

GCSE Physics 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/physics/specifications/AQA-8463-SP-2016.PDF>

Curriculum Intent

The **intent** of GCSE Physics 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 physical phenomena:

- Energy and energy resources
- Particles at work
- Forces in action
- Waves, electromagnetism and space

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

Throughout GCSE Physics 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 physics 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 physics related titles that have been carefully selected by their physics 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 Physics in collaboration with our mathematics specialists. These are reinforced further albeit through a complementary subject in GCSE Biology and GCSE Chemistry:

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

For example, in GCSE Physics UTC students may draw and analyse a straight-line graph of the temperature against work done in the specific heat capacity 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 Chemistry may draw and analyse a straight-line graph of total volume of sodium hydroxide added against mean maximum temperature in the temperature changes practical. Higher Tier students will also be taught how to complete multi-step calculations and calculate the speed from a graph using a tangent. Our students are well prepared in physics numeracy as 30% of the marks in GCSE Physics 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 physics 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/physics-8463/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 Physics 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 website is used for **independent learning** and **catch-up** tasks alongside the **revision guide** provided by us at the UTC. Access the Free science lessons website and access the video learning as documented below.

<https://www.freesciencelessons.co.uk/videos/>

Paper 1 – Y10 2024 2025

Half term 1

Topic 1 Conservation and dissipation of energy

1. [Changes in energy stores](#)
2. [Conservation of energy](#)
3. [Energy and work](#)
4. [Gravitational potential energy](#)
5. [Kinetic energy](#)
6. [Elastic potential energy](#)
7. [Energy dissipation](#)
8. [Energy and efficiency](#)
9. [Electrical appliances](#)
10. [Energy and power](#)

Topic 2 Energy transfer by heating

11. [Energy transfer by conduction](#)
12. [Infrared radiation FT & HT](#)

Half term 2

13. [Specific heat capacity](#)
14. [Specific heat capacity \(Required practical 1 \)](#)
15. [Heating and insulating buildings](#)
16. [Thermal insulators \(Required practical 2 \)](#)

Topic 3 Energy resources

17. [Energy demands](#)
18. [Renewable energy](#)
19. [Nuclear energy](#)
20. [Big energy issues](#)

Topic 6 Molecules and matter

21. [Density](#)
22. [Density \(Required practical 5 \)](#)
23. [Internal energy](#)
24. [Specific Latent heat](#)
25. [Pressure in gases](#)
26. [Work done on a gas](#)

Half term 3

Topic 7 Radioactivity

- 27. [Atomic structure](#)
- 28. [Changes in the nucleus](#)
- 29. [Properties of alpha, beta, and gamma radiation](#)
- 30. [Half life](#)
- 31. [Nuclear radiation in medicine](#)
- 32. [Nuclear fission and fusion](#)
- 33. [Nuclear issues](#)

Topic 4 Electric circuits

- 34. [Electrical charge](#)
- 35. [Electrical fields](#)
- 36. [Current and charge](#)
- 37. [Potential difference](#)

Half term 4

- 38. [Component characteristics](#)
- 39. [Series and parallel circuits](#)
- 40. [Resistance \(Required practical 3 \)](#)
- 41. [I-V characteristics \(Required practical 4 \)](#)

Topic 5 Electricity in the home

- 42. [AC and DC supply](#)
- 43. [Mains electricity](#)
- 44. [Electrical power](#)
- 45. [Energy transferred by appliances](#)

Half term 5

- 46. [Appliances and efficiency](#)

Topic 8 Forces in balance (Paper 2)

- 47. [Vectors and scalars](#)
- 48. [Contact and non-contact forces](#)
- 49. [Resultant forces](#)
- 50. [Moments](#)
- 51. [Levers and gears](#)
- 52. [More moments and centre of mass](#)
- 53. [Resolving forces HT](#)

Paper 2 – Y11 2024 2025

Half term 1

Topic 8 Forces in balance

- 54. [Vectors and scalars](#)
- 55. [Contact and non-contact forces](#)
- 56. [Resultant forces](#)
- 57. [Moments](#)
- 58. [Levers and gears](#)
- 59. [More moments and centre of mass](#)
- 60. [Resolving forces HT](#)

Topic 9 Motion

- 61. [Distance-time graphs](#)
- 62. [Velocity-time graphs](#)
- 63. [Further acceleration calculations and terminal velocity](#)
- 64. [Velocity and acceleration](#)

Topic 10 Forces and motion

- 65. [Newton's first law](#)
- 66. [Newton's second law](#)
- 67. [Newton's third law](#)
- 68. [More terminal velocity](#)
- 69. [Acceleration \(Required practical 7 \)](#)

Half term 2

- 70. [Vehicle stopping distance](#)
- 71. [Forces and braking](#)
- 72. [Momentum HT](#)
- 73. [Conservation of momentum HT](#)
- 74. [Change in momentum](#)
- 75. [Forces and elasticity](#)
- 76. [Stretching a spring \(Required practical 6 \)](#)

Topic 11 Forces and pressure

- 77. [Pressure and surfaces](#)
- 78. [Pressure in liquids and flotation HT](#)

Topic 12 Wave properties

- 79. [Transverse and longitudinal waves](#)
- 80. [Properties of waves](#)

Half term 3

- 81. [The wave equation](#)
- 82. [Waves in a ripple tank \(Required practical 8 \)](#)
- 83. [Waves in a solid \(Required practical 8 \)](#)
- 84. [Reflection HT](#)
- 85. [Refraction HT](#)
- 86. [Reflection and refraction \(Required practical 9 \)](#)

- 87. [Sound waves HT](#)
- 88. [Ultrasound HT](#)
- 89. [Seismic waves HT](#)

Topic 13 Electromagnetic waves

- 90. [Electromagnetic waves](#)
- 91. [Uses of electromagnetic waves](#)
- 92. [Infrared \(Required practical 10 \)](#)
- 93. [Black body radiation](#)

Topic 14 Light

- 94. [Visible light](#)
- 95. [Convex lenses](#)
- 96. [Concave lenses](#)
- 97. [Magnifying glasses](#)

Half term 4

Topic 15 Electromagnetism

- 98. [Permanent and induced magnets](#)
- 99. [Magnetic fields](#)
- 100. [Electromagnets](#)
- 101. [Electromagnetic devices](#)
- 102. [The motor effect HT](#)
- 103. [The electric motor](#)
- 104. [Loudspeakers and headphones](#)
- 105. [The generator effect HT](#)
- 106. [The alternator and dynamo HT](#)
- 107. [The microphone](#)
- 108. [Transformers HT](#)
- 109. [Transformer calculations HT](#)

Topic 16 Space

- 110. [The Solar System](#)
- 111. [The life history of a star](#)
- 112. [Orbital motion](#)
- 113. [The expanding universe and red shift](#)