

Mapping Guide

DRAFT

LEVEL 3 CAMBRIDGE ADVANCED NATIONAL (AAQ) IN

# HUMAN BIOLOGY

**Certificate H049**

**Extended Certificate H149**

For first teaching in 2025

**Mapping the Cambridge Advanced National in Human  
Biology to Cambridge Technicals Applied Science  
Level 3: 05847-05849, 05879, 05874**

# Introduction

Cambridge Advanced Nationals are our new Level 3 qualifications, available for first teaching in 2025. We've worked closely with teachers and representatives from higher education institutions throughout the development process to ensure that these qualifications are of the highest quality, preparing your students for their next steps.

These qualifications offer current, engaging content that is relevant for young people pursuing degree courses and careers across various fields. Students will learn and develop vital practical skills, which they can directly apply to real-life situations and professional scenarios. At the same time, they will also develop a solid foundation of theoretical knowledge and understanding necessary for their progression to university. We've designed these new qualifications to be accessible for all students.

We've created this mapping guide to help you move from the current Level 3 Cambridge Technicals qualifications to the new Cambridge Advanced Nationals qualifications. The guide clearly shows which content is the same as you are used to, and where new content has been introduced.

# This mapping guide

In the tables that follow, you can see:

- new unit details including Topic Area (TA) numbers and titles
- how the new units map to the existing specification units that you may be familiar with
- which content is completely new to these qualifications
- which content from the existing specifications no longer features in the new qualification
- brief comments about the changes we've made.

Please note, some content that was in the Cambridge Technical in Applied Science is now in the Cambridge Advanced National in Human Biology.

**CAMBRIDGE  
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NATIONALS**

**In each unit, you'll see we now have teaching content in Topic Areas instead of learning outcomes. Read more in the specification.**

# Mapping detail

Cambridge Advanced National (AAQ)  
Human Biology

Cambridge Technicals  
Applied Science  
Level 3: 05847-05849,  
05879, 05874

F170: Fundamentals of human biology		Unit number	LO number	Comment
Topic Area number	Topic Area title			
1	Human cells and tissues	1 8 2	3 1/23/4/5 4	As the focus is on Human Biology, this is the only topic area retained from Unit 1 Science fundamentals. There is greater emphasis on structure related to function. Practical aspects of cell microscopy and tissue research and development have been included. This topic area also includes the learning outcomes from the current Cell biology unit, which will now be externally assessed.
2	Human physiology, organs and systems	4	1/2/3/4/5	This topic area covers the organs and systems associated with the current human physiology unit. Some of the methods of measuring the activity of the systems and noted associated diseases vary from the current qualification. This topic area will now be externally assessed.
3	Key concepts in endocrinology, neurobiology and reproduction	4	5	This topic area is also from the human physiology unit.  The renal system is now in topic area 2. The monitoring of homeostasis has been added. The Central Nervous System (CNS) is also included. New content on the structure and function of the reproductive system, together with hormonal control and reproductive ageing have been added. This topic area will now be externally assessed.
4	Basics of microbiology	18	1	Contains learning outcomes from the Microbiology and Laboratory techniques unit. Archaea- and microscopic invertebrates have been removed. The location of bacteria and their method of reproduction and culture are included. Beneficial microbes have been considered. Tissue culture is not included. This topic area will now be externally assessed.

<b>F171: Health and disease</b>		<b>Unit number</b>	<b>LO number</b>	<b>Comment</b>
<b>Topic Area number</b>	<b>Topic Area title</b>			
1	Causes and effects of diseases and disorders	4	1/23/4/5	Some of the diseases from the current human physiology unit are included. Extra physiological diseases have been added for various body systems. Deficiency diseases and genetic disorders have also been included. The causes and effects of a number of communicable diseases of viruses, bacteria, fungi, protozoans and multicellular parasites have been added. There are two examples of a disease/disorder in each system or microorganism identified. This topic area will now be externally assessed.
2	Curative management and preventative therapies	18	4	Antimicrobials are considered from their practical effect on bacterial growth and antimicrobial resistance. Specific antibiotic classification and their mode of action is no longer required. Most of this topic area is new and includes various forms of therapies such as surgery, medication, transplants, dialysis, patient counselling and vaccinations.
3	The role of immunology	4	6	The role of innate and adaptive immunity has been retained from the Human physiology unit. Immune dysfunction has also been retained but now includes transplants. The role played by vaccines in influencing the immune system has also been included.
4	Techniques for diagnosis and monitoring	4	3/4	While initial tests on the cardio and respiratory systems are retained, most of this topic area is new. Added now are diagnostic tests such as medical history assessment and physical examinations, blood and urine tests. Monitoring of specific groups and the methods of monitoring are also included.
5	Reporting, research and confidentiality	22	1/3/4	While this topic area retains some aspects of the Global scientific information unit, the focus of the new unit is on national over global information and health data rather than general scientific information. The legislation required in the new qualification is minimal and focuses on how confidentiality is maintained. The value of analytics to health care data has been added in addition to how health research is approached.

<b>F172: Genetics</b>		<b>Unit number</b>	<b>LO number</b>	<b>Comment</b>
<b>Topic Area number</b>	<b>Topic Area title</b>			
1	Fundamentals of genetics	5	1	Stages of meiosis have been removed. The focus is on the function of DNA and the role of telomeres, gene expression and regulation, with a greater emphasis on types of variation.
2	Mode of inheritance	5	1/2	The principles of monohybrid and dihybrid inheritance are retained. There is a detailed section on genetic mutations and associated disorders.
3	Genetic counselling and genetic testing	5	3	The current qualification focuses on the techniques involved in genetic testing. The new topic area covers genetic counselling; how and why genetic tests are taken; and the privacy and ethical considerations associated with DNA collection.
4	Gene therapy and genetic engineering	5	4	The Human Genome Project is no longer referenced in the new qualification but its implications in terms of medical treatments have been developed. Details of how and where gene therapy may be used and a comparison made with genetic engineering. CRISPR technology is included.

<b>F173: Biomedical Techniques</b>		<b>Unit number</b>	<b>LO number</b>	<b>Comment</b>
<b>Topic Area number</b>	<b>Topic Area title</b>			
1	What biomedical science is	N/A	N/A	This new topic area focuses on the role of a biomedical scientist and relevant disciplines associated with biomedical scientists. The handling of specimens and the importance of using reference values and population statistics is explored.
2	Diagnostic techniques: cells and microscopy	2 18 8	4/6 1 2	The topic area also covers types of microscopy and microbiology techniques as in Laboratory techniques current unit. Tissue culture is not included but lawn and pour plate culture have been added. Identification techniques include staining, colony morphology and selective media as in the Microbiology unit. Diagnostic techniques of histopathology, haematology and immunological assays is new content and cytological techniques is expanded.
3	Diagnostic techniques: biological molecules	2 11	2/3/5 2	A wide range of reagent strip testing techniques has been included. The range of cation and anion tests in this topic area is more extensive. Spectroscopy and chromatography techniques are also retained in the new qualification but with the emphasis on biological molecules. Standard chemical tests for organic compounds have been added. Titration is also retained but redox, complexometric and back titrations have been added. Colorimetry and spectrophotometry and biosensors are added.

**Cambridge Advanced National (AAQ)  
Human Biology**

**Cambridge Technicals  
Applied Science  
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<b>F173: Biomedical Techniques</b>		<b>Unit number</b>	<b>LO number</b>	<b>Comment</b>
<b>Topic Area number</b>	<b>Topic Area title</b>			
4	Planning a clinical investigation	23	1/2/3	<p>This investigation incorporates aspects of the first three learning outcomes of Scientific research techniques but is confined to a clinical biomedical investigation and is less prescribed than the current unit Scientific research unit. Recording data in an appropriate format is retained. Method and results (LO1), diagrams, tables, spreadsheets, dataloggers, writing are included here.</p> <p>As in the current Laboratory techniques and Control of hazards in the laboratory units, good practice, risk management and assessment, recognition of laboratory hazards, health and safety and are included with the emphasis on biomedical clinical investigations</p>
		2	1	
		6	1/2	
5	Report writing	3	1/2	<p>Using mathematical and graphical techniques to analyse data from Scientific analysis and reporting unit as relevant to the clinical investigation. Complex mathematical techniques are removed.</p> <p>Results (calculations), discussion and conclusions (LO4) and evaluations (LO4) are included. Recommendations are not required.</p>
		23	4	
		3	4	

<b>F174: Nutrition and Metabolism</b>		<b>Unit number</b>	<b>LO number</b>	<b>Comment</b>
<b>Topic Area number</b>	<b>Topic Area title</b>			
1	Nutrients required for a healthy body	7	1	The macro and micronutrients required remain the same. How food processing and storage affects macronutrients is now included. The processes of mechanical and chemical digestion and absorption which appeared in the current Human Physiology unit are now included here. <sup>7</sup>
		4	1	
2	Diets and disorders	7	1	Energy intake and dietary reference values remain. Variations in dietary needs have moved from LO3 to LO2. Factors affecting eating and food imbalance problems have moved from LO3 to LO2 and now appear under subtopic malnutrition. A wider range of diseases and disorders are now included.  Measuring the energy content of food has been removed. Metabolic rates are now in topic area 3. Food labels have been removed from LO4, and included here.
		7	3	
		7	4	
3	Metabolic pathways and control mechanisms	N/A	N/A	This is a new topic that focuses in detail on metabolism. Metabolic pathways and the role of the liver in metabolism are included. Control mechanisms include regulation of food intake and blood glucose and osmoregulation.
4	Diagnosis, monitoring and treatment for nutritional/ metabolic disorders	N/A	N/A175	This is a new topic area. Clinical assessments and scanning techniques involved in diagnosis are reviewed. Monitoring considers BMI and growth charts, biomarkers, biosensors and monitors. It also covers treatment for malnutrition, diabetes, obesity and non-alcoholic fatty liver disease.

<b>F175: Human reproduction</b>		<b>Unit number</b>	<b>LO number</b>	
<b>Topic Area number</b>	<b>Topic Area title</b>			
1	Conception and pregnancy	N/A	N/A	<p><b>This is a new unit and does not correspond with any of the units or learning outcomes in the current qualification.</b></p> <p>The role of the menstrual cycle and its impact on fertility is covered. Stages of development from fertilisation to foetus are covered and methods of contraception are considered.</p> <p>Detailed information of what may be expected at a first antenatal appointment and associated antenatal care plan is included. This is followed by techniques used to monitor pregnancy and foetal development. Potential pregnancy complications are considered. This is concluded with a consideration of relevant legislation and regulation.</p> <p>This includes how infertility is diagnosed and the causes of infertility in both females and males. Treatment options are covered and the topic area concludes with a reproductive health plan.</p> <p>The topic area explores the range of options available to assist reproduction, eligibility for treatment and success rates. This is concluded with a consideration of relevant legislation and regulation.</p>
2	Pregnancy (antenatal) care	N/A	N/A	
3	Infertility	N/A	N/A	
4	Assisted reproduction (AR)	N/A	N/A	

<b>F176: The brain</b>		<b>Unit number</b>	<b>LO number</b>	<b>This is a new unit and does not correspond with any of the units or learning outcomes in the current qualification.</b>	
<b>Topic Area number</b>	<b>Topic Area title</b>				
1	Structure and function of the nervous system	N/A	N/A		This topic area focuses on the structure and function of the brain, spinal cord and nerves.
2	Neuron communication and control	N/A	N/A		This topic area covers the operation and interpretation of action potentials, together with the structure and function of the synapse. The nervous control of movement and balance and that of the heartbeat are also included.
3	Nociception, neurotransmitters and drugs	N/A	N/A		This topic area covers different types of receptors and then focuses on nociceptors which sense pain. Neurotransmitters and their associated problems are considered. Medicinal, recreational and fitness-enhancing drugs are considered in their roles in modifying brain and nervous system function.
4	The diagnosis and treatment of brain disorders/injuries	N/A	N/A		This topic area covers the diagnosis of brain disorders/injuries including those that are inherited, age-related, physical injury related, together with mental health issues. Aspects of treatment include treatment plans, surgery, drugs and lifestyle modifications. The supportive role of healthcare professionals is also included.
5	Monitoring and scanning the brain	N/A	N/A	This topic area covers how the brain is monitored through the use of electroencephalograph (EEG) readings, including the analysis of sleep patterns. A review of the advantages and disadvantages of various brain-scanning techniques completes the topic.	

<b>F177: Drug development</b>		<b>Unit number</b>	<b>LO number</b>	<b>Comment</b>
<b>Topic Area number</b>	<b>Topic Area title</b>			
1	Pharmaceutical drugs	11	1/4	Five groups of drugs have now been classified by their shared effects and the basic classifications of synthetic and biological have been removed. The properties and mode of action of drugs is considered in more depth. The routes of drug delivery has also been added here from LO4.
2	Process of drug development	11	1/5	Drug development and discovery have now been moved to topic area 2. The roles of research scientists in the phases of drug development have been included. The discovery of new drugs is considered in more depth, particularly aspects of preclinical and clinical research. Specific legislation associated with this research and post market surveillance have been added.
3	Factors influencing drug development	11	1/5	LO3 production processes of a drug have now been removed. The role of stakeholder groups in drug development have been included as have ethical and market considerations. This topic area incorporates some aspects of LO1 and LO5.
4	Producing a clinical research proposal	N/A	N/A	How to pitch and communicate a clinical research proposal is a new inclusion.

# New content not in the Cambridge Technical specification

Cambridge Advanced National unit number	Cambridge Advanced National unit	Cambridge Advanced National Topic Area number	Cambridge Advanced National Topic Area
F170	Fundamentals of human biology		
F171	Health and disease	2	Curative management and preventative therapies
		3	Techniques for diagnosis and monitoring
F172	Genetics	3	Genetic counselling and genetic testing
F173	Biomedical techniques	1	What biomedical science is
F174	Nutrition and metabolism	3	Metabolic pathways and control mechanisms
		4	Diagnosis, monitoring and treatment for nutritional/metabolic disorders
F175	Human reproduction	1	Conception and pregnancy
		2	Pregnancy (antenatal) care
		3	Infertility
		4	Assisted reproduction (AR)
F176	The brain	1	Structure and function of the nervous system
		2	Neuron communication and control
		3	Nociception, neurotransmitters and drugs
		4	The diagnosis and treatment of brain disorders/injuries
		5	Monitoring and scanning the brain
F177	Drug development	4	Producing a clinical research proposal

# Cambridge Technical content not in the Cambridge Advanced National

Cambridge Technical unit number	Cambridge Technical unit title	Cambridge Technical LO number	Cambridge Technical LO title
Unit 1	Science fundamentals	1	<i>Unit not covered within this qualification.</i>
		2	
		4	
		5	
Unit 3	Scientific analysis and reporting	3	Be able to use keys for analysis
Unit 6	Control of hazards in the laboratory	3	Be able to design a safe functioning laboratory to manage the risk presented by hazards
Unit 7	Human nutrition	2	Be able to calculate nutritional requirements to maintain energy for different levels of activity
Unit 10	Testing consumer products	1 to 5	<i>Unit not covered within this qualification.</i>
Unit 11	Drug development	3	<i>Unit not covered within this qualification.</i>
Unit 13	Environmental surveying	1 to 4	<i>Unit not covered within this qualification.</i>
Unit 14	Environmental Management	1 to 5	<i>Unit not covered within this qualification.</i>
Unit 15	Sustainability and renewable energy	1 to 4	All 4
Unit 16	Waste management	1 to 4	<i>Unit not covered within this qualification.</i>
Unit 17	Food technology	1 to 4	All 4
Unit 18	Microbiology	3	<i>Unit not covered within this qualification.</i>
Unit 19	Crop production and soil science	1 to 4	All 4
Unit 20	Conservation of biodiversity	1 to 4	<i>Unit not covered within this qualification.</i>
Unit 21	Product testing techniques	1 to 4	<i>Unit not covered within this qualification.</i>
Unit 22	Global scientific information	2	Understand the classification and quality management of scientific information

# Appendix

## Cambridge Technical qualification units and learning outcome (LO) titles

Unit number	Unit title	LO number	LO title
Unit 1	Science fundamentals	1	Understand the chemical structures of elements and compounds
		2	Understand reactions in chemical and biological systems
		3	Understand cell organisation and structures
		4	Understand the principles of carbon chemistry
		5	Understand the importance of inorganic chemistry in living systems
Unit 2	Laboratory techniques	1	Understand the importance of health and safety and quality systems to industry
		2	Be able to separate, identify and quantify the amount of substances present in a mixture
		3	Be able to determine the concentration of an acid or base using titration
		4	Be able to examine and record features of biological samples
		5	Be able to identify cations and anions in samples
		6	Be able to use aseptic technique
Unit 3	Scientific analysis and reporting	1	Be able to use mathematical techniques to analyse data
		2	Be able to use graphical techniques to analyse data
		3	Be able to use keys for analysis
		4	Be able to analyse and evaluate the quality of data
		5	Be able to draw justified conclusions from data
		6	Be able to use modified, extended or combined laboratory techniques in analytical procedures

Unit number	Unit title	LO number	LO title
Unit 4	Human physiology	1	Understand the structure and functions of the digestive system
		2	Understand the role and function of the musculoskeletal systems
		3	Be able to assess how the cardiovascular system functions in the body
		4	Be able to assess how the respiratory system functions in the body
		5	Understand how homeostasis maintains balance within the body
		6	Understand the role and function of the immune system
Unit 5	Genetics	1	Understand the importance of meiosis
		2	Be able to apply techniques used in genetics crosses
		3	Understand the techniques of DNA mapping and genomics
		4	Understand the impact of an innovation in an application of genomics
Unit 6	Control of hazards in the laboratory	1	Understand the types of hazard that may be encountered in a laboratory
		2	Be able to use health and safety procedures to minimise the risk presented by hazards in a laboratory
		3	Be able to design a safe functioning laboratory to manage the risk presented by hazards
Unit 7	Human nutrition	1	Understand human nutritional requirements in the maintenance of health
		2	Be able to calculate nutritional requirements to maintain energy for different levels of activity
		3	Understand conditions relating to dietary needs
		4	Be able to label food with nutritional information
Unit 8	Cell biology	1	Understand the functions of the plasma membrane and endomembrane systems
		2	Be able to use cytological techniques
		3	Understand the cell cycle and the importance of mitosis
		4	Understand the process and significance of differentiation
		5	Understand the potential of stem cells in medical therapies

Unit number	Unit title	LO number	LO title
Unit 11	Drug development	1	Understand drug discovery and development principles
		2	Understand the range of techniques used in drug production
		3	Be able to carry out a basic extraction, synthesis, isolation and purification of a simple drug or pharmaceutical
		4	Understand the importance of product formulation and dosage form
		5	Understand the importance of planning clinical trials when introducing new drugs
Unit 18	Microbiology	1	Be able to classify and identify microorganisms
		2	Understand the use of microorganisms in agriculture
		3	Be able to use microbiology in food production
		4	Understand the action of antimicrobials on microorganisms
Unit 22	Global scientific information	1	Understand by whom, where and why scientific information is held globally and how it is stored for transmission
		2	Understand the classification and quality management of scientific information
		3	Be able to apply the key features, impact and consequences of legal, regulatory frameworks and information governing the storage and use of global scientific information
		4	Understand the principles of information security and risks
Unit 23	Scientific research techniques	1	Be able to develop a research plan
		2	Be able to conduct secondary research in a given scenario to a given brief
		3	Be able to design a scientific investigation for a given scenario
		4	Be able to draw conclusions and make recommendations from research, analysis and feedback

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