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| **Image result for Doncaster school for the deaf logoScience Secondary Curriculum Overview** |
| As a core subject, all pupils study Science at Key Stage 3 and Key Stage 4 and this follows age-appropriate National Curriculum programmes of Study. Our teaching at Doncaster School for the Deaf is planned to inform and engage, covering a broad, balanced curriculum with suitable challenge for all learners.  In Years 7 and 8 this is delivered as a 2 year Key Stage 3 curriculum, following the AQA Activate scheme. Our learners are largely working at levels well below their chronological age and many have substantial gaps in their science knowledge and understanding from Key Stage 1 and 2, alongside delays in language and literacy. As a consequence all new students complete a baseline test on entry and Key Stage 3 teaching and coverage is adapted to address the needs of each group, as well as differentiated for individual pupils.  Secondary science teaching uses a high proportion of practical activities and experimental work, making the concepts as visual and tangible as possible to make learning more accessible. Students are introduced to scientific equipment and laboratory safety at the earliest stage, with recaps as necessary for older year groups, and the skills needed to plan and work scientifically and complete valid investigations are embedded throughout all the secondary science topics.  Scientific ideas necessarily involve a wide range of specific language to accurately explain and describe and our teaching reflects this with a focus on teaching new vocabulary explicitly at the start of every new topic, reinforced by regular use in lessons and by highlighting more general literacy connections as they arise. Science is also fundamental in many aspects of our modern lives and the way our world functions, and opportunities for making connections with the incidental and everyday role that science ideas have in our common experiences are also emphasised in lessons. This is explicitly planned to complement development of our pupil’s range of life skills, and also supports the acquisition of seemingly common knowledge that may be absent or only superficially understood by many of our Deaf learners.  All pupils study the Key Stage 4 curriculum in Years 9 and 10, following the AQA Entry Level Certificate in Science specification. This allows them to cover the broad range of Key Stage 4 science topics at an accessible level and with assessment by end-of-topic tests in-class (Externally Set Assignments) and investigative coursework (Teacher Devised Assignments) rather terminal exams. AQA’s Entry Level specification is also designed to closely parallel their core GCSE science courses and in Year 11 more able pupils have the option to transition to single GCSE science courses in Biology, Chemistry or Physics. |

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|  | **Biology** | **Chemistry** | **Physics** |
| Year 8 | 1: Breathing + Digestion   * Measuring breathing and the parts of our respiratory system. * Gas exchange in the lungs. * Nutrients in a balanced diet and food tests for carbohydrate, sugar, protein and fat. * The parts of the digestive system. * What are useful and harmful drugs. * The effects on health of smoking and alcohol.   2: Respiration + photosynthesis   * Energy from fuel+oxygen. * Describing respiration in cells. * Photosynthesis in plants * Investigating leaves and measuring photosynthesis.   3: Evolution   * Natural selection and the idea of evolution. * Examples of evolution – animals and humans. * Extinction of species. | 1: Elements and Periodic Table   * Atoms and elements. * Elements on the periodic table. * Examples of joining elements to creating molecules. * Modelling molecules (molymod and computer). * Writing chemical formulae. * Similar elements – groups on the periodic table (demonstrate group 1 metals)   2: Earth climate+resources   * Global warming and greenhouse gases. * Where do metals come from – ores and extracting metals. * Global resources and recycling.   3: Types of reactions   * Atoms in reactions. * Combustion reactions. * Thermal decomposition reactions. * Exothermic and endothermic reactions. | 1: Forces + Pressure   * Contact and non-contact forces * Friction and drag forces (water resistance investigation) * Measuring pressure in gases and liquids * Calculating foot pressure   2: Energy, work, machines   * Simple examples of working machines and work done = energy. * Measuring temperature - energy and temperature. * Energy transfer. Heat conduction, convection and radiation.   3: Sound, light, waves   * Sound as a wave vibration in solid, liquid and gas/ Sound wave properties: loudness/amplitude, pitch/frequency. * Light movement, light rays and reflection and refraction. * The human eye and vision.   4: Magnetism + Electromagnets   * Magnetic materials, magnets and poles (attraction, repulsion). * Investigating magnets and magnetic fields. * Creating electromagnets. * Demonstrating uses of electromagnets. |
| Year 7 | 1: Cells, organs, organisms   * What are plant & animal cells: parts inside cells. * Use microscopes to study cells. * Examples of specialized cells and their functions. * Comparing unicellular and multicellular organisms.   2: Interdependence +Ecosystems   * Describing feeding relationships in food chains + food webs. * Examples of habitats and animal adaptations. * Looking at different types of competition in ecosystems.   3: Reproduction   * Adolescence and human reproductive organs * Fertilisation and the growth of a foetus. * Stages of the menstrual cycle *(period sanitary products - tampons and towels)* | 1: Reactions of metals/non-metals   * *What are metals – observing + testing properties.* * *What are reactions?* * *Rusting and reactions of metals with water* * *Which metals react faster? The reactivity series* * *Reactions of metals and oxygen and acid.* * *Writing simple reactions (word equations)*   2: Reaction of Acids   * What are acids and alkalis? * How to test for acids and alkalis * Testing strong or weak acids and pH numbers. * Neutralising acid and alkalis. * Indigestion investigation   3: Particles + Mixtures   * Solid / liquid / gas particle models * Changes of state – boiling and melting, temperature curves * Demonstrating diffusion of particles in gas, liquid and solid * Mixtures and using separating techniques – filtration, evaporation, distillation and chromatography   4: Earth+Space   * What is inside the Earth. * Types of rocks – sedimentary and igneous. * Changing rocks – metamorphic rocks and the rock cycle. | 1: Forces, Speed and gravity   * What are forces? * Measuring and comparing balanced and unbalanced forces. * Measuring and calculating speed. * Speed investigation – distance time graphs. * Gravity – mass and calculating weight.   2: Energy Sources + Transfer   * Observing the energy in food and fossil fuels. * Renewable and non-renewable energy resources. * Energy stores and describing energy transfers. * Energy maths – energy is not lost (conservation of energy).   3: Circuits+electricity   * Creating and drawing simple circuits – series and parallel. * What is current – measuring current in circuits. * What is voltage – measuring potential difference of power supplies and in parts of a circuit.   4: Earth+Space   * Objects in space: planets, moons, sun and stars, galaxies. * Our solar system * The Earth and moon – why the moon has phases. * The Earth and sun – why we have seasons. |
|  | **Biology** | **Chemistry** | **Physics** |
| Year 11 | Option to study for single subject GCSE science (Biology, Chemistry, Physics) following the AQA single science specifications complementing the Entry Level Y9, 10 course. | | |
| Year 9,10 | Component 1: The Human Body   * Using microscopes, looking at cell parts and their functions, and how specialized cells are adapted for their jobs. * Levels of organization in the organism: cells into tissues, tissues into organs, organs into organ systems and revising the position and function of the major organs. * How the heart and circulatory system works and the job done by different components of our blood. * The parts of the digestive system and their roles. Investigating how enzymes work and help in digestion. * What happens in cellular respiration, respiration products and reactants, and how they are used and provided by the body. * The health effects of lifestyle choices such as overeating, drugs, alcohol, smoking and how to stay healthy and fit. * How infectious diseases spread by pathogens, bacteria and viruses, and how these make us ill. The way our immune system works, and the 2 types of white blood cells that stop pathogens. Investigating antibiotics to kill bacteria and the way vaccinations stimulate the immune system. * How our nervous system is used to sense and control our body, investigating the speed of reactions and learning the steps involved in a reflex arc. * Control of organs by hormones and some key glands and target organs. How hormones control stages in the menstrual cycle.   Component 2: Environment, Evolution + Inheritance   * What happens in photosynthesis, products and reactants of photosynthesis and how the plant uses or provides them. * Stages in food chains and webs, the terminology for plants/animals and different levels of food chains. * Decomposition as another food chain process that recycles energy in the chain. The carbon cycle and the way decomposition recycles carbon. * How some organisms are adapted to their habitat and examples of beneficial adaptations, in hot and cold habitats. Different types of competition animals and plants. * Examples of different environmental changes that affect animals and plants (grouped into living, biotic, and non-living, abiotic, changes). * Effects of human population of the natural environment such as pollution and habitat loss. * Natural selection and evidence for evolution (fossils + living selection) Using artificial selection in breeding and farming. * The location of genes as a code on DNA strands, stored as chromosomes in the cell nucleus. Genetic inheritance in sexual and asexual reproduction of living organisms, looking at examples of variation and clones. | Component 3: Elements, mixtures and compounds   * Atoms as the building blocks of all substances - elements and their locations / similarities on the periodic table. * Creating compounds – observing example reactions, demonstrating new properties of the compounds, and modelling the compound creation. * States of matter – using a particle model to observe atom spacing and movement in the 3 states of matter and what happens in phase changes. * Different forms of carbon (allotropes) and explaining their properties from models of their structure. * Mixtures and practical techniques to separate them (filtration, evaporation, distillation, chromatography). * The useful properties of different metals (conduction, hardness, strength, melting point, resistance to corrosion), how to test these and some example uses of particular metals. Examples of metal alloys. * Extraction of metals from the earth – pure metals and metal-rich ores. Smelting reaction of copper with carbon. The impacts of mining and benefits of metal recycling. * The chain structure of polymers, polymer properties and the uses of some common polymers.   Component 4: Elements, mixtures and compounds   * The properties of acids and bases, acid neutralisation reactions demonstrating the products created, acid-metal reactions and testing for hydrogen gas. * Energy in reactions, investigating thermal energy and reaction speed, examples of exothermic and endothermic reactions. * Measuring rate of reactions and how to change it (heat, particle size = surface area, concentration). * Crude oil as a mixture of hydrocarbon fractions, how fractional distillation separates different fractions by their boiling points. * Demonstrating complete combustion of fuels and testing the products, the combustion equation, products of incomplete combustion and acid pollution from sulphur-rich fuels. * Changes in atmosphere, looking at pie charts of ancient and current atmospheres, processes that have changed the atmosphere. Greenhouse gases and atmospheric warming. * Creating safe drinking water (filtering out contaminants and microbes and chlorine sterilisation). | Component 5: Energy, Forces + Structure of Matter   * Energy types and transfers, simple examples including heat loss, identifying useful and waste energy out, conservation of total energy. * Fossil fuels and renewable energy, examples and advantages of non-renewable and renewable sources of energy. * The effects of forces: examples of work done by movement and against friction (demonstrating heat created by friction) . * Measuring speed, using a formula to calculate speed using different units. * Stopping distances, factors that affect braking and thinking distance, measuring reaction times. * Simple atomic structure, properties of radioactivity from the atomic nucleus – alpha, beta, gamma penetration and dangers.   Component 6: Electricity, Magnetism + Waves   * Simple series and parallel circuits, measuring current in series circuits, how current is changed by resistance in the circuit, measuring voltage across batteries/components. * Examples of direct and alternating current, demonstrating their properties on an oscilloscope. * Mains wiring in a plug, electrical safety from earth wires and fuses, double insulated appliances * Measuring electrical energy transfer – electricity meters and kWh units, calculating kWh, comparing electrical power in W and kW. * Magnetic poles and attraction/repulsion, examples of magnetic fields for attracting / repelling poles * How electromagnets work and are used, creating simple electromagnets, investigating factors that affect electromagnets’ strength (coil numbers, core material). * Measuring the properties of the two types of wave (longitudinal + transverse) – wavelength, frequency, amplitude, calculating wave speed. * The different waves of the Electromagnetic Spectrum, ordering them by wavelength, example uses of each wave, and the risks of short EM waves (UV, X-ray, gamma). |