

BTEC International Level 3 - **Applied Science** - Content Mapping

2010 QCF Unit		International BTEC Level 3 unit to which 2010 unit relates	Areas of content in the 2010 unit not covered in the International unit
No.	Title		
1	Fundamentals of Science	<p>Fully covered in:</p> <p>Unit 1 Principles and Applications of Biology I</p> <p>A1 Cell structure and function A3 Tissues</p> <p>Unit 2 Principles and Applications of Chemistry I</p> <p>A1 The Periodic Table and atomic structure A2 Electronic structure B1 Bonding and Structure D1 Reacting quantities D2 Gravimetric and volumetric analysis</p> <p>Unit 6 Principles and Applications of Chemistry II</p> <p>A1 Energetics</p>	
2	Working in the science industry	<p>Partially coverage in:</p> <p>Unit 4 Investigative Project Skills</p> <p>B3 Health and Safety and ethical considerations C1 Experimental procedures and techniques D1 Scientific report for the investigative project D2 Scientific evaluation of findings</p>	<p>Not covered:</p> <p>LO2 Be able to design a scientific laboratory: <i>Design features; Specialist laboratories; Safety requirements</i></p> <p>LO3 Know about laboratory information management systems: <i>Scientific data storage; Workplace records</i></p>
3	Scientific investigations	<p>Fully covered:</p> <p>Unit 4 Investigative Project Skills</p>	

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4	Scientific Practical Techniques	<p>Partially covered in:</p> <p>Unit 2 Principles and Applications of Chemistry I</p> <p>C1 The s block elements C2 The halogens C3 Transition metals D1 Reacting quantities</p> <p>Unit 4 Investigative Project Skills</p> <p>C1 Experimental procedures C2 Collect and collate data</p> <p>Unit 6 Principles and Applications of Chemistry II</p> <p>D4 Preparation and testing of organic compounds</p> <p>Unit 21 Applications of Organic Chemistry</p> <p>C2 Practical techniques for synthesis C3 Testing identity, estimating purity and determining yield</p>	<p>Not covered:</p> <p>LO2 Be able to use scientific techniques to separate and purify Substances: <i>Sampling: Importance of sampling, sampling techniques</i></p>
5	Perceptions of Science	<p>Fully covered:</p> <p>Unit 8 Contemporary Issues in Science</p>	
6	Using Mathematical Tools in Science	None	
7	Mathematics Calculations for Science	None	
8	Using Statistics in Science	None	

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9	Informatics in Science	<p>Partially covered in:</p> <p>Unit 2 Principles and Applications of Chemistry I</p> <p>D1 Reacting quantities D2 Gravimetric and volumetric analysis</p> <p>Unit 4 Investigative Project Skills</p> <p>C2 Collect and collate data C3 Data presentation and interpretation C4 Analyse data</p> <p>Unit 19 Microbiology and microbiological techniques</p> <p>D3 Measuring microbial growth</p>	<p>Not covered:</p> <p>LO1 Know how informatics is used in science: <i>Aims: to understand how systems work; modelling systems</i></p> <p>LO2 Be able to collect scientific data: <i>Computational science</i></p> <p>LO3 Be able to store and analyse scientific data: <i>Data warehousing/databases</i></p>
10	Using Science in the Workplace	None	
11	Physiology of Human Body Systems	<p>Fully covered in:</p> <p>Unit 1 Principles and Applications of Biology I</p> <p>C1 Structure of the lymphatic system C2 Function of the lymphatic system C3 Health matters and treatments related to the lymphatic system</p> <p>Unit 11 Functional Physiology of Human Body Systems</p> <p>A1 Structure of the digestive system A2 Function of the digestive system A3 Health matters and treatments of the digestive system</p> <p>Unit 12 Human Regulation and Reproduction</p> <p>A2 Cardiovascular and respiratory system regulation and control</p>	

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12	Physiology of Human Regulation and Reproduction	<p>Fully covered in:</p> <p>Unit 9 Biomedical Science</p> <p>C1 Urine composition C2 Urinalysis</p> <p>Unit 11 Functional Physiology and Human Body Systems</p> <p>B1 Endocrine system B2 Disorders of the endocrine system B3 Nervous system B4 Disorders of the nervous system C1 Homeostasis C2 Interrelationship between nervous and endocrine system C3 Disturbance of homeostasis</p> <p>Unit 12 Human Regulation and Reproduction</p> <p>B1 Feedback and control B2 Glands and organs B3 Homeostatic mechanisms B4 Impact of imbalance C1 Structure and function of reproductive anatomy C2 Reproductive process</p>	

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13	Biochemistry and Biotechnical techniques	<p>Partially covered in:</p> <p>Unit 13 Biological molecules and Metabolic pathways</p> <p>A1 Water A2 Carbohydrates A3 Proteins and nucleic acids A4 Lipids B1 Respiration B2 Effect of activity on requirements for oxygen and output of CO₂ B3 Factors that can affect respiration</p>	<p>Not covered:</p> <p>LO3 Be able to investigate factors that affect the activities of enzymes in biological systems: <i>Enzyme function; Laboratory techniques; Commercial applications</i></p>
14	Energy changes, sources and applications	<p>Partially covered in:</p> <p>Unit 7 Principles and Applications of Physics II</p> <p>A1 Thermal Physics in domestic and industrial applications</p> <p>Unit 10 Climate change</p> <p>C2 Changes to industrial methods and science innovation C3 Changes that can be made by individuals</p>	<p>Not covered:</p> <p>LO3 Understand the differences and relationships between different energy-transfer mechanisms: <i>Energy-transfer mechanisms; Differences between forced and natural convection</i></p> <p>LO4 Understand the properties of electrical energy sources: <i>Structure and operating principles of common primary and secondary cells</i></p>
15	Microbiological Techniques	<p>Fully covered in:</p> <p>Unit 19 Microbiology and Microbiological Techniques</p>	
16	Chemistry for Biology Technicians	<p>None</p>	

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No.	Title		
17	Electric circuits and their applications	Fully covered in: Unit 17 Electrical Circuits and their Applications	
18	Genetics and Genetic Engineering	Fully covered in: Unit 14 Genetics and Genetic Engineering	
19	Practical Chemical Analysis	Partially covered in: Unit 2 Principles and Applications of Chemistry I D1 Reacting quantities D2 Gravimetric and volumetric techniques Unit 4 Investigative Project Skills B3 Health and Safety and ethical considerations C1 Experimental procedures and techniques Unit 6 Principles and Applications of Chemistry II D4 Testing of organic compounds Unit 16 Applications of Inorganic Chemistry D2 Redox reactions and colorimetry Unit 21 Applications of Organic Chemistry C3 Testing identity, estimating purity and determining yield D1 Spectroscopic techniques D2 Chromatographic techniques	Not covered: LO4 Know how an industrial or commercial laboratory operates: <i>Laboratory type; consumers and third parties</i>
20	Medical Physics Techniques	Fully covered in: Unit 22 Medical Physics Applications	

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21	Biomedical Science Techniques	<p>Fully covered in:</p> <p>Unit 1 Principles and Applications of Biology I</p> <p>C3 Health matters and treatments related to the lymphatic system</p> <p>Unit 5 Principles and Applications of Biology II</p> <p>A1 Structure and function of biological molecules A2 Roles of proteins, and lipids in maintaining health A3 Disruption of biological processes in living organisms</p> <p>Unit 9 Biomedical Science</p> <p>A1 The components of blood A2 Changes to blood components and composition A3 Diagnostic techniques used in haematology B1 Tissue investigation and consequences of diagnosis C2 Urinalysis</p> <p>Unit 15 Diseases and Infections</p> <p>A1 Pathogens and infectious diseases B1 Methods by which infectious diseases can be spread B2 Methods by which infectious diseases can be prevented from spreading D1 Defence mechanism categories D2 Non-specific D3 Specific</p>	

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22	Chemical Laboratory Techniques	<p>Partially covered in:</p> <p>Unit 2 Principles and Applications of Chemistry I</p> <p>C1 The s block elements C2 The halogens D1 Reacting quantities D2 Gravimetric and volumetric analysis</p> <p>Unit 6 Principles and Applications of Chemistry II</p> <p>D4 Preparation and testing organic compounds</p> <p>Unit 16 Applications of Inorganic chemistry</p> <p>D2 Redox titrations and colorimetry</p> <p>Unit 21 Applications of Organic chemistry</p> <p>C1 Practical organic synthesis C2 Practical techniques for synthesis C3 Testing identity, estimating purity and determining yield D1 Spectroscopic techniques D2 Chromatographic techniques</p>	<p>Not covered:</p> <p>LO2 Be able to measure percentage yield and percentage purity: <i>Green chemistry: atom economy</i></p>

23	Science for Environmental Technicians	<p>Fully covered in:</p> <p>Unit 10 Climate Change</p> <p>A1 Evidence and theory of early atmospheric composition A2 Changes to the atmosphere with time A3 Development and understanding of present-day atmospheric composition B1 Evidence of atmosphere changes since the start of industrialisation B2 Nature and causes of greenhouse gases</p> <p>Unit 24 Pollution and Waste Management</p> <p>A1 Polluting substances and their sources A2 Facts and figures relating to pollution of water, land and atmosphere B2 Evidence of pollution effects on the plant kingdom C1 Current methods of managing waste</p> <p>Unit 25 Water quality</p> <p>A2 The hydrological cycle B3 Pollutants C1 Measuring and reporting on water quality D1 Water treatment D3 Water conservation and consumption control</p> <p>Unit 27 Ecosystems</p> <p>A1 Terms and concepts to describe ecosystems A2 Characteristics of ecosystems B2 Energy flow in ecosystems B3 Chemicals are cycled between organisms and the Earth</p> <p>Unit 28 Sustainable Energy</p> <p>A2 Environmental impact of fossil-fuel use</p>	
24	Principles of Plant and Soil Science	<p>None</p>	

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25	Electronics for Science Technicians	<p>Partially covered in:</p> <p>Unit 17 Electrical Circuits and their applications</p> <p>A1 Electric symbols, units and definitions A2 Electrical formulae and relationships A3 Electrical properties and uses of materials B1 Circuit characteristics B2 Measurement devices D1 Uses of passive transducers D2 Uses of active transducers D3 Uses of sensors and other measurement devices</p>	<p>Not covered:</p> <p>LO3 Be able to construct analogue and digital circuits safely: <i>Constructional techniques; Layout design</i></p> <p>LO4 Be able to construct and test circuits containing analogue, digital and integrated components: <i>Analogue circuits; Digital integrated circuits; Digital sequential systems</i></p>
26	Industrial Chemical reactions	<p>Fully covered in:</p> <p>Unit 20 Applications of Physical Chemistry</p>	
27	Chemical Periodicity and its Applications	<p>Fully covered in:</p> <p>Unit 2 Principles and Applications of Chemistry I</p> <p>A2 Electronic structure B1 Bonding and structure C1 The s block elements C3 Transition metals C6 Extraction of elements</p> <p>Unit 16 Applications of Inorganic Chemistry</p> <p>A1 Acid-base characteristics of inorganic compounds A2 Characteristics of transition metal compounds and complexes B2 Solubility of ionic compounds D1 Redox reactions D2 Redox titrations and colorimetry D3 Electrochemical cells and electrode potentials</p>	

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28	Industrial Applications of Organic Chemistry	<p>Fully covered in:</p> <p>Unit 6 Principles and Applications of Chemistry II C1 Structure and Bonding of Organic Compounds</p> <p>C2 Representations and naming organic compounds C3 Isomerism and properties of organic compounds D1 Reactions of alkanes and alkenes D2 Reactions of halogenoalkanes and alcohols D3 Organic chemistry mechanisms D4 Preparation and testing of organic compounds</p> <p>Unit 21 Applications of Organic Chemistry</p> <p>A1 Isomerism A2 Carbonyl compounds A3 Carboxylic acids and derivatives A4 Nitrogen containing compounds B1 Structure, properties and reactions of benzene B2 Monosubstituted aromatic compounds C1 Practical organic synthesis C2 Practical techniques for synthesis C3 Testing identity, estimating purity and determining yield</p>	
29	Physiological Investigations	None	
30	Medical Instrumentation	None	
31	Criminology	None	
32	Forensic Evidence Collection and Analysis	None	
33	Forensic Photography	None	

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No.	Title		
34	Criminal Psychology	None	
35	Applications of Forensic Psychology	None	
36	Forensic Fire Investigation	None	
37	Forensic Science Informatics	None	
38	Traffic Accident Investigation	None	
39	Criminal Investigation Procedures	None	
40	Criminal Investigation in Practice	None	
41	Clinical Psychology	None	
42	Geology of Natural Resources	None	
43	Diseases and Infections	Fully covered in: Unit 15 Diseases and Infections	
44	Astronomy	Fully covered in: Unit 18 Astronomy and Space Science	
45	Basic Polymer Technology	None	
46	Plastics Materials	None	

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47	Plastics Processing	None	
48	Polymer Process Engineering	None	
49	Rubber Products and Specialist Elastomers	None	
50	Rubber Technology	None	
51	Mechanical and Thermal Treatment of Metals	None	
52	Structure and Properties of Metals	None	
53	Extraction and Refining of metals	None	

BTEC International Level 3 units not mappable to QCF qualification

International Unit Number	International Unit Name
26	Animal Conservation