British Values - Science

KS3 Science

Respect civil and criminal law

- The law in the UK and debate on whether drugs in sports are ok. Debating skills and experience link into British values and the School ethos i.e. the tolerance and acceptance of other people's views.
- Students follow laboratory rules for the safety of all. This lends itself very well to British values of respect, tolerance, teamwork, resilience and self-esteem.
- We can bring in lots of examples of past and present British scientists with pictures, newspaper articles and short videos of their successes for example Dalton and Watson and Crick. Get students to do research into a past or present British scientist as homework project for this topic.
- Understanding the need to have speed limits (speed, force, change of momentum)
- Smoking, alcohol, drugs and the law (guidelines for the legal limit)
- Crime scene investigations (chromatography and finger print analysis)

Appreciate viewpoints of others on ethical issues

- Students are taught through student debates in issues such as whether transplants should be given to certain individuals and not others.
- Stem cells & selective breeding – areas for debate and discussion in relation to UK laws and the ethics of selective breeding. This fits in very well with the ideas behind British values and the school's ethos i.e. debates provide an opportunity to encourage tolerance and acceptance of other people's views.
- Health – staying healthy Supersize vs Superskinny – pictures of UK celebrities, newspaper articles, NHS guidelines, debates on funding and payment for operations and treatments for those who have made poor lifestyle choices.
- Pollution: Combustion – what is the dangers of carbon monoxide poisoning.
- Human reproduction – first IVF babies. Can bring in Religious values and British values into this topic in relation to RESPECT and TOLERANCE
- Biodiversity – should zoos be allowed debate, importance of maintaining biodiversity.
- Evolution. Looking at the theories and how this could be compared to religious text.

Acceptance and engagement with fundamental British values of democracy

- Forces and electricity – link to British technology firms and advancement made in knowledge based on British scientists' discoveries e.g. Faraday. Building electrical circuits requires teamwork, resilience and show respect to others.
- Reproduction – inclusion and discussion of the LGBTQ community

Contribute positively to life in Modern Britain

- Discussion about microbes, e.g. Coronavirus and how we can limit the spread and help supress the effects.
- The science department have celebrated the influence and contribution to science by female scientists which is deployed on our corridors.
- During acid and alkali and plant cell lessons can discuss UK farming and different soil conditions in the UK. Helen Sharman carried out agricultural experiments whilst up in space
- Effects of extreme hot climates - can find newspaper articles when it has got hot in the UK and the advice given by the NHS and governments when it gets hot and cold. And effects on other organisms e.g. animals
- Ecology – using different methods of increasing and sustaining biodiversity. Looking at human impact of certain areas.

KS4 Science

Respect civil and criminal law

- Law is an integral part of science. New research into drug design, stem cell technology (e.g. Year 10 genetics), genetic engineering (e.g. year 10 genetics), mining, engineering, mobile phone and computer research all have to follow strict laws that govern their safety and application.
- From patenting work to following British Safety Standards to destroying a cloned embryo before thecells can specialize (e.g. year 10 genetics), civil and criminal law must be considered by all scientists developing new and existing technology.
- Students are challenged to understand the reasoning behind such laws and how legislation can differ between different countries and how this may impact upon Britain itself. An example is the easing of America's stance on genetic modification research has led to many scientists leaving Britain to get bigger grants in America.
- We actively promote civic institutions so that students value and appreciate the local the Health system, the Police, the justice system and Social Services and how Science has an active role in theday to day functioning of these establishments.

Appreciate viewpoints of others on ethical issues

- Science has many complex ethical issues from genetic engineering, cloning, (e.g. year 10 genetics) drug testing andpollution to nuclear power stations (year 10 topic CP3 energy).
- Students are expected to weigh up both sides of any argument and provided a reasoned responsethat underpins their own stance to these issues.
- This is done through debates, links with industry, Science Week events, examinations and ResearchPrep tasks.

Acceptance and engagement with fundamental British values of democracy

- Science is a universal language and discipline that can be used anywhere in the world regardless of race, language or religion. We show, through initiatives such as the Human Genome Project, how Scientists collaborate worldwide to share data, theories and conclusions. The physics behind buildinga bridge are the same in Britain as they are in Nairobi. The element Gold has the same symbol in the periodic table regardless of whether it is English or Arabic being spoken (e.g. year 10 topic CC4 periodic table).
- Through topics such as evolution (year 10 biology topic 4), biodiversity (year 11 biology topic 9) and variation, we emphasise how we are all the same species regardless of ethnicity, background or beliefs. This supports the British ethos behind democracy.

Contribute positively to life in Modern Britain

- From inventing the World Wide Web, to mobile phones (physics year 10 EM waves), laptops, electricity (e.g. year 11 CP9 electricity), televisions, bicycles, Stem Cell Transplants (year 10 genetics), DNA Fingerprinting and Marmite, no other country has contributed so much to modern life in the 21st Century. The Science Faculty promotes this through its teaching and through its elevation of such notable scientists as Charles Darwin, Robert Hooke, Stephen Hawking,Watson and Crick, Rosalind Franklyn and Jocelyn Bell Burnell.
- By setting these examples and role models, we endeavour to support a new wave of scientists who will contribute positively to modern Britain. In 2014, the majority of our highest achieving studentswent on to study science based courses at the best Universities in the country.
- The fundamental principle of Science is to understand the world in such a fashion so as to improvethe quality of life for all species that inhabit it.

KS5 Biology

Respect civil and criminal law

- Law is an integral part of science. New research into drug design, **stem cell technology** 2.1.6 Cell diversity and cellular organisation, **genetic engineering** 6.1.3 Manipulating Genomes, mining, engineering, mobile phone and computer research all have to follow strict laws that govern their safety and application.
- From patenting work to following British Safety Standards to destroying a **cloned embryo** 6.2.1 Cloning and biotechnology (Arguments for and against using cloned plant and animal embryos.) before the cells can specialise, civil and criminal law must be considered by all scientists developing new and existing technology.
- **Students are challenged to understand the reasoning behind such laws and how legislation can differ between different countries** 4.2.1 Biodiversity. (The ecological, economic and aesthetic reasons for maintaining biodiversity.) and how this may impact upon Britain itself. An example is the easing of America's stance on genetic modification research has led to many scientists leaving Britain to get bigger grants in America.
- We actively promote civic institutions so that students value and appreciate the local the Health system, the Police, the justice system and Social Services and how Science has an active role in theday to day functioning of these establishments.

Appreciate viewpoints of others on ethical issues

- Science has many complex ethical issues from **genetic engineering**, 2.1.6 Cell diversity and cellular organisation **cloning,** 6.2.1 Cloning and biotechnology drug testing and pollution to nuclear power stations.
- Students are expected to **weigh up both sides of any argument and provided a reasoned response** 6.2.1 Cloning and biotechnology (Arguments for and against artificial cloning in animals.) that underpins their own stance to these issues.
- This is done through debates, links with industry, Science Week events, examinations and ResearchPrep tasks.

Acceptance and engagement with fundamental British values of democracy

- Science is a **universal language and discipline that can be used anywhere in the world** 4.2.2 Classification and evolution (Use of a universal taxanomic system so that anyone in the world, no matter what language they speak, is able to understand it.) regardless of race, language or religion. We show, through initiatives such as the **Human Genome Project**, 6.1.3 Manipulating genomes how Scientists collaborate worldwide to share data, theories and conclusions. The physics behind building a bridge are the same in Britain as they are in Nairobi. The element Gold has the same symbol in the periodic table regardless of whether it is English or Arabic being spoken.
- Through topics such as **evolution, biodiversity and variation, we emphasise how we are all the same species regardless of ethnicity, background or beliefs** 4.2.1 Biodiversity (Similarites between all living things in terms of variation of DNA.) This supports the British ethos behind democracy.

Contribute positively to life in Modern Britain

- From inventing the World Wide Web, to mobile phones, laptops, electricity, televisions, bicycles, **Stem Cell Transplants,** 2.1.6 Cell division and cellular organization (use in research and medicine) DNA Fingerprinting and Marmite, no other country has contributed so much to modern life in the 21st Century. The Science Faculty promotes this through its teaching and through its elevation of such notable scientists as **Charles Darwin**, 4.2.2 Classification and evolution **Robert Hooke**, 2.1.1 Cell structures (Not in specification, but is usually mentioned.) Stephen Hawking, **Watson and Crick, Rosalind Franklyn** 2.1.3 Nucleotides and nucleic acids (Not in specification, but is usually mentioned.) and Jocelyn Bell Burnell.

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KS5 Chemistry

Respect civil and criminal law

- Safety in lab
- Care in dealing with chemicals and subsequent disposal
- Students should also consider the ethical issues presented by their work in the laboratory, which might include consideration for using minimum quantities of resources, such as through microscale procedures; the safe disposal of waste materials, especially from organic reactions; and appropriate consideration for other people involved in their own work or who is working nearby

Acceptance and engagement with fundamental British values of democracy

- Students can consider how the historical development of theories explaining acid and base behaviour show that scientific ideas change as a result of new evidence and fresh thinking.
- They can also appreciate that catalyst research is a frontier area, and one which provides an opportunity to show how the scientific community reports and validates new knowledge.

Contribute positively to life in Modern Britain

- Students have an understanding of how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society
- Fuel cells and alternative source of energy - Students can also consider how chemists continue to search for alternative sources of energy, through the development of fuel cells
- Polymers - students can consider how the polymer industry provides useful solutions for many modern applications, but poses questions about sustainability of resources and the feasibility of recycling.
- Students can consider how an appreciation of equilibrium processes, coupled with kinetics, can lead chemists to redevelop manufacturing processes to make them more efficient

Appreciate viewpoints of others on ethical issues

- An understanding of how society makes decisions about scientific issues and how the sciences contribute to the success of the economy and society
- Students should also consider the ethical issues presented by their work in the laboratory, which might include consideration for using minimum quantities of resources, such as through microscale procedures; the safe disposal of waste materials, especially from organic reactions; and appropriate consideration for other people involved in their own work or who is working nearby
- They will also encounter practical organic chemistry, showing them how chemists work safely with potentially hazardous chemicals by managing risks.
- Students can consider how the historical development of theories explaining acid and base behaviour show that scientific ideas change as a result of new evidence and fresh thinking.

KS5 Physics

Appreciate views of others on ethical issues

Students are expected to be able to form reasoned opinions on ethical issues surrounding the applications of science and technology, such as nuclear power, the defence industry, and justification for the funding of scientific research that might be of limited humanitarian value. They are expected to have an understanding of arguments on both sides of the issues, and respect opinions drawn. This is done through classroom discussion, science week events, and research tasks.

Contribute positively to life in modern Britain.

Students are expected to have an awareness of how British scientific and technological endeavour has shaped the modern world. The World Wide Web, mobile phones, laptops, electricity, televisions, bicycles, Stem Cell Transplants, and DNA Fingerprinting are all contributions that shape their lives. The history of science contains many notable British contributions, and the physics department promotes this through its teaching and through its elevation of such notable scientists as Robert Hooke, Isaac Newton, Michael Faraday, James Clerk Maxwell, Stephen Hawking and Jocelyn Bell Burnell. The roll of the UK in international scientific projects such as CERN and the James Webb space telescope are also highlighted.

By setting these examples and role models, we endeavour to support a new wave of scientists who will contribute positively to modern Britain. In 2014, the majority of our highest achieving students went on to study science based courses at the best Universities in the country.

The fundamental principle of Science is to understand the world in such a fashion so as to improve the quality of life for all species that inhabit it.