



## Unit 22: Biochemistry for Health

---

### Delivery guidance

#### Approaching the unit

The unit covers biological molecules and their action in metabolic processes. It goes on to cover the principles of biochemistry in industry. The delivery could include a mixture of research, practical investigation, and industry and speaker visits to see the practical applications of the theory.

#### Delivering the learning aims

**Learning aim A** is an investigation into how the structure of biological molecules affects metabolism. A series of annotated diagrams showing the biological molecules' structure, with notes linking them to aspects of metabolism, is one way to approach this learning aim.

**Learning aim B** is an exploration of the action of biological molecules. This may be approached with a mixture of research and practical investigation. The research should cover the theory behind the practical findings, linking them to metabolic processes.

**Learning aim C** looks at the use of biochemistry in the development of new drugs and the treatment of metabolic disorders. It also covers some uses of enzymes in biotechnology. Learners would benefit from visits to laboratories that conduct research into drug development and the use of enzymes in biotechnology. If this is not possible, speakers from industry may be able to come into the centre to talk about how they use biochemical principles in their work.

### Assessment model

Learning aim	Key content areas	Recommended assessment approach
<b>A</b> Explore how the structure of biological molecules affects metabolism	<b>A1</b> Structure of atoms <b>A2</b> Structure and function of inorganic molecules <b>A3</b> Structure and function of organic molecules <b>A4</b> Principles of metabolism	A report on the structure of atoms, the structure, function and role of inorganic and organic molecules, and the principles of metabolism.
<b>B</b> Explore the action of biological molecules in metabolic processes	<b>B1</b> Configuration of biomolecules <b>B2</b> Characteristics of biomolecules <b>B3</b> Nucleic acids <b>B4</b> Biochemical investigation	A report on how the structure, functions and action of biomolecules affect metabolic rates.
<b>C</b> Examine the principles of biochemistry in industry	<b>C1</b> Aetiology of metabolic disorders <b>C2</b> Biotechnology uses <b>C3</b> Research of biochemistry use	A report on metabolic disorders and diseases, and how biotechnology is used in current medical research to develop techniques and technology for treating metabolic disorders.

## Assessment guidance

This unit is internally assessed. There is a maximum of three summative assignments for this unit. Tutors should refer to the assessment guidance in the specification for specific detail, particularly in relation to the requirements for Pass, Merit and Distinction grades.

It is suggested that **learning aim A** is assessed via a practical workbook and written report. Within the report, learners must address the structure, function and role of inorganic and organic molecules and their impact on metabolism. The workbook should include the write-ups of their practical investigations into the changing factors that affect the molecules' structure and action. To support learners in their report writing, they should be encouraged to use headings, sub-headings and annotation such as pictures and diagrams to support explanations.

**Learning aim B** could be assessed through a practical workbook and a written report with the write-up of practicals investigating enzyme activity and the enzymatic extraction of DNA. This would be backed up by notes on the physical and chemical properties of biomolecules and nucleic acids. The report should link the structure, function and action of the biomolecules to the effect on metabolic rates.

**Learning aim C** could be assessed through a written report on case studies demonstrating the different genetic and endocrine disorders and how enzymes are used to treat and diagnose them, to include DNA profiling and testing. The report should go on to investigate drug development and the advantages and disadvantages of DNA sequencing.



## Getting started

This gives you a starting place for one way of delivering the unit, based around the recommended assessment approach in the specification.

### Introduction

Introduce this unit by discussing learners' knowledge of chemical structure and processes. Link these to metabolic processes, pointing out that all metabolism is a result of chemical reactions and that these occur because of the structure of the molecules.

### Learning aim A: Explore how the structure of biological molecules affects metabolism

- Learning aim A is about how the structure of biological molecules affects metabolism.
- For A1, A2 and A3, a series of annotated diagrams showing the relevant structures with notes either from the tutor or researched by learners should show how the structures link to biological systems and metabolic processes.
- For A4, notes from tutor-led discussions and lectures could be backed up by learners' own research to give an overview of the metabolic processes.

### Learning aim B: Explore the action of biological molecules in metabolic processes

- For B1, notes on condensation and hydrolysis of organic polymers and glucose metabolism, including cellular respiration, could be backed up by practical investigations looking at food analysis and energy conversion.
- For B2, a series of practicals with accompanying notes looking at enzyme action could cover this section.
- For B3, an approach could include learners making notes on cell replication and the role of DNA and protein synthesis in replication.
- For B4, individual research into scientific methodology, the factors affecting research, health and safety and report writing could be applied to the practicals carried out in this section.

### Learning aim C: Examine the principles of biochemistry in industry

- For C1, groups could research the disorders listed, sharing their findings among the whole group to ensure complete coverage.

**BTEC INTERNATIONAL HEALTH AND SOCIAL CARE**  
**UNIT 22: BIOCHEMISTRY FOR HEALTH**

- For C2, a series of practicals based on the use of biochemistry, backed up by research where there are no appropriate practical investigations, could be used.
- For C3, learners could research the use of biochemistry in the treatment of metabolic disorders. If available, a speaker from a research institution could come into the centre to explain their work.

### **Details of links to other BTEC units and qualifications, and to other relevant units/qualifications**

This unit links to:

- Unit 11: Scientific Techniques for Health Science
- Unit 13: Microbiology for Health Science
- Unit 17: Nutritional Health
- Unit 19: Medical Physics Applications in the Health Sector
- Unit 20: Genetics
- Unit 21: Biomedical Science.

### **Resources**

#### **Textbooks**

Any current international Level 3 textbook with a section on biological molecules, physiological and psychological diseases and disorders, and the development of treatments for physiological and psychological diseases and disorders will provide suitable content to support learners. Health and Social Care Level 3 textbooks may also contain useful information.

#### **Journals**

New Scientist

[www.newscientist.com](http://www.newscientist.com)

Royal College of Nursing

[www.rcn.org.uk/magazines](http://www.rcn.org.uk/magazines)

Scientific American

[www.scientificamerican.com](http://www.scientificamerican.com)

**BTEC INTERNATIONAL HEALTH AND SOCIAL CARE**  
**UNIT 22: BIOCHEMISTRY FOR HEALTH**

Nursing Times

[www.nursingtimes.net](http://www.nursingtimes.net)

### **Websites**

The King's Fund

[www.kingsfund.org.uk](http://www.kingsfund.org.uk)

Search for 'trends in medical advances in pharmaceutical innovation'. Outlines potential pharmaceutical innovations in the next 20 years. References provided to other articles.

Multiple Sclerosis Trust

[www.mstrust.org.uk](http://www.mstrust.org.uk)

Search for 'drug development process' for an outline of the drug development process.

The Pharmaceutical Journal

[www.pharmaceutical-journal.com](http://www.pharmaceutical-journal.com)

Search for 'drug development – the journey of a medicine from lab to shelf' for an article on drug development which details the process and clinical trials.

*Pearson is not responsible for the content of any external internet sites. It is essential for tutors to preview each website before using it in class so as to ensure that the URL is still accurate, relevant and appropriate. We suggest that tutors bookmark useful websites and consider enabling students to access them through the school/college intranet.*