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| **SUBJECT: SCIENCE SECONDARY** | **Science Curriculum Plan (Secondary)** |
|  | 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. Some of our learners are working at levels below their chronological age alongside delays in language and literacy. 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 are taught the skills needed to plan and work scientifically and complete valid investigations.Scientific ideas necessarily involve a wide range of specific language and teaching reflects this with a focus on learning new vocabulary at the start of every new topic, reinforced by regular use in lessons. Science ideas are found in many areas of modern life and opportunities for making connections with everyday roles of science in our common experiences are also emphasised in lessons. Pupils begin working towards Entry Level qualifications in science in Year 9. 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 and investigative coursework rather terminal exams.Pupils may follow the AQA double award Entry Level Certificate which closely parallels their core GCSE science courses and in Year 10 and 11 these pupils have the option to transition to GCSE science courses in combined or single sciences. Pupils may follow the OCR single award Entry Level Certificate and may also complete AQA Unit Awards with a focus on how science links to adult life skills. |

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|  | **Biology** | **Chemistry** | **Physics** |
| **Year****10/11** | Pupils can study AQA GCSE combined science in Year 10 and 11 following AQA science specifications that build on the AQA Entry Level course completed in Year 9, or AQA GCSE single science following AQA science specifications that build on the AQA Entry Level course in Year 9/10. Pupils may study AQA Unit Awards related to adult life skills. |
| **Year****9/10** | All pupils will follow Entry Level courses from Year 9. Pupils may study AQA double award Entry Level Certificate, over 1 or 2 years. Pupils may study the OCR single award Entry Level Certificate, which covers a choice of similar content, over 2 years.The AQA double award Entry Level Certificate content covers: |
| 1: The Human Body* Using microscopes, cell parts specialized cells.
* Levels of organization in organisms for cells to tissues to organs to organ systems.
* The heart and circulatory system and the parts in our blood.
* The digestive system and digestive enzymes.
* Respiration in cells.
* Health effects of lifestyle choices (overeating, drugs, alcohol, smoking) and keeping healthy.
* Infectious diseases and prevention (immune system, antibiotics and vaccinations).
* The nervous system for sense and control, the speed of reactions and reflexes.
* Hormone control, homeostasis and the menstrual cycle.

2: Environment, Evolution + Inheritance* Photosynthesis and how plants supply and use photosynthesis reactants/products.
* Levels and changes in food chains and webs.
* The carbon cycle and decomposition.
* Adaptations to hot and cold habitats and competition animals and plants.
* Causes of environmental changes and the effects of human population on natural environments.
* Natural selection, evolution and using artificial selection.
* Genes as a code on DNA, genetic inheritance and sexual and asexual reproduction and variation.
 | 3: Elements, mixtures and compounds* Atoms, elements and the periodic table.
* Creating compounds through reactions, differences in compounds and their elements.
* Particle model of states of matter and changing state.
* Different forms of carbon and their properties.
* Separation techniques (filtration, evaporation, distillation, chromatography).
* Useful properties of metals, test metals and metal alloys.
* Metal ores, metal extraction using carbon reduction, metal recycling.
* The structure of polymers, polymer properties and common uses.

4: Elements, mixtures and compounds* Acids and bases, acid neutralisation, acid-metal reactions and testing for hydrogen gas.
* Changing rates of reactions (heat, particle size = surface area, concentration)
* Energy in reactions, thermal energy and reaction speed, exothermic and endothermic reactions.
* Separation of hydrocarbon fractions using fractional distillation of crude oil.
* Complete and incomplete combustion of fuels and acid pollution from sulphur-rich fuels.
* The atmosphere and processes that create it. Greenhouse gases and global warming.
* Creating safe drinking water through filtering and chlorine sterilisation.
 | Component 5: Energy, Forces + Structure of Matter* Energy types and transfers, useful and waste energy and energy diagrams.
* Fossil fuels and sources of non-renewable and renewable energy.
* Forces, and work done by forces.
* Measuring and calculating speed using a formula.
* Stopping distances, and factors affecting braking and thinking distances.
* Properties of radioactivity – alpha, beta, gamma penetration and dangers.

Component 6: Electricity, Magnetism + Waves* Series and parallel circuits, measuring current, measuring voltage, resistance in circuits and current changes.
* Direct and alternating current.
* Mains wiring in a plug, and electrical safety.
* Calculating electrical power in W and kW, calculating energy transfer in kWh.
* Attraction/repulsion of magnetic poles, magnetic field of attracting/repelling magnets.
* Investigating how to make stronger electromagnets and their uses.
* Measuring the properties of longitudinal + transverse waves.
* Electromagnetic Spectrum waves, ordering them by wavelength, and example uses and risks.
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In Years 7 and 8 pupils follow this 2 year Key Stage 3 curriculum. Some areas may be reduced as they repeat Key Stage 2 learning, or deferred as they are covered in Entry Level science.

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| **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: Inheritance and Evolution* Inheritance of genetic information, genes and DNA
* Variation between species and between individuals in a species
* 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.
* Similar elements –periodic table groups (group 1 metals)
* Joining elements to creating molecules.
* Modelling molecules (molymod and computer).
* Writing chemical formulae.
* Atoms in reactions, writing symbol equations.

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* Combustion reactions.
* Thermal decomposition reactions.
* Displacement 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, Heat Transfer* Simple examples of working machines and work done = energy.
* Thermal energy and measuring 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
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| **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
* Skeletal and muscular systems.

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.
* 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? Contact and non-contact 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.
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