

## Lincoln UTC

### Science curriculum

GCSEs in the three separate sciences (biology, chemistry and physics) are often seen as the preserve of the most able and, in many schools, only taken by students in the top sets. It is undoubtedly true that they have the potential to enhance any young person's CV and to open a myriad of doors in their future. All Lincoln UTC students (regardless of prior attainment, disadvantage, or special educational need) take the three separate sciences.

Science graduates are highly sought after. The study of science opens up some of the most rewarding career opportunities, both in terms of salary and job satisfaction. Scientists have the highest employment rates of any subject.

Our students' learning in science complements their work in engineering. The chemical engineer needs to understand the chemistry of polymers and the composition of alloys. The innovators who will engineer the cars of tomorrow need to understand electromagnetism and Newton's laws of motion.

Our aim is for all our students to have the skills, the knowledge and the qualifications to help them secure the very best careers.

The sciences are essential to an appreciation of the world we inhabit and the impact we, as individuals, can have on it, on each other and on all the species with whom we share the planet. The study of science includes the exploration of difficult moral and ethical questions in medical research and genetic technology. It is a vital part of understanding our own bodies and how best to stay healthy. It provides students with the environmental knowledge they need to behave in a responsible and sustainable manner.

Our curriculum and our approach to teaching is designed to ensure that our students 'think like scientists', developing confidence in handling data and weighing up the evidence that supports or challenges theories and models. Practical and experimental work is a significant part of the curriculum, carefully mapped to make sure that students develop the necessary skills in each of the three disciplines.

Our curriculum is spiral in nature. The teaching is designed to ensure that all students are secure in the basics within each topic through repetition and practice which promotes recall, fluency and automaticity... checking that key subject knowledge is transferred to long-term memory. Topics are re-visited regularly and frequently (typically, one lesson each week), with work that helps students understand the links between topics, between different subjects and with real world, employment related contexts.

# GCSE BIOLOGY

(8461)

## Topics

- 1 Cell biology
- 2 Organisation
- 3 Infection and response
- 4 Bioenergetics
- 5 Homeostasis and response
- 6 Inheritance, variation and evolution
- 7 Ecology

## Assessment

Paper 1	+	Paper 2
<b>What's assessed</b> Topics 1–4: Cell biology; Organisation; Infection and response; and Bioenergetics.		<b>What's assessed</b> Topics 5–7: Homeostasis and response; Inheritance, variation and evolution; and Ecology.
<b>How it's assessed</b> <ul style="list-style-type: none"> <li>• Written exam: 1 hour 45 minutes</li> <li>• Foundation and Higher Tier</li> <li>• 100 marks</li> <li>• 50 % of GCSE</li> </ul>		<b>How it's assessed</b> <ul style="list-style-type: none"> <li>• Written exam: 1 hour 45 minutes</li> <li>• Foundation and Higher Tier</li> <li>• 100 marks</li> <li>• 50 % of GCSE</li> </ul>
<b>Questions</b> Multiple choice, structured, closed short answer and open response.		<b>Questions</b> Multiple choice, structured, closed short answer and open response.

# GCSE CHEMISTRY

(8462)

## Topics

- 1 Atomic structure and the periodic table
- 2 Bonding, structure, and the properties of matter
- 3 Quantitative chemistry
- 4 Chemical changes
- 5 Energy changes
- 6 The rate and extent of chemical change
- 7 Organic chemistry
- 8 Chemical analysis
- 9 Chemistry of the atmosphere
- 10 Using resources

## Assessment

Paper 1:
<b>What's assessed</b> Topics 1–5: Atomic structure and the periodic table; Bonding, structure, and the properties of matter; Quantitative chemistry, Chemical changes; and Energy changes.
<b>How it's assessed</b> <ul style="list-style-type: none"><li>• Written exam: 1 hour 45 minutes</li><li>• Foundation and Higher Tier</li><li>• 100 marks</li><li>• 50% of GCSE</li></ul>
<b>Questions</b> Multiple choice, structured, closed short answer and open response.

  

Paper 2:
<b>What's assessed</b> Topics 6–10: The rate and extent of chemical change; Organic chemistry; Chemical analysis, Chemistry of the atmosphere; and Using resources. Questions in Paper 2 may draw on fundamental concepts and principles from sections 4.1 to 4.3.
<b>How it's assessed</b> <ul style="list-style-type: none"><li>• Written exam: 1 hour 45 minutes</li><li>• Foundation and Higher Tier</li><li>• 100 marks</li><li>• 50% of GCSE</li></ul>
<b>Questions</b> Multiple choice, structured, closed short answer and open response.

## Topics

# GCSE PHYSICS

(8463)

- 1 Energy
- 2 Electricity
- 3 Particle model of matter
- 4 Atomic structure
- 5 Forces
- 6 Waves
- 7 Magnetism and electromagnetism
- 8 Space physics (physics only)

## Assessment

Paper 1:
<b>What's assessed</b> Topics 1-4: Energy; Electricity; Particle model of matter; and Atomic structure.
<b>How it's assessed</b> <ul style="list-style-type: none"><li>• Written exam: 1 hour 45 minutes</li><li>• Foundation and Higher Tier</li><li>• 100 marks</li><li>• 50% of GCSE</li></ul>
<b>Questions</b> <ul style="list-style-type: none"><li>• Multiple choice, structured, closed short answer and open response.</li></ul>

  

Paper 2:
<b>What's assessed</b> Topics 5-8: Forces; Waves; Magnetism and electromagnetism; and Space physics. Questions in paper 2 may draw on an understanding of energy changes and transfers due to heating, mechanical and electrical work and the concept of energy conservation from <a href="#">Energy</a> (page 17) and <a href="#">Electricity</a> (page 23).
<b>How it's assessed</b> <ul style="list-style-type: none"><li>• Written exam: 1 hour 45 minutes</li><li>• Foundation and Higher Tier</li><li>• 100 marks</li><li>• 50% of GCSE</li></ul>
<b>Questions</b> <ul style="list-style-type: none"><li>• Multiple choice, structured, closed short answer and open response.</li></ul>