



## CULTURAL CAPITAL OPPORTUNITIES IN SCIENCE

**Below are some examples of how Cultural Capital is incorporated into our KS3 and KS4 curriculum.**

	<b>Term 1</b>	<b>Term 2</b>	<b>Term 3</b>
<b>Year 7</b>	<p>Research of a scientist. Working in a laboratory environment – considering hazards, risks and safety. Hazard symbols. Force-extension linear relation, Hooke’s Law as a special case. Chromatography and how it is used, for example in drug testing and forensic analysis. The Brownian motion in gases and how its explanation using particle theory finally established the theory within the scientific community.</p>	<p>Fire safety and the fire triangle and the importance of using the correct type of fire extinguisher for a particular fire type. Neutralisation reactions and how they are useful in everyday life. Uses of indicators. Chemical reactions in everyday life.</p>	<p>Human reproduction – pregnancy, including the effect of maternal lifestyle on the foetus through the placenta, IVF, puberty, menstrual cycle. The interdependence of organisms in an ecosystem, how organisms affect, and are affected by their environment, including the accumulation of toxic materials.</p>
<b>Year 8</b>	<p>Content of a healthy human diet, comparing energy values of different foods. The consequences of imbalances in the diet, including obesity, starvation and deficiency diseases. Aerobic and anaerobic respiration in humans and microorganisms.</p>	<p>Gravity in space. Our Sun as a star, other stars in our galaxy, other galaxies. Looking at how technological developments have increased our knowledge of the Solar system. Magnets, electromagnets and their uses.</p>	<p>Vaccinations – the story of Edward Jenner. Introduction to Dalton’s atomic theory. Photosynthesis in plants and the role they have in providing oxygen.</p>
<b>Year 9</b>	<p>Darwin, evolution and natural selection. A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. Importance of maintaining biodiversity and the use of gene banks. The principles underpinning the Mendeleev Periodic table. Chemical reactions – for example displacement reactions including the Thermite reaction. Insulators and conducting materials.</p>	<p>Fuels and energy resources (renewable and non-renewable) Calculating fuel bills and understanding the cost of electricity. Examples of energy transfers. Sankey diagrams, comparing the efficiency of different appliances.</p>	<p>Levers and their uses and moment calculations. Energy transfers- for example how the design of a building or appliance can impact individuals and the environment. Convection currents linked to hot air balloons, breezes and boiling water.</p>

	<b>Biology</b>	<b>Chemistry</b>	<b>Physics</b>
<b>Year 10</b>	<p>The brain and techniques to explore it.</p> <p>Discovery of antibiotics and antibiotic resistance.</p> <p>Vaccines and herd immunity.</p> <p>Drug trials.</p> <p>How diseases are spread and prevented.</p> <p>Aseptic techniques.</p> <p>Non-communicable and lifestyle diseases.</p> <p>DNA/ extraction of DNA.</p> <p>Mendelian genetics.</p> <p>Evolution of humans including the evidence found.</p> <p>Advantages and disadvantages of selective breeding.</p> <p>Tissue cultures in breeding programs.</p> <p>Genetic engineering and its uses.</p>	<p>The history of the Periodic table.</p> <p>The uses of diamond, graphite and graphene.</p> <p>Simple distillation and fractional distillation.</p> <p>Making drinking water safe.</p> <p>Extraction of metals from their ores by electrolysis, reduction by carbon, phytoextraction and bacterial.</p> <p>Evaluation of the advantages of recycling metals.</p> <p>Consideration of the life cycle assessment of a product.</p> <p>The Haber process.</p>	<p>Energy resources, renewable and non-renewable and the impact of choices</p> <p>Conservation of energy</p> <p>Energy efficiency including insulation of building</p> <p>Understanding radiation and the issues associated with it</p> <p>Nuclear power and the issues associated with it</p> <p>Forces and energy related to moving objects</p> <p>Understanding waves and wave behaviour</p> <p>Properties and uses of the electromagnetic spectrum</p>
<b>Year 11</b>	<p>Control of blood sugars and diabetes.</p> <p>The Menstrual cycle.</p> <p>Fertility treatments.</p> <p>Contraception.</p> <p>How the kidneys work and dialysis treatment.</p> <p>How plants grow and the factors affecting the rate of photosynthesis.</p> <p>Blood, blood vessels and the circulatory system.</p> <p>Calculating cardiac output.</p> <p>Fieldwork techniques.</p> <p>Abiotic and biotic factors affecting ecosystems.</p> <p>Food security.</p> <p>Maintaining biodiversity.</p> <p>Use of fertilisers and crop rotation.</p> <p>Food preservation.</p>	<p>The addition of a catalyst to speed up a chemical reaction.</p> <p>Examples of endothermic and exothermic reactions.</p> <p>Crude oil as a finite resource and an important source of useful substances.</p> <p>Complete and incomplete combustion of hydrocarbons and the products of combustion.</p> <p>Pollutant gases and the problems they cause.</p> <p>Advantages and disadvantages of using hydrogen, rather than petrol, as a fuel in cars.</p> <p>The potential effects on the climate of increased levels of carbon dioxide and methane.</p>	<p>Work done, power and energy</p> <p>Forces and their effects including vector diagrams</p> <p>Electricity, circuits and electrical safety</p> <p>Static electricity and uses</p> <p>Generating electricity and the national grid</p> <p>Motors and the motor effect</p> <p>Magnets and magnetism, linked to the earth's magnetic field</p> <p>Uses and function of transformers</p> <p>Car stopping distance and crash safety</p> <p>Understanding particles, density and forces</p>

***\*The KS3 science curriculum is taught on a rotational basis and therefore termly sequences may be different.***

Pupils are also provided with opportunities beyond the National Curriculum to further support Cultural Capital in Science

- Year 7 trip to London visiting the Science and Natural History museums
- Year 10 experiencing lectures by world leading Scientists at GCSE Science Live in Manchester
- Extra- curricular Science club for Year 7 and Year 8 pupils.