Curriculum Intent Statement for Science – Chemistry

At Chase Terrace Academy we aspire for all of our students to achieve greater things than they ever thought possible.

We pride ourselves on being a warm and welcoming school that places community at the heart of everything we do. Our ambitious curriculum is enriching and inclusive, providing challenge and breadth for all. This empowers our students to become compassionate, confident and creative individuals who are resilient, respectful and equipped with a desire to take up a fulfilling role in society and the wider world.

In Science we want to encourage our students to understand and value different cultures, countries and people as well as having an appreciation of how the world works and science in the media which can often be misinterpreted.

We aspire for our students to retain a sense of wonder about our vast and complex Universe. Future generations should be aware of how scientific and technological progress is changing the world, and to help the wider public understand it. It is important to ensure that these changes are heading in the right direction. In a democratic society, this means that everyone needs to have a basic understanding of science to make informed, responsible decisions about the future.

We provide the opportunity for those students with a particular passion for science to study single sciences. This gives students the scope to further broaden and deepen their scientific knowledge in preparation for study at A-level and beyond.

'Curriculum is designed to be ambitious & meet the needs' 'Develops skills for future learning & employment'

Outcomes: For competitive statistics and outcomes in-line and beyond National averages for KS4 courses – particularly Grade 7 & beyond. Destination figures which show student's passion for the subject.

Students to have a 'deeper' knowledge: teaching is designed to help students to remember in the long term the content they have been taught and to integrate new knowledge into larger concepts. Students confident to debate and discuss their knowledge of topics and respond to feedback in a way that is progressive.

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Curriculum, implementation – How and what we do

Schemes of learning

- Revised curriculum at KS3 – mastery and deeper learning embedded into lessons including key command words working across the JTMAT.
- Literacy and numeracy activities incorporated into lessons and all schemes of learning as well as within our assessments particularly graphs and data.
- Science in the news built is incorporated into lessons as and when.
- Curriculum at KS4 is appropriate and engaging to students. Content is relevant to all learners and diverse.
- Transition unit completed in Year 9 to help prepare students for the KS4 course.
- Revision is woven into SOW to ensure content is retained in the long-term.
- Assessments are reviewed and amended where necessary to support outcomes and to ensure the 'deeper learning' approach.
- Knowledge organisers are updated every year in line with latest assessments and feedback from exam boards and examiners

Quality of marking and feedback

- Clear expectations and routines for student response to feedback (e.g. purple pens and QLA)
- Standardisation activities for mock assessments and book trawls carried out on a termly basis.
- Informal learning walks.
- Use of open-door policy.

Extra-curricular and intervention

- Quality first teaching to ensure gap is narrowed.
- Year 11 intervention held after school in line with the intervention programme.
- Year 10 intervention held afterschool in line towards the end of Y10 when capacity allows.

Science Curriculum Implementation Plan

Science Overall Big Picture			
	Term 1	Term 2	Term 3
Year 7	• Lab Safety ↓ • Organisms 1 – Movement & Cells ↓ • Matter 1 – Particle Model ↓ • Forces 1 – Speed & Gravity ↓ • Assess / DIRT / RETEACH →	• Genes 1 – Variation ↓ • Matter 1 – Separating Mixtures ↓ • Energy 1 – Energy Costs & Transfer ↓ • Assess / DIRT / RETEACH →	• JTMAT End of Year 7 Exam ↓ • Ecosystem 1 – Plant Reproduction ↓ • Reactions 1 – Acids & Bases ↓ • Earth 1 – Earth Structure & Universe
Year 8	• Matter 2 – Periodic Table & Elements ↓ • Waves 1 – Light & Sound ↓ • Organisms 2 – Breathing & Digestion ↓ • Assess / DIRT / RETEACH →	• Earth 2 – Earth's Resources & Climate ↓ • Forces 2 – Contact Forces & Pressure ↓ • Genes 2 – Evolution & Inheritance ↓ • Assess / DIRT / RETEACH →	• Reactions 2 – Types of Reaction ↓ • JTMAT End of Year 8 Exam ↓ • Energy 2 – Heating & Cooling ↓ • Genes 1 – Human Reproduction ↓ • Assess / DIRT / RETEACH →
Year 9	• Applied science skills 1 ↓ • Energy ↓ • Atomic structure & Periodic Table ↓ • Cells ↓ • Assess / DIRT / RETEACH	• Cells (continued) ↓ • Atomic structure & Radiation ↓ • Energy changes / formula / equations ↓	• Energy changes (continued) ↓ • Transport in cells ↓ • Assess / DIRT / RETEACH ↓ • Applied science skills 2 ↓ • GCSE

Year 10	• **Biology** – Organisation → Infection & Response → Bioenergetics → Review of Cells → Homeostasis • **Chemistry** – Review of atomic structure → Structure & bonding → Quantitative chemistry → Chemical changes → Energy changes review → Rates of reaction • **Physics** – Electricity → Particle model of matter → Review of atomic structure & radiation → Forces (part 1) • Required practical revision if needed
Year 11	• **Biology** – Homeostasis review → Inheritance → Ecology → Review → **Exams** • **Chemistry** – Rates review + equilibria → Organic → Chemical analysis → Earth's atmosphere → Using resources → Review → **Exams** • **Physics** – Forces → Waves → Electromagnetism → Static electricity → Space (single only) → Review → **Exams**
Year 12	**Biology** • Biological molecules → Cells → Organisms exchange substances with their environment → Genetic information, variation and relationships between organisms → Energy transfers in and between organisms (photosynthesis only) **Chemistry** • **Physical** – Atomic structure → Amount of substance → Bonding → Energetics → Kinetics → Equilibria → Redox → Kinetics → Equilibria • **Inorganic** – Periodicity → Group 2 → Group 7 • **Organic** – Nomenclature → Isomerism → Alkanes → Halogenoalkanes → Alkenes → Alcohols → Organic analysis **Physics** • Measurements and their errors → Particles and radiation → Mechanics and materials • Waves → Electricity •
Year 13	**Biology** • Energy transfers in and between organisms (respiration only and energy in ecosystems only) → Organisms respond to changes in their internal and external environment→ Genetics, populations, evolution and ecosystems → The control of gene expression → Essay writing → **Revision & Exams**

	Chemistry • **Physical** – Thermodynamics → Rate equations → Equilibrium constants → Electrode potentials → Acids & Bases → **Revision & Exams** • **Inorganic** – Properties of period 3 → Transition metals → Reaction of ions in aqueous solution → **Revision & Exams** • **Organic** – Optical isomerism → Aldehydes & ketones → Acids & their derivatives → Aromatic chemistry → Amines → Polymers → Amino acids, proteins & DNA → Organic synthesis → Nuclear magnetic resonance → Chromatography → **Revision & Exams** **Physics** • Further mechanics → Thermal physics → Nuclear physics → **Revision & Exams** • Fields and their consequences → Medical physics → **Revision & Exams**

Chemistry Implementation Plan

CHEMISTRY			
	Term 1	Term 2	Term 3
Year 7	• Lab Safety • Matter 1 – Particle Model	• Matter 1 – Separating Mixtures	• Reactions 1 – Acids & Bases
Year 8	• Atoms, Elements & Compounds	• Chemical Reactions	• Chemical Quantities
Year 9	• Applied science skills 1 • Atomic structure & Periodic Table	• Energy changes • Applied science skills 2	
Year 10	• Structure & bonding • Quantitative chemistry	• Chemical changes	• Energy changes revisit • Rate & extent of chemical change
Year 11	• Organic chemistry • Chemical analysis • Earth & its atmosphere	• Atmosphere revision • Using resources	• Revision & exam preparation
Year 12	• Atomic structure • Amount of substance • Bonding • Kinetics	• Organic – alkenes • Halogenoalkanes • Alcohols • Equilibria	• Analysis, Mass spec & IR • Optical isomerism • Aldehydes & ketones • Revision & exam preparation

	• Intro into organic & Alkanes • Energetics	• Redox • Group 2 • Group 7 • Periodicity	• Thermodynamics (A2)
Year 13	• Carboxylic Acids & Esters • Aromatic Chemistry • Amines • NMR • Acids & Bases • Electrode potentials	• Polymers • Amino Acids, Proteins & DNA • Organic synthesis • Chromatography • Transition metals • Reactions of ions in aqueous solutions • Properties of period 3 elements and their oxides	• Revision & exam preparation

Chemistry Curriculum Implementation Plan

Chemistry				
Knowledge and Skills – Students will be taught to…	Reading, Oracy, Literacy and Numeracy	Formative Assessment	Summative Assessment	Link to GCSE Content
Throughout their Chemistry journey students will learn to analyse patterns, draw conclusions, present data, read, understand and respond to information, justify opinions, collect data, plan variables, test hypotheses, estimate and minimise risks, examine consequences, review theories and interrogate sources of information. **Intro into Science** • Lab safety & hazards • Microscopes & Bunsen burners	**Reading:** • Regular use of on screen sources and science news articles in lessons. • Research and online reading • Science revision guides **Recommended reading:** Frozen Planet – Alistair Fothergill Horrible Science (collection	Questioning in lessons Whole class feedback during lessons Regular verbal feedback Peer and self-assessment of written work	4 end of unit assessments based on all previous work which continues to build on ideas from previous topics completed in the academic year to inform reports. At the end of each year students will sit an end of year exam covering	Most of the topics in year 7&8 are designed to maintain student's natural curiosity, develop practical skills and also to provide solid foundations of the concepts they will meet at GCSE. In year 9 students revisit and build upon some of the key ideas in science (e.g. cells,

• The scientific method **Matter 1 – Particles Model** • Properties of solids, liquids and gases • The particle model • Density, • Expansion & Contraction • Diffusion • Change of state **Matter 1 – Separating Mixtures** • Soluble and insoluble substances • Solubility • Filtration • Distillation • Chromatography **Reaction 1 – Acids and Bases** • Testing acids and alkalis • Making indicators • The pH Scale and neutralisation **Matter 2 – Periodic Table & Elements** • The Periodic Table • Elements • Compounds • Metals & non-metals • Compounds and formulae • Chemical reactions	of books) – Nick Arnold Longitude – Dava Sobel Nightwatch – Terence Dickinson Planet Earth – Alistair Fothergill The Planets – Dava Sobel Science: The Definitive Visual Guide – Adam Hart Davis (Dorling Kingsley) Wonders of the Universe - Brian Cox WOW: The Visual Encyclopaedia – Dorling Kingsley Oxygen – Nick Lane **Numeracy:** • Writing chemical formula, • Standard form (not in yr7&8) this is introduced in year 9 to set a basis for GCSE ideas they meet in yr 10 & 11. • Graphing & scales • Averages • The idea of uncertainties is met in year that build on the ideas of averages met in Yr 7 & KS2 • Formula & balancing equations	Low stakes quizzing Exit strategies	all the key ideas from the current year and some topics from previous years	particles and energy) to provide a solid foundation for the concepts they will meet in year 10 & 11 (e.g. cells, particles, chemical reactions, energy & forces). All set questions are GCSE style. Range of language based skills to prepare for GCSE.

Earth 2 – Earth's Resources & Climate • Global warming • Fossil fuels • Carbon sinks • Greenhouse effect • Natural resources • Mineral & ores • Extraction of metals • Recycling • Electrolysis **Reactions 2 – Chemical Reactions** • Chemical and physical changes • Reactions of acids and metals • Combustion • Oxidation and reduction • Reactions of metals and the reactivity series • Displacement **Applied Science Skills 1** • Averages • Writing methods • Graph skills • Data analysis • Conclusions & evaluations **Atomic Structure & Periodic Table** • Models of the atom (plum pudding & nuclear) • Structure of atom • Electron arrangement	• Using and rearranging equations is briefly met in yr 8 and built upon in the following years **Literacy & Oracy:** • Encourage group discussion and debate. • Communicate ideas clearly & effectively. • Make sure spelling and punctuation is accurate			

• Mendeleev • Modern Periodic Table • Groups 1,7, 0 • Transition metals **Applied Science Skills2** • Averages • Writing methods • Graph skills • Data analysis • Conclusions & evaluations **Energy Changes** • Exothermic & endothermic reactions • Reaction profile diagrams • Energy changes in reactions (Bond breaking & making) • Fuel cells & batteries **Structure & Bonding** • Ionic bonding • Covalent bonding • Metallic bonding & their properties • Simple & giant molecules (including fullerenes 7 graphene) **Quantitative Chemistry** • Conservation of mass • Relative formula mass (Mr) • The Mole • Limiting reactants • Reacting quantities				

• Concentrations & solutions **Chemical Changes** • Reactions of metals • Displacement reactions • Reactivity series • Oxidation & reduction • Half equations • Acids, Bases & Salts • Making salts • Electrolysis **Rate & Extent of Chemical Change** • Defining & measuring rate of reaction • Factors affecting rate of reaction • Collision theory and explaining factors affecting rate • Reversible reactions • Dynamic equilibria **Organic Chemistry** • Crude Oil & Fractional distillation • Alkanes • Types of Combustion • Cracking & Alkenes • Alkenes, Alcohols, Carboxylic acids, Esters and Polymers (single chemistry only) **Chemical Analysis** • Pure & impure substances • Chromatography • Testing for gases				

• Flame tests, testing for cations using NaOH (single chemistry only) • Testing for anions (single chemistry only) • Instrumental analysis (single chemistry only) **Earth & The Atmosphere** • Early atmosphere • Modern atmosphere • Combustion & Greenhouse effect • Climate change • Atmospheric pollutants **Using Resources** • Sustainable development • Renewable & non-renewable resources • Obtaining potable water • Purifying water • Extracting copper and alloys • Life Cycle assessment • Reusing, reducing & recycling Single chemistry only • Corrosion • Ceramics, Composites & Polymers • Fertilisers & Haber Process				