops - blessing or curse? Cloning. Vaccinations - should they be compulsory? Alcohol abuse and the impact this has on society. Industrial production of chemicals – How the procedures are carried out, potential risks to the area,and pollution issues. Puberty and Menstruation and contraception. Heart disease and factors of increased risk. The implications of using fossil fuels on global warming and climate change. The implications of using nuclear fission to generate electricity, including the Chernobyl and Fukishima disasters. Uses and dangers of gamma radiation. The use of radiotherapy for palliative care. The ethical implications of physicsand its applications. Energy conservation and environmental implications. The advantages, disadvantages and risks of these applications, and the safe uses of radioactive substances. Study of laser and other treatments for correcting vision, the use of X-rays in medicine, ECGs and pacemakers.	Discussion around the support for evolution provided by fossils. What do those who are against evolutionsay about fossils andtheir existence? The theory of natural selection and the conflicts with the creationist theory. The emotions connected with climate change and global warming. How scientific understanding and theories develop and the limitations of science. The importance of scale in terms of time, size and space.	Fitness and health of society and the rise oftype 2 diabetes. Car safety issues and regulations in different countries. Generation and transmission of electricity around the world. The importance of the application of physics to issues of global importance, suchas how seismologists locate an earthquake Effects of contraception of healthin developing countries.	Prolife discussion around faith and personal choice plus contraception and the impact on world health. Impressing on students that they allhave equal access to learning and can use that and our support to become whet everthey want with out prejudicial impedance.

Year	Social	Moral	Spiritual	Cultural	British Values
Year 11	Application of key skills in investigations; teamwork, problem solving, evaluating own progress, peer work. Student enjoyment of the subject through practicals around qualitative analysis. Respiration and Exercise – this is made practical which allows students to develop knowledge in a hands-on and fun way. It allows the application of science to everyday events and increases students understanding of what is happening in their bodies during exercise. The need for electrical safety. Highlighted possible scientific career and further education choices. Importance of wider understanding when assessing information presented to society and the influence it may have.	Industrial production of chemicals – How the procedures are carried out, potential risks to the area, and pollution issues. Green chemistry. The rise of diabetes amongst the human population and the need to control the levels of sugar in our diet. The role of humans in the ecosystem, both the positive and negative effects that we are having, along with the steps that we can take to minimise our impact.	Enjoyment of learning – applications of chemistry in real world scenarios. The Standard Model of particle physics and how it came about. The evidence for the origin, structure and continuing evolution of the Universe. How physics principles are vital in modern medicine in the way in which they are applied to diagnosis, treatment and storage of medicines.	The applications of science in the real world through the use of IVF as an example. Fermentation – How the process of fermentation influences modern life. Water testing - our reliance on this process. The differing uses of medical techniques across the world. The future of nuclear fusion as a way of generating electricity. Consider the role that physics and physicists play in providing safe and useful machines. Look at how international collaboration is necessary for the building of particle accelerators and how these can lead to new discoveries about the world around us.	Impacts of education on wealth and links to health as young learners making choices in society and the science behind that and collecting and presentation of evidence around government policy. Impressing on students that they all have equal access to learning and can use that and our support to become whet ever they want without prejudicial impedance. Particularly in relation to revision and teacher feedback and support.

Promoting SMSC and British Values in A Level Science lessons

Year	Social	Moral	Spiritual	Cultural	British Values
Year 12 Bio	Application of key skills in investigations; teamwork, problem solving, evaluating own progress, peer work. Opportunities for creativity. Breaking down problems together to plan investigations. Producing shared resources. Exam skills and sharing misconceptions.	HIV and the attitudes of society towards suffers. Biodiversity of organisms and the impact of humans on the environment. Health and fitness in relation to heart and diseases such as malaria.	There are biochemical relationships between all organisms - does this provide evidence for evolution? Adaptation of organisms to their environment or intelligent design? To what extent are trees and plants 'living'?	Real world situation of HIV in the developing countries, applications of science - cures for HIV? Biodiversity and conservation and impact on local populations and tourism.	Through Statistics we discuss the importance of understanding data presented and how it can be manipulated. Discussed in relation to use of national data and political campaigning etc. National and International Environmental law and its impacts on local and global policy and politics. National Parks etc. Vaccination and the right to choose but impacts on wider society.
Year	**Social**	**Moral**	**Spiritual**	**Cultural**	**British Values**
Year 13 Bio	Application of key skills in investigations; team work, problem solving, evaluating own progress, peer work. Opportunities for creativity. Breaking down problems together to plan investigations. Producing shared resources. Exam skills and sharing misconceptions.	Biotechnology and its applications. Cloning - advantages, disadvantages and arguments for and against. The rights and wrongs of genetic manipulation. Stem cells and their potential uses. Cloning. Food production and providing for world needs. Sustainability and conservation.	What determines sex, and is this different to gender?	Gene therapy. Sustainable management, conservation and humans and the Galapagos and Arctic. Study of the Terai Region in Nepal and Maasai Mara in Kenya as part of wider conservation study.	Through Statistics we discuss the importance of understanding data presented and how it can be manipulated. Discussed in relation to use of national data and political campaigning etc. National and International Environmental law and its impacts on local and global policy and politics.

Year	Social	Moral	Spiritual	Cultural	British Values
Year 12 Chem	Application of key skills in investigations; teamwork, problem solving, evaluating own progress, peer work. Opportunities for creativity.	The atmosphere. Issues around CFCs, ozone etc. Fritz Haber – work for the Nazis, but also invention of Haber Process.	Haber process. What are the optimum reaction conditions given cost, pressure and possible explosions.	Environment issues around plastic bags. Discussion of gender balance of names on Periodic Table (*e.g.* curium and meitnerium named after women) and diversity of people.	Syntheses of drugs (*e.g.* aspirin). Rights and wrongs of legal/illegal drugs. Models of the atoms, showing the fact that people can have different beliefs and that the different models all still work.
Year	**Social**	**Moral**	**Spiritual**	**Cultural**	**British Values**
Year 13 Chem	Breaking down problems together to plan investigations. Producing shared resources. ISAs and comparing research summaries. Exam skills and sharing misconceptions.	How the development of new chemicals is impacting on the less developed world. During transition metals, mentioning of cis-platin – cancer drug. Comparison of NMR and MRI.	Colour chemistry – Inspiring – the origin of colour and how we perceive it.	Green chemistry – Problems in the 70s and 80s with CFCs. Combustion of organic compounds, forming greenhouse gases.	Nitration of benzene/toluene – formation of explosives. Light touch on their usage. Use of analysis techniques in solving of crimes, and injustices prior to 1992 (when DNA was discovered).

Year	Social	Moral	Spiritual	Cultural	British Values
Year 12 Phys	Application of key skills in investigations; team work, problem solving, evaluating own progress, peer work. Opportunities for creativity.	Demonstrate and describe ethical, safe and skilful practical techniques. Consider ethical issues in the treatment of humans, other organisms and the environment.	Awareness of the on-going development of new ideas in physics. The fundamental properties and nature of matter, radiation and quantum phenomena.	Analyse and explain the impact of their own and others experimental and investigative activities. Appreciate the role of the international scientific community in validating new knowledge and ensuring integrity.	The physics curriculum is designed to enable students to be curious and discover new ideas and test theories. This discovery encourages the development of a student's self-confidence and their self-esteem. **The rule of law -** The students review the health and safety processes within their education or training institution. Understanding of the need to have speed limits enhanced through the study of speed, force and change of momentum in Physics **Individual liberty -** they discuss the extent that this exists or is limited by regulation. They might also discuss their own freedom of choice in terms of future education and career choices. **Tolerance and mutual respect -** they discuss this in relation to cooperation in the classroom working with their fellow students and staff.
Year	**Social**	**Moral**	**Spiritual**	**Cultural**	**British Values**
Year 13 Phys	Breaking down problems together to plan investigations. Producing shared resources. ISAs and comparing research summaries. Exam skills and sharing misconceptions. Individual activities that provide the opportunity for self-reflection, awareness and challenge.	The use of nuclear power and its positive and negative effects on the environment and society. Demonstrate and describe ethical, safe and skilful practical techniques. The use of nuclear weapons and the use of nuclear energy.	Astrophysics – origins of the Universe. Insight into the behaviour of objects at great distances from Earth and discover the ways in which information from these objects can be gathered.	The development of the theory of special relativity. Celebrating the role scientists have played in our society. Raising awareness that scientific developments are the product of many different cultures.	Similar to year 12 but specifically **Democracy – nuclear power** Different opinions on how the Universe began and the future of the Universe.