GCSE Biology 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 Liner 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/biology/specifications/AQA-8461-SP-2016.PDF

Curriculum Intent

The **intent** of GCSE Biology 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 biological phenomena:

- Cells and organisation
- Disease and bioenergetics
- Biological responses
- Genetics and evolution
- Ecology

At the UTC we specifically intend students to appreciate biology's relevance to the world of work, in particular healthcare science. Healthcare science **careers** are explicitly taught within relevant topics in the GCSE Biology 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 Biology so students have an appreciation of how biology 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 biology beyond GCSE, irrespective of prior attainment. All students are motivated through the study of separate science GCSE Biology; commonly known as a triple science, as GCSE Biology 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 Biology along with the other related A-level sciences of A-level Chemistry and A-level Physics or Medical Science.

Throughout GCSE Biology 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 biology key words as each topic is taught students demonstrate their understanding of a growing biology 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 biology related titles that have been carefully selected by their biology 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 Biology in collaboration with our mathematics specialists. These are reinforced further albeit through a complementary subject in GCSE Chemistry and GCSE Physics:

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

For example, in GCSE Biology UTC students may draw and analyse a straight-line graph of the change in mass against concentration of sugar solution in the osmosis practical. Whilst in GCSE Chemistry 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. 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. Our students are well prepared in biological numeracy as 10% of the marks in GCSE Biology examinations now requires such a skill.

The students at our UTC experience more that 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 biology 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/biology-8461/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 Biology 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 – Y10

Half term 1

B1 Cell structure and transport

1. Eukaryotes vs Prokaryotes
2. Size of cells
3. Order of Magnitude
4. Animal cells
5. Plant cells
6. Animal cell specialisation
7. Plant cell specialisation
8. Microscopes (Required practical 1)
9. Microscopy
10. Diffusion
11. Surface area to volume ratio
12. Osmosis
13. Osmosis (required practical 3)
14. Active transport

Half term 2

B2 Cell division

15. Bacterial division
16. Culturing microorganisms (Required practical 2)
17. Mitosis
18. Stem cells

B3 Organisation and the digestive system

19. Digestive system
20. Digestive enzymes
21. Effect of temperature on enzymes
22. Effect of pH on amylase (required practical 5)
23. Food tests (required practical 4)
24. Absorption in the small intestine

Half term 3

B4 Organising animals and plants

25. The heart and circulation
26. Arteries veins and capillaries
27. The blood
28. Cardiovascular disease
29. Gas exchange and the lungs
30. Plant tissues
31. Transpiration

Half term 4

B5 Communicable diseases

32. Pathogens
33. Measles and HIV
34. Salmonella and gonorrhoea
35. Malaria
36. Infectious disease in plants
37. Plant disease detection (HT only)
38. Plant defence responses

B6 Preventing and treating disease

39. Vaccination
40. Antibiotics
41. Testing medicines
42. Monoclonal antibodies (HT only)
43. Uses of monoclonal antibodies (HT only)

Half term 5

B7 Non-communicable diseases

44. Cancer
45. Communicable vs non-communicable
46. Risk factors
47. Lifestyle diseases

B8 Photosynthesis

48. Photosynthesis
49. Uses of glucose from photosynthesis
50. Photosynthesis (required practical 6)
51. Factors affecting photosynthesis

B9 Respiration

52. Respiration
53. Exercise and respiration
54. Metabolism

Half term 6

Revision

Paper 2 – Y11

Half term 1

B10 The human nervous system

55. Homeostasis
56. The Nervous System
57. Reaction Time (required practical 7)
58. The Brain
59. The Eye
60. How the eye focuses
61. Thermoregulation

Half term 2

B11 Hormonal coordination

62. The Endocrine System
63. Blood Glucose Regulation
64. Menstrual Cycle (Interaction of hormones HT only)
65. Contraception
66. Hormones to treat infertility
67. Negative Feedback
68. Plant hormones (gibberlins and ethene HT only)
69. Plant Responses (Required practical 8)
70. Uses of Plant Hormones

B12 Homeostasis in action

71. Controlling body temperature
72. The Kidneys
73. Maintaining Water Balance

Half term 3

B13 Reproduction

74. Sexual and Asexual reproduction
75. Meiosis
76. Advantages and disadvantages of sexual/asexual reproduction
77. DNA and the genome
78. DNA structure
79. Protein Synthesis

80. Mutations
81. Alleles
82. Cystic Fibrosis
83. Polydactyly
84. Family trees
85. Inheritance of Sex

B14 Variation and evolution

86. Variation
87. Evolution by Natural Selection
88. Selective Breeding
89. Genetic Engineering
90. Cloning Plants
91. Cloning Animals

Half term 4

B15 Genetics and evolution

92. The History of Genetics
93. Darwin and Natural Selection
94. Speciation
95. Fossils as evidence for evolution
96. Resistant Bacteria as evidence for evolution
97. Classification

B16 Adaptation and interdependence

98. Competition and Interdependence
99. Biotic and abiotic factors
100. Adaptations
101. Sampling Organisms
102. Required practical 9
103. Mean, median, mode

B17 Organisation of an ecosystem

104. Food chains and predator-prey relationships
105. Carbon cycle
106. Water cycle
107. Decomposition
108. Decay (required practical 10)

B18 The effect of human interactions on ecosystems and biodiversity

109. Environmental change
110. Biodiversity
111. Waste Management
112. Land Use

113. Climate Change
114. Maintaining Biodiversity
115. Trophic Levels
116. Pyramids of Biomass
117. Food Security
118. Modern Farming Methods
119. Sustainable Fisheries
120. Biotechnology