2016 Suite

OCR
Oxford Cambridge and RSA

Cambridge TECHNICALS LEVEL 3

# APPLIED SCIENCE

Cambridge TECHNICALS 2016

## Unit 4

## Human physiology

D/507/6151

Guided learning hours: 60

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# LEVEL 3

# UNIT 4: Human physiology

# D/507/6151

**Guided learning hours:** 60

**Essential resources required for this unit:** Access to cardiovascular monitoring equipment

**This unit is internally assessed and externally moderated by OCR.**

## UNIT AIM

This unit aims to enable learners to understand why the essential processes such as the digestive, musculoskeletal, cardiovascular and respiratory systems are so important in maintaining health. How organs and body systems have to interact to ensure that the body can provide the conditions necessary for movement and growth and protection.

Unfortunately things do go wrong and each system has well known associated malfunctions. This unit will target some of the more common ones that relate to each system allowing learners to appreciate the effects on individuals and what has to be done, on possibly a daily basis, to enable them to lead as full and independent life as possible.

At the end of the unit, you will have knowledge and understanding of how body systems are structured, how they function and how they are inter-related. You will also gain practical skills in measuring using cardiovascular and respiratory monitoring equipment on human volunteers.

## TEACHING CONTENT

The teaching content in every unit states what has to be taught to ensure that learners are able to access the highest grades.

Anything which follows an i.e. details what must be taught as part of that area of content. Anything which follows an e.g. is illustrative, it should be noted that where e.g. is used, learners must know and be able to apply relevant examples in their work, although these do not need to be the same ones specified in the unit content.

For internally assessed units you need to ensure that any assignments you create, or any modifications you make to an assignment, do not expect the learner to do more than they have been taught, but must enable them to access the full range of grades as described in the grading criteria.

| Learning outcomes<br><br>The Learner will: | Teaching content<br><br>Learners must be taught: |
|---|---|
| 1. Understand the structure and functions of the digestive system | 1.1 The components and functions of the digestive system i.e.:<br>• Upper gastrointestinal tract<br>  o Buccal cavity<br>  o Oesophagus<br>  o Stomach<br>  o Duodenum<br><br>• Lower gastrointestinal tract<br>  o Small intestine - ileum<br>  o Large intestine - colon<br><br>1.2 The process of mechanical and chemical digestion i.e.:<br>• Digestive roles of liver and pancreas<br>• Action of digestive enzymes<br>• Absorption and assimilation<br>• Mastication<br>• Peristalsis and muscle action in the stomach<br><br>1.3 The causes and effects of common digestive disorders i.e.:<br>• Infection e.g. gastroenteritis<br>• Inflammation e.g. colitis<br>• Irritable bowel syndrome (IBS) |
| 2. Understand the role and function of the musculoskeletal systems | 2.1 The components and functions of the musculoskeletal system i.e.:<br>• Structure of bone and muscle<br>• Types of joint and limitations of movement<br>• Components of a synovial joint e.g. elbow or knee<br>• Muscle action around a joint<br><br>2.2 Common disorders of the musculoskeletal system i.e.:<br>• Arthritis<br>• Osteoporosis |

| Learning outcomes<br><br>The Learner will: | Teaching content<br><br>Learners must be taught: |
|---|---|
| 3. Be able to assess how the cardiovascular system functions in the body | 3.1 The components and function of the cardiovascular system i.e.:<br>• Heart<br>• Blood<br>• Types of Blood vessels including the cardiac system<br>• Pulmonary circulation<br><br>3.2 Monitoring the cardiovascular system in people i.e.:<br>• Pulse rates<br>• Heart monitors<br>• Pacemakers, defibrillators<br>• During exercise and at rest<br>• Comparison of different populations (e.g. age groups)<br><br>3.3 Common cardiovascular disorders, their possible causes and symptoms i.e.:<br>• hypertension<br>• coronary heart disease (symptoms to include angina and heart attack)<br>• varicose veins |
| 4. Be able to assess how the respiratory system functions in the body | 4.1 The components and function of the respiratory system i.e.:<br>• Structure of lungs<br>• Inspiration and expiration<br>• Gaseous exchange<br><br>4.2 How the respiratory system is monitored in people i.e.:<br>• vital capacity, residual volume etc. - use of spirometer<br>• Peak flow<br>• Oxygen saturation - oximeter<br>• Comparison of different populations (e.g. age groups, smoker/non-smoker)<br><br>4.3 Common disorders of the respiratory system i.e.:<br>• asthma<br>• emphysema<br>• cystic fibrosis |
| 5. Understand how homeostasis maintains balance within the body | 5.1 How the following structures and systems maintain homeostasis within the body i.e.:<br><br>• The concept of homeostasis<br>• The autonomic nervous system<br>• The endocrine system including the main glands:<br>  o Hypothalamus.<br>  o Pineal Gland.<br>  o Pituitary Gland.<br>  o Thyroid.<br>  o Parathyroid.<br>  o Thymus.<br>  o Adrenal.<br>  o Pancreas |

| Learning outcomes<br><br>The Learner will: | Teaching content<br><br>Learners must be taught: |
|---|---|
| | • Structure and functions of the kidneys<br>• Role of liver in excretion<br><br>5.2 Common disorders caused by the inability to maintain homeostasis i.e.:<br>• Heart failure<br>• Diabetes<br>• Dehydration<br>• Hyperglycemia<br>• Hypoglycemia |
| 6. Understand the role and function of the immune system | 6.1 How the innate immune system functions i.e.:<br>• Surface barriers<br>• Complement systems<br>• Cellular barriers<br>• Natural killer cells<br><br>6.2 How the adaptive immune system functions i.e.:<br>• Lymphocytes<br>• Immunological memory and the use of vaccination<br><br>6.3 Disorders of the immune system i.e.:<br>• Autoimmune diseases<br>• Inflammatory diseases<br>• Cancer<br>• Immunodeficiency |

## GRADING CRITERIA

| LO | Pass | Merit | Distinction |
|---|---|---|---|
| | The assessment criteria are the Pass requirements for this unit. | To achieve a Merit the evidence must show that, in addition to the Pass criteria, the candidate is able to: | To achieve a Distinction the evidence must show that, in addition to the pass and merit criteria, the candidate is able to: |
| 1. Understand the structure and functions of the digestive system | *P1: Describe how food is processed by the digestive system | M1: Explain the digestive related symptoms of someone with a common digestive disorder | |
| 2. Understand the role and function of the musculoskeletal system | *P2: Describe the importance of the musculoskeletal system in maintaining structure and movement of the body | | D1: Explain the importance of bone marrow to the skeletal and immune system |
| 3. Be able to assess how the cardiovascular system functions in the body | *P3: Take a range of measurements related to the cardiovascular system, relating the results to its functions | M2: Explain how common cardiovascular disorders can affect the functions in the body | |
| 4. Be able to assess how the respiratory system functions in the body | *P4: Take a range of measurements related to the respiratory system, relating the results to its functions | M3: Investigate effects on the respiratory system in different populations | |
| 5. Understand how homeostasis maintains balance within the body | *P5: Outline the importance of regulating body fluids in the body | | |
| 6. Understand the role and function of the immune system | *P6: Describe the immune system, outlining its function | | D2: Explain how the immune system functions when a vaccine is administered thereby preventing infection by certain diseases |

## ASSESSMENT GUIDANCE

Assessment guidance for the learning outcomes could consist of; research (including statistics), report writing, practical assessment using the models (or animal organs). A leaflet on preventative lifestyles helps to link the body structures and functions, to illness and disease.

Feedback to learners: you can discuss work-in-progress towards summative assessment with learners to make sure it's being done in a planned and timely manner. It also provides an opportunity for you to check the authenticity of the work. You must intervene if you feel there's a health and safety risk.

Learners should use their own words when producing evidence of their knowledge and understanding. When learners use their own words it reduces the possibility of learners' work being identified as plagiarised. If a learner does use someone else's words and ideas in their work, they must acknowledge it, and this is done through referencing. Just quoting and referencing someone else's work will not show that the learner knows or understands it. It has to be clear in the work how the learner is using the material they have referenced to inform their thoughts, ideas or conclusions.

For more information about internal assessment, including feedback, authentication and plagiarism, see the centre handbook. Information about how to reference is in the OCR Guide to Referencing available on our website: http://www.ocr.org.uk/i-want-to/skills-guides/.

## SYNOPTIC LEARNING AND ASSESSMENT

It will be possible for learners to make connections between other units over and above the unit containing the key tasks for synoptic assessment. Please see Section 6 of the Qualification Handbook for more details. We have indicated in the unit where these links are with an asterisk.

| Name of other unit and related LO | This unit: |
|---|---|
| **Unit 1 Science fundamentals**<br><br>LO2 Understand reactions in chemical and biological systems.<br><br>LO3 Understand cell organisation and structures<br><br>LO4 Understand the principles of carbon chemistry | LO1 Understand the structure and functions of the digestive system (P1)<br><br>LO2 Understand the role and function of the musculoskeletal system (P2)<br><br>LO3. Be able to assess how the cardiovascular system functions in the body (P3)<br><br>LO4 Be able to assess how the respiratory system functions in the body (P4)<br><br>LO5 Understand how homeostasis maintains balance within the body (P5)<br><br>LO6 Understand the role and function of the immune system (P6) |
| **Unit 2 Laboratory techniques**<br><br>LO2 Understand the principles of carbon chemistry<br><br>LO3 Be able to determine the concentration of an acid or base using titration<br><br>LO4 Be able to examine and record features of biological samples | LO3 Be able to assess how the cardiovascular system functions in the body (P3)<br><br>LO4 Be able to assess how the respiratory system functions in the body (P4) |

| Name of other unit and related LO | This unit: |
|---|---|
| **Unit 3 Scientific analysis and reporting**<br><br>LO1 Be able to use mathematical techniques to analyse data<br><br>LO2 Be able to use graphical techniques to analyse data<br><br>LO4 Be able to analyse and evaluate the quality of data<br><br>LO5 Be able to draw justified conclusions from data<br><br>LO6 Be able to use modified, extended or combined laboratory techniques in analytical procedures<br><br>LO7 Be able to record, report on and review scientific analyses | LO3 Be able to assess how the cardiovascular system functions in the body (P3)<br><br>LO4 Be able to assess how the respiratory system functions in the body (P4) |
| **Unit 6 Control of hazards in the laboratory**<br><br>LO1 Understand the types of hazard that may be encountered in a laboratory<br><br>LO2 Be able to use health and safety procedures to minimise the risk presented by hazards in a laboratory | LO3 Be able to assess how the cardiovascular system functions in the body (P3)<br><br>LO4 Be able to assess how the respiratory system functions in the body (P4) |
| **Unit 7 Human nutrition**<br><br>LO2 Be able to calculate nutritional requirements to maintain energy for different levels of activity | LO3 Be able to assess how the cardiovascular system functions in the body (P3)<br><br>LO4 Be able to assess how the respiratory system functions in the body (P4) |
| **Unit 8 Cell biology**<br><br>LO1 Understand the functions of the plasma membrane and endomembrane systems | LO1 Understand the structure and functions of the digestive system (P1) |

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Alternatively, you can email us on **vocational.qualifications@ocr.org.uk**

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