Curriculum Map
Year 9

Chemistry

Learning Aims and Curriculum Intent:

In Year 9 Science lessons at Forest, students will continue to develop not only science knowledge but will an understanding of science as a process. Students will develop GCSE level skills in asking questions, developing, and using models, planning and carrying out investigations, analysing and interpreting data, using mathematics and computational thinking, constructing explanations, thinking critically and engaging in argument from evidence to obtain, evaluate, and communicate information. They will develop more complex explanations, making links between the different topics and scientific disciplines.

The topics studied include physical changes, elements, chemical changes, separation, air and rates of reaction. These essential concepts will be developed further at A level if taken, and beyond.

Term	Content, Key Questions and Knowledge	Skills	Assessment
Michaelmas	**States of Matter** • **Properties of matter.** *How can we classify materials as solids, liquids and gases?* • **The particle model.** *How can we explain the properties (that we can see) of solids, liquids and gases in terms of particles (that we can't see)?* • **Change of state.** *How can we explain the properties (that we can see) of solids, liquids and gases in terms of particles (that we can't see)?* • **Applying the particle model – expansion of solids.** *Why does a solid expand when it is heated?* • **Applying the particle model – Brownian motion.** *How do gases and liquids move?* • **Applying the particle model – Diffusion** *How can we use the particle model to explain diffusion?* • **Applying the particle model - gas pressure.** *How is gas pressure created?* • **Investigating the effect of temperature on the rate of diffusion.** *How does temperature affect the rate of diffusion?*	Representing chemical and word equations Observing, describing and recording experimental results, both qualitative and quantitative Modelling using particle diagrams Understanding abstract concepts Working safely and following a set of instructions carefully Generating a hypothesis from an observation Justifying a hypothesis using scientific reasoning Identifying hazards and associated risks in the lab Identifying independent, dependent and control variables in an experiment Drawing an appropriate results table for any given method Understanding the difference between categoric, discrete and continuous data and select the most suitable graph for the data being used Drawing a bar graph with correct scale, axes, and appropriate bars Drawing a line graph with correct scale, axes, points and smooth line/curve of best fit Writing a method to test a hypothesis. Record the results to the correct resolution, and explaining why this resolution is correct Identifying anomalies in an experiment. Plotting multiple graphs on the same axes and comparing them Using your graphs to determine if your hypothesis was correct. Drawing a conclusion and justifying it.	30 mark written topic test
	Atomic Structure and Elements • **Atomic Structure** *What does an atom consist of?* • **Determining the number of sub-atomic particles in an atom** *How do we know how many sub-atomic particles each elements' atoms have?* • **Electron Arrangement** *How are electrons arranged in an atom?* • **The Periodic Table** *How are elements arranged in the Periodic Table?* • **Metals and Non-metals**		30 mark written topic test
	Separating Techniques • **Pure substances and mixtures** *How does a mixture differ from a pure substance?* • **Solutions** *How are solutions formed?* • **Solubility and temperature** *How does solubility change with temperature?* • **Drawing solubility curves** *How can we draw a solubility curve?* • **Interpreting solubility curves** *How can we interpret a solubility curve?* • **Classifying mixtures** *How can we classify mixtures?* • **Filtration** *How can we use filtration to separate a mixture?* • **Crystallisation** *How can we use crystallisation to separate a mixture?* • **Distillation** *How can we use distillation to separate a mixture?* • **Chromatography** *How can we use chromatography to separate a mixture?*		32 mark written topic test

Lent	**Chemical Reactions** • **Bonding** *How can we determine the type of bonding present in a compound?* • **Elements, compounds and mixtures** *How can we determine whether a substance is an element or a compound?* • **Physical and Chemical changes** *How can we determine if a change is physical or chemical?* • **Naming compounds** *How can we name compounds?* • **Writing word equations** *How can we write word equations to represent chemical reactions?* • **Balancing chemical equations** *How can we balance chemical equations?* • **Metal reactivity** *How can we determine the reactivity of metals?*		37 mark written topic test
	Air • **Composition of the Air** *How can we determine the % of oxygen in the air?* • **Metal or Non-metal?** *How can we determine if a substance is a metal or a non-metal?* • **Combustion and the Environment** *How do some products of combustion affect the environment?* • **Metal Carbonates** *How does heat energy affect a metal carbonate?* • **Testing for Gases** *How can we test for different gases?* • **Water Purity** *How can we determine if a sample of water is pure?*		40 mark written topic test
Trinity	**Rates of Reaction** • **Exothermic and Endothermic** *What's the difference between exothermic and endothermic reactions?* • **Energy Level Diagrams** *How can we visualise endothermic and exothermic reactions in the form of diagrams?* • **Measuring the rate of a reaction** *How can we change variables to influence the rate of a reaction?* • **Collision Theory and Effect on Surface Area** *What happens to particles in a chemical reaction and how can we affect the rate of reaction by changing the surface area of one of the reactants?* • **Effect of Concentration** *How can we affect the rate of reaction by changing the concentration of one of the reactants?* • **Effect of Temperature** *How can we affect the rate of reaction by changing the temperature?*		35 mark written topic test

Examples of Homework	CenturyTech, questions in Active Learn textbook, exam questions, research tasks e.g. researching information about an element or group of the periodic table
Key terminology	Change of state, diffusion, electronic configuration, sub-atomic particle, solution, solubility, filtration, crystallisation, distillation, chromatography, elements, compounds, mixtures, bonding, combustion, carbonates, exothermic, exothermic, collision theory.

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<tr><td>Super-curricular enrichment and scholarly extension</td><td colspan="2">Read:
Royal Society of Chemistry (RSC) website: Access their education resources and publications.
Chemguide: A comprehensive online guide to chemistry topics.
"The Disappearing Spoon: And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements" by Sam Kean
"The Cartoon Guide to Chemistry" by Larry Gonick and Craig Criddle
"The Elements: A Visual Exploration of Every Known Atom in the Universe" by Theodore Gray
"Chemistry: Getting a Big Reaction" by Simon Basher
"Chemical Chaos: Experiments and Understanding Science" by Nick Arnold
Watch:
"Chemistry: A Volatile History" (BBC Four)
"The Mystery of Matter: Search for the Elements" (PBS)
"The Secret Life of Chaos" (BBC Four)
"Chemical Reactivity" (American Chemical Society)
Royal Society of Chemistry (RSC) website: Access their education resources and publications.
Khan Academy: Explore their chemistry lessons and videos.
YouTube channels like "Crash Course Chemistry" and "The Organic Chemistry Tutor" for informative videos.
Listen:
"Chemistry World Podcast" by the Royal Society of Chemistry: This podcast covers a wide range of chemistry topics, including interviews with leading scientists, discussions on current research, and explorations of chemical concepts. It provides insights into various aspects of chemistry and its applications.
"Chemistry in its Element" by Chemistry World: In each episode, this podcast explores the story behind a specific chemical element. It delves into the history, properties, and applications of the element, providing a fascinating look into the periodic table.
Visit:
The Science Museum in London: Explore the chemistry exhibits, including the "Who Am I?" gallery and "Materials" section.
The Natural History Museum in London: Visit the Earth Hall and the minerals and gemstones collections.
The Royal Society of Chemistry (RSC) in Cambridge: Attend RSC events, workshops, and lectures.</td></tr>
<tr><td>Useful websites</td><td colspan="2">BBC Bitesize
Savemyexams
Century Tech
Physicsandmathstutor
Royal Society of Chemistry (RSC).
Chemguide</td></tr>
<tr><td rowspan="2">Who can I contact?</td><td>Head of Department</td><td>Ms. J White (Head of Science) jrw@forest.org.uk; Mr Barlow (Head of Chemistry)</td></tr>
<tr><td>Teachers</td><td></td></tr>
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