



Unit 11: Scientific Techniques for Health Science

Delivery guidance

Approaching the unit

Learners will study a range of laboratory skills, including analysis of samples and microscope use to understand changes in cell features and aseptic prevention of cross-contamination.

Delivering the learning aims

Learning aim A could be introduced by a visit to a health-related laboratory and observing the journey of a sample through the process from receiving to sending out results. A combination of individual research and tutor-led notes could then be used to inform the report the learner has to produce.

Learning aims B and C are a series of practical activities. Learners could record their practical work in a laboratory notebook and the tutor should record observations of learners carrying out the tasks. The two learning aims could be delivered through a series of practical laboratory-based lessons and assessed in a circus format where learners move around a series of activities over several lessons.

Assessment model

Learning aim	Key content areas	Recommended assessment approach
A Understand how a health-related laboratory deals with samples sent for analysis	<p>A1 Health-related laboratories</p> <p>A2 Diagnostic tools</p> <p>A3 Procedures for samples</p> <p>A4 Health and safety requirements</p>	A research report on the activities and diagnostic tools in health-related laboratories.
B Carry out investigations using techniques similar to those in a health-related laboratory	<p>B1 Aseptic techniques used in health-related laboratories</p> <p>B2 Analysis techniques in health-related laboratories</p> <p>B3 Using a practical microbiology skill</p>	Practical work with a report on health-related laboratory procedures and methods, and preparing, mounting and examining microscopic examples.
C Carry out investigations using light microscopes similar to those in a health-related laboratory	C1 Use of light microscope	

Assessment guidance

This unit is internally assessed. There is a maximum number of two 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 through a written report. The report must cover how a health-related laboratory deals with the samples sent for analysis. This includes the type of work the laboratory may carry out and the procedures they use for in-vivo and in-vitro diagnostics. The report should look at the procedures, the related data recording and manipulation, and the quality assurance methods associated with the procedures covered.

In their report learners should be encouraged to use headings and subheadings for the different procedures and related activities. Flow charts and scientific diagrams are also a useful way of illustrating practical procedures.

Learning aims B and C are a series of practical activities with an associated report. These should be recorded in a laboratory notebook. This book then is evidence of the practical work. A written report based on the procedures in the workbook will allow learners to cover the rest of the criteria. Tutor observation records should be used to support the evidence in the laboratory notebook.



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 the types of health-based laboratories and the kinds of tests the different laboratories may undertake. Extend the discussion to cover why the different kinds of tests are done.

Learning aim A: Understand how a health-related laboratory deals with samples sent for analysis

- For learning aim A, the opportunity to visit a health-related laboratory and observe how samples are received and processed would be an invaluable experience for learners.
- For A1 learners need to be aware of the different types of health-related laboratories and the kind of work they do. A flow chart of the journey of both in-vitro and in-vivo samples could be a way of giving learners an overview of the processes involved.
- For A2 and A3 the different diagnostic tools and the procedures for samples that laboratories use, including in-vivo and in-vitro methods, should be covered. Notes on the reasons for the different diagnostic tools and the range of investigative procedures used, which can be referred to when carrying out the procedures themselves, would be useful and can form the basis of the research report.
- For A4 the health and safety requirements to enable the procedures to be carried out safely should be researched and notes made, both to support the writing of the report and as a reference while carrying out the practical activities in learning aims B and C.

Learning aim B: Carry out investigations using techniques similar to those in a health-related laboratory

Learning aim C: Carry out investigations using light microscopes similar to those in a health-related laboratory

- Learning aims B and C are a series of practical activities based on the techniques that would be used in a health-related laboratory. These

activities need to be recorded through observation records and in the learner's laboratory notebook.

- For B1 aseptic technique and the accurate measurement of micro-organisms must be demonstrated. Stock cultures of micro-organisms are available from many suppliers. Learners could do a serial dilution and plate up the resulting cultures to estimate the original concentration of the culture. The culture could also be used to investigate the effect of antiseptics and/or disinfectants using the prepared discs that are available to use with cultures spread on agar plates. This activity would then cover the requirements for B3.
- For B2 learners need to demonstrate analytical techniques. This could be a practical circus that covers the following:
 - preparation of standard solutions
 - food analysis techniques to measure lipid and acid content.
- For C1 and C2 learners need to carry out investigations using light microscopes. These investigations should include preparing and staining samples themselves and observing and recording prepared samples under two different magnifications.

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

This unit links to:

- Unit 2: Anatomy and Physiology for Health and Social Care
- Unit 5: Principles of Safe Practice in Health and Social Care

Resources

Textbooks

Annets, F, Hartley, J, Hocking, S, Llewellyn, R, Meunier, C, Parmar, C and Peers, A – *BTEC National Applied Science Student Book 1* (Pearson, 2016)
ISBN 9781292134093

This book for the Level 3 BTEC Nationals in Applied Science includes units that will contain overlapping scientific content and some contemporary issues that may be relevant in the study of this unit.

BTEC INTERNATIONAL HEALTH AND SOCIAL CARE
UNIT 11: SCIENTIFIC TECHNIQUES FOR HEALTH SCIENCE

Annets, F, Hartley, J, Hocking, S, Llewellyn, R and Meunier, C –
BTEC National Applied Science Student Book 2 (Pearson, 2016)
ISBN 9781292134130

This book for the Level 3 BTEC Nationals in Applied Science includes units that will contain overlapping scientific content and some contemporary issues that may be relevant in the study of this unit.

Hoffbrand, A V and Moss, P A H – *Hoffbrand's Essential Haematology*
(Wiley-Blackwell, 2015) ISBN 9781118408674

Howard, M R and Hamilton, P J – *Haematology: An Illustrated Colour Text*
(Churchill Livingstone, 2013) ISBN 9780702051395

Iles, R and Docherty, S (eds) – *Biomedical Sciences: Essential Laboratory Medicine*
(Wiley-Blackwell, 2012) ISBN 9780470997758

Luxton, R – *Clinical Biochemistry, 2nd edition* (Scion Publishing Ltd, 2008)
ISBN 9781904842415

Ramakrishnan, S – *Manual of Medical Laboratory Techniques* (Jaypee Brothers
Medical Publishers, 2012) ISBN 9789350256343

Journals

PubMed

<https://www.ncbi.nlm.nih.gov/pubmed>

A search engine containing biomedical literature from MEDLINE, life science journals and online books.

Science Direct

www.sciencedirect.com

A search engine for peer-reviewed journals, articles and books related to science, including health science.

Websites

American Cancer Society

www.cancer.org

Information about types of cytology tests used to look for cancer.

BTEC INTERNATIONAL HEALTH AND SOCIAL CARE
UNIT 11: SCIENTIFIC TECHNIQUES FOR HEALTH SCIENCE

Cellular Pathology Services

<http://cellularpathologyservices.co.uk/>

Information about the microscopic examination of cells in body fluids.

General Medical Council

www.gmc-uk.org/

Information about the General Medical Council and the role it plays in health science.

Healthline

www.healthline.com

Search for information about urinalysis.

Lab Tests Online

<https://labtestsonline.org.uk/>

Information about laboratory tests including how the tests are performed, normal range of results and what abnormal results could indicate.

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