

## *Spiritual, Moral, Social & Cultural Development (SMSC) in*

### **SCIENCE**

Science is a distinctive form of creative human activity which involves a way of seeing, exploring, understanding and explaining the natural and physical world. Scientific ideas are exposed to being refuted through experimentation. However, pupils need to appreciate that science is not neutral and that the environment in which they operate influences scientists and the pursuit of science. Science is therefore a cultural activity, practised in particular social, political and economic contexts.

- **SPIRITUAL DEVELOPMENT**

*Can be enhanced by helping pupils to appreciate the beauty and majesty of the natural and physical world:*

Pupils learn to appreciate the difference between living and non-living things. Science classifies living things into two main groups: Plants and Animals, where humans form part of the Animal Kingdom. Plants and animals share the same features of life such as movement, respiration, sensitivity (to their surroundings e.g. light, touch), growth, reproduction etc. and animals depend upon plants for their survival, by providing food, oxygen and resources.

Pupils also consider the vast range of plant and animal species and are given opportunities to study them first hand. They learn how plants and animals have become adapted to surviving in different environments and that the variety of life is so extensive that scientists have still not identified all living things. Pupils learn to classify living things, in order to identify and appreciate their unique and varied physical characteristics, so that they can have a better understanding of the individual needs and requirements of plant and animal species and promote greater respect for all living things.

Pupils learn to appreciate that human activity such as hunting, deforestation, pollution, over-utilisation of non-renewable resources, can have a severe impact on all plants and animals within the global community and that it has already led to the extinction of certain plant and animal species. The eradication of a species is viewed as a tragic loss to the global community.

- **MORAL DEVELOPMENT**

*Can be enhanced through helping pupils to recognise the moral implications of scientific evidence:*

Scientific evidence can be distorted to prove different viewpoints. For example, when analysing the effects of drugs, pollutants, radioactive products and genetically modified foods on humans. In the work on reproduction, genetics, inheritance and selection, there are opportunities to discuss issues relating to contraception and abortion as well as inherited genetic disorders and cloning.

Since scientists have their own belief framework, it is important for scientists to uphold values of integrity. During Scientific Investigations pupils are therefore encouraged to be thorough in all operations, including observation, calculating, analysing evidence and reporting; to be open minded and willing to look for new evidence facts and theories; to be self-critical and to encourage others to criticise their work.

- **SOCIAL DEVELOPMENT:**

*Can be enhanced through helping pupils to see how science can be used to solve problems, which can help to improve the conditions in which people live:*

During their study on Electricity, pupils are asked to imagine what life would be like without electricity. Similarly, the unit of work on Energy allows pupils to consider the importance of crude oil as a non-renewable resource, to generate electricity for industrial and domestic uses, as well as a material resource for thousands of different specialised and everyday medicines and chemicals.

- **CULTURAL DEVELOPMENT:**

*Enhanced through enabling pupils to appreciate that people from all societies now and in the past have been involved in scientific exploration and discovery:*

Too frequently scientific endeavour is presented from a Euro centric or westernised perspective. Thus pupils are familiar with the achievements of Edison and Faraday in connection with electricity, but not with Latimer a black scientist who invented the first long lasting carbon filament lamp in 1881.

Florence Nightingale's work as a nurse was popularised during the Crimean war. However, racist attitudes initially prevented Mary Seacole from working as a nurse in the Crimea. Seacole eventually financed herself to make the lengthy journey to the Crimea. She nursed soldiers for a longer period of time than Nightingale and gained the same level of popularity amongst the soldiers.

Dr. Charles Drew was the first to develop a method of separating plasma from blood, so that blood could be stored and utilised when needed. Dr. Drew was seriously injured in a car accident and needed blood to save his life. When he was rushed to the nearest hospital, he was refused attention because he was black. In 1950 hospitals in the USA were still segregated by race. He died before reaching a hospital that treated black people, since this was located much further away.

The above examples could be issues for discussion during work on Electricity, Health and Humans as Organisms. There are opportunities to help learners to question the reasons underlying inequalities between peoples and nations and relate those issues to those of global interdependence.

The interpretation of natural and physical phenomena may differ from one culture to another. This is an important consideration since science has its limitations and cannot always provide clear-cut answers, particularly at the boundaries of scientific knowledge.