

GCSE Chemistry Course Information

Course Overview

- **Exam Board** – AQA
- **Usual Age Range** – 14 to 16
- **Qualification** – One GCSE
- **Curriculum Time** – Three 50-minute lessons per week in class plus work in Independent Learning Time
- **Assessment** – Two 1-hour-45-minute examinations taken at the end of the two-year course
- **Grading** – Reformed Linear GCSE Scale of 9, 8, 7, 6, 5, 4, 3, 2, 1. UTC students taking Foundation Tier examinations will be awarded within the range of 1 to 5. UTC students taking Higher Tier examinations will be awarded within the range of 4 to 9.
- **Full specification** - <https://filestore.aqa.org.uk/resources/chemistry/specifications/AQA-8462-SP-2016.PDF>

Curriculum Intent

The **intent** of GCSE Chemistry is to give UTC students an opportunity to develop a broad understanding of the content within the following four fundamental areas that are further split into topics and to be able to apply this understanding to explain chemical phenomena:

- Atoms, bonding, and moles
- Chemical reactions and energy changes
- Rates, equilibrium, and organic chemistry
- Analysis and the Earth's resources

At the UTC we specifically intend students to appreciate chemistry's relevance to the world of work, in particular healthcare science. Healthcare science **careers** are explicitly taught within relevant topics in the GCSE Chemistry sequence of learning. Students will also have direct first-hand experience of our healthcare science partners through project days and other aspects of UTC life such as our extensive UTC extra programme or via our assessed non-GCSE technical healthcare science curriculum. A variety of careers outside this specialism are also taught in appropriate topics in GCSE Chemistry so students have an appreciation of how chemistry relates to the wider world of work so they can make an informed choice to the career they would like to pursue.

A further intent is to motivate all students to pursue further study in chemistry beyond GCSE, irrespective of prior attainment. All students are motivated through the study of separate science GCSE Chemistry; commonly known as a triple science, as GCSE Chemistry is available at Higher Tier and Foundation Tier at this UTC.

Suggested **destinations** after completion of this course include progression onto a level 3 course at the UTC such as A-level Chemistry along with the other related A-level sciences of A-level Biology and A-level Physics or Medical Science.

Throughout GCSE Chemistry students are encouraged to develop their **literacy skills**. Students are regularly exposed to reading material in class and extended writing activities such as experimental write ups. Extended response questions allow students to demonstrate their ability to construct and develop a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. Through the explicit teaching of specific chemistry key words as each topic is taught students demonstrate their understanding of a growing chemistry vocabulary as topics are taught through carefully designed written tasks, as well as verbally through questioning techniques used by their teacher. This **love of reading** is further developed by both non-fiction and fiction chemistry related titles that have been carefully selected by their chemistry teachers that are available to borrow in our Learning Resource Centre.

The following five fundamental **numeracy** threads running through all three GCSE sciences are taught via the context of GCSE Chemistry in collaboration with our mathematics specialists. These are reinforced further albeit through a complementary subject in GCSE Biology and GCSE Physics:

- Arithmetic and numerical computation
- Handling data
- Algebra
- Graphs
- Geometry and trigonometry

For example, in GCSE Chemistry UTC students may draw and analyse a straight-line graph of total volume of sodium hydroxide added against mean maximum temperature in the temperature changes practical. Whilst in GCSE Biology students may draw and analyse a straight-line graph of the change in mass against concentration of sugar solution in the osmosis practical. Students in GCSE Physics may also draw and analyse a straight-line graph but of the temperature against work done in the specific heat capacity practical. Higher Tier students will also be taught how to complete multi-step calculations, calculate an empirical formula and the rate of a reaction from the gradient of a graph. Our students are well prepared in chemical numeracy as 20% of the marks in GCSE Chemistry examinations now requires such a skill.

The students at our UTC experience more than the ten required practical activities that the examination board requires. All students benefit from a combination of a hands-on approach and written work. Students are well prepared for further study and careers with a practical and procedural component. Students are engaged in chemistry because they have this opportunity.

Remote Learning and Revision

Students will benefit from additional study on-site and at home using their personal copy of their Oxford University Press Revision Guide provided by the UTC.

Students can communicate with the teacher via the message function on Teams if absent from school and well enough to do some work.

Students should use the following websites:

- Free Science Lessons – <https://www.freesciencelessons.co.uk>
- AQA Practice Papers - <https://www.aqa.org.uk/subjects/science/gcse/chemistry-8462/assessment-resources?f.Resource+type%7C6=Question+papers>

Students may choose to use the following additional websites:

- GCSE Pod – <https://www.gcsepod.com>
- Seneca – <https://senecalearning.com/en-GB/>

Curriculum Overview

The learning in GCSE Chemistry is sequenced as follows.

Note: the full Curriculum Plans are available on request to info@nefuturesutc.co.uk

Revision Resources – Click on the following for links to videos

The following links are used for **independent learning** and **catch-up** tasks alongside the **revision guide** provided by us at the UTC.

Paper 1 - Year 10

Term start -September

C1 Atomic structure

1. [Elements, Compounds and Mixtures](#)
2. [Interpreting a Chemical Formula](#)
3. [Filtration and Crystallisation](#)
4. [Simple Distillation](#)
5. [Fractional Distillation](#)
6. [Paper Chromatography](#)
7. [Alpha-Scattering Experiment](#)
8. [The Nuclear Model](#)
9. [Atomic Number and Mass Number](#)
10. [Relative Atomic Mass](#)
11. [Electron Energy Levels](#)

C2 The periodic table

12. [Electron Energy Levels](#)
13. [Development of the Periodic Table](#)
14. [Group 0](#)
15. [Metals](#)
16. [Group 1 Part 1](#)
17. [Group 1 Part 2](#)
18. [Group 7 Part 1](#)
19. [Group 7 Part 2](#)
20. [Group 7 Part 3](#)
21. [Transition Elements \(Triple\)](#)

Autumn Half Term

C3 Structure and bonding

22. [The Three States of Matter](#)
23. [Ionic Bonding 1](#)
24. [Ionic Bonding 2](#)
25. [Properties of Ionic Compounds](#)
26. [Covalent Bonding 1](#)
27. [Covalent Bonding 2](#)

28. [Covalent Bonding 3](#)
29. [Properties of Small Covalent Molecules](#)
30. [Diamond and Silicon Dioxide](#)
31. [Graphite](#)
32. [Graphene and Fullerenes](#)
33. [Bonding in Polymers](#)
34. [Metals and Alloys](#)
35. [Nanoparticles \(Triple\)](#)
36. [Limitations of Bonding Diagrams](#)

Christmas Break

C4 Chemical calculations

37. [Conservation of Mass](#)
38. [Charges on Ions](#)
39. [Formula of Ionic Compounds](#)
40. [Balancing Chemical Equations](#)
41. [Relative Formula Mass](#)
42. [Calculating Moles of an Element](#) (HT only)
43. [Calculating Moles of a Compound](#) (HT only)
44. [Calculating Mass of a Number of Moles](#) (HT only)
45. [Using Moles to Balance Equations](#) (HT only)
46. [Avogadro's Constant 1](#) (HT only)
47. [Avogadro's Constant 2](#) (HT only)
48. [Reacting Masses 1](#) (HT only)
49. [Reacting Masses 2](#) (HT only)
50. [Limiting Reactant](#) (HT only)
51. [Calculating Percentage Yield 1 \(Triple\)](#) (HT only)
52. [Calculating Percentage Yield 2 \(Triple\)](#) (HT only)
53. [Atom Economy \(Triple\)](#)
54. [Concentration of Solutions](#)
55. [Using Concentration of Solutions 1 \(Triple\)](#)
56. [Using Concentration of Solutions 2 \(Triple\)](#)
57. [Required Practical 2: Carrying out a Titration \(Triple\)](#)
58. [Titration Calculations 1 \(Triple\)](#) (HT only)
59. [Titration Calculations 2 \(Triple\)](#) (HT only)
60. [Using Gas Volumes 1 \(Triple\)](#) (HT only)
61. [Using Gas Volumes 2 \(Triple\)](#) (HT only)

Spring half Term

C5 Chemical changes

62. [Reaction of Metals with Oxygen](#)
63. [The Reactivity Series](#)
64. [Extraction of Metals](#)
65. [Oxidation and Reduction in terms of Electrons](#) (HT only)
66. [Acids and Alkalis](#)
67. [Acids Reacting with Metals 1](#)

68. [Acids Reacting with Metals 2](#)
69. [Three Reactions of Acids](#)
70. [Required Practical 1: Making Soluble Salts](#)
71. [Strong and Weak Acids](#) (HT only)

C6 Electrolysis

72. [Introducing Electrolysis](#)
73. [Electrolysis of Aluminium Oxide](#)
74. [Electrolysis of Aqueous Solutions 1](#)
75. [Electrolysis of Aqueous Solutions 2](#)
76. [Required Practical 3: Electrolysis](#)

Easter break

C7 Energy changes

77. [Exothermic and Endothermic Reactions](#)
78. [Bond Energy Calculations 1](#) (HT only)
79. [Bond Energy Calculations 2](#) (HT only)
80. [Required Practical 4: Temperature Changes](#)
81. [Cells and Batteries \(Triple\)](#)
82. [Fuel Cells \(Triple\)](#)

Revision and mocks – end of year 10

Paper 2 - Year 11

Term start -September

C8 Rates and equilibrium

83. [Mean Rate of Reaction](#)
84. [Using Tangents to Determine Rate](#) (HT only)
85. [Effect of Concentration on Rate](#)
86. [Required Practical 5: Rates of Reaction](#)
87. [Effect of Surface Area on Rate](#)
88. [Effect of Temperature on Rate](#)
89. [Catalysts](#)
90. [Reversible Reactions](#)
91. [Concentration and Reversible Reactions](#) (HT only)
92. [Temperature and Reversible Reactions](#) (HT only)
93. [Pressure and Reversible Reactions](#) (HT only)

C9 Crude oil and fuels

94. [Crude Oil and Hydrocarbons](#)
95. [Properties of Hydrocarbons](#)
96. [Combustion of Hydrocarbons](#)
97. [Fractional Distillation of Crude Oil](#)

98. [Cracking](#)

99. [Alkenes](#)

Autumn Half Term

C10 Organic reactions

100. [Reactions of Alkenes 1](#)

101. [Reactions of Alkenes 2](#)

102. [Alcohols](#)

103. [Reactions of Alcohols](#)

104. [Carboxylic Acids](#)

C11 Polymers

105. [Addition Polymers](#)

106. [Condensation Polymers](#) (HT only)

107. [Amino Acids](#)

108. [DNA](#)

Christmas Break

C12 Chemical analysis

109. [Purity and Formulations](#)

110. [Chromatography](#)

111. [Required Practical 6: Chromatography](#)

112. [Testing for Gases](#)

113. [Flame tests](#)

114. [Metal Hydroxide Precipitates](#)

115. [Identifying Non-Metal Ions](#)

116. [Required Practical 7: Identifying Ions](#)

Spring Half Term

C13 The Earth's atmosphere

117. [The Atmosphere](#)

118. [Fossil Fuels](#)

119. [The greenhouse effect](#)

120. [Climate change](#)

121. [Carbon footprint](#)

122. [Pollutants from fuels](#)

C14 The Earth's resources

123. [Using the Earth's Resources](#)

124. [Potable Water](#)

125. [Required Practical 8: Water](#)

126. [Waste Water Treatment](#)

127. [Alternative Methods of Extracting Metals](#) (HT only)

128. [Life-Cycle Assessment](#)

129. [Recycling](#)

Easter Break

C15 Using our resources

- 130. [Corrosion](#)
- 131. [Alloys](#)
- 132. [Ceramics and Composites](#)
- 133. [Thermosoftening and Thermosetting Polymers](#)
- 134. [The Haber Process](#)
- 135. [NPK Fertilisers](#)

End of year 11 - Exams