Unit Title: Anatomy and physiology for exercise and health

Level: 3

Credit value: 6

Guided learning hours: 43

Unit expiry date: 31/12/2013

Unit purpose and aim

This unit covers the knowledge an instructor needs about anatomy and physiology relating to exercise programming for a range of clients.

Learning Outcomes	Assessment Criteria	Knowledge, understanding and skills
1 Understand the heart and circulatory system and its relation to exercise and health	1.1 Explain the function of the heart valves 1.2 Describe coronary circulation 1.3 Explain the effect of disease processes on the structure and function of blood vessels 1.4 Explain the short and long term effects of exercise on blood pressure, including the valsalva effect 1.5 Explain the cardiovascular benefits and risks of endurance/aerobic training 1.6 Define blood pressure classifications and associated health risks	
2 Understand the musculoskeletal system and its relation to exercise	2.1 Explain the cellular structure of muscle fibres 2.2 Describe the sliding filament theory 2.3 Explain the effects of different types of exercises on muscle fibre type 2.4 Identify and locate the	**2.4 Major Muscles (building on Level 2)** Rotator Cuff Teres minor, Supraspinatus Subscapularis Infraspinatus Shoulder Girdle

	muscle attachment sites for the major muscles of the body 2.5 Name, locate and explain the function of skeletal muscle involved in physical activity 2.6 Identify the anatomical axis and planes with regard to joint actions and different exercises 2.7 Explain the joint actions brought about by specific muscle group contractions 2.8 Describe joints/joint structure with regard to range of motion/movement and injury risk 2.9 Describe joint movement potential and joint actions 2.10 Describe the structure of the pelvic girdle and associated muscles and ligaments	Levator Scapulae Pectoralis Minor Serratus Anterior Trapezius Rhomboids major/minor Teres Major Spinal Extensors Erector Spinae: Iliocostalis, Longissimus, Spinalis Multifidus Quadratus Lumborum Hip Flexors (Iliopsoas) Iliacus Psoas Major Adductors Magnus, Brevis, Longus, Pectinius, Gracilis, Sartorius Abductors Gluteus Medius, Gluteus Minimus, Piriformis, Tensor Fascia Latae Abdominals Internal and external Obliques, Transverse abdominis Quadriceps Rectus Femoris Vastus Lateralis Vastus Medialis Vastus Intermedius Hamstrings Semitendinosus Semimembranosus Biceps Femoris **2.6** learners should be able to define and identify the frontal, saggital and transverse planes. **2.8** recognising that synovial joints are most at risk of injury.

3	Understand postural and core stability	3.1	Describe the structure and function of the stabilising ligaments and muscles of the spine	**Bones** Axial Skeleton • Cranium • Cervical Vertebrae • Thoracic Vertebrae • Lumbar Vertebrae • Sacral Vertebrae • Sternum • Ribs • Coccyx Appendicular Skeleton • Scapula • Clavicle • Humerus • Ulna • Radius • Carpals • Metacarpals • Phalanges • Ilium • Ischium • Pubis • Femur • Patella • Tibia • Fibula • Tarsals • Calcaneus • Metatarsals **Joints** **As level 2 plus:** Synovial Condyloid / Ellipsoid Saddle
		3.2	Describe local muscle changes that can take place due to insufficient stabilisation	
		3.3	Explain the potential effects of abdominal adiposity and poor posture on movement efficiency	
		3.4	Explain the potential problems that can occur as a result of postural deviations	
		3.5	Explain the impact of core stabilisation exercise and the potential for injury/aggravation of problems	
		3.6	Explain the benefits, risks and applications of the following types of stretching: • static (passive and active) • dynamic • proprioceptive Neuromuscular Facilitation	

4	Understand the nervous system and its relation to exercise	4.1 Describe the specific roles of: • the central nervous system (CNS) • the Peripheral Nervous System (PNS) including somatic and autonomic systems 4.2 Describe nervous control and transmission of a nervous impulse 4.3 Describe the structure and function of a neuron 4.4 Explain the role of a motor unit 4.5 Explain the process of motor unit recruitment and the significance of a motor unit's size and number of muscle fibres 4.6 Explain the function of muscle proprioceptors and the stretch reflex 4.7 Explain reciprocal inhibition and its relevance to exercise 4.8 Explain the neuromuscular adaptations associated with exercise/training 4.9 Explain the benefits of improved neuromuscular coordination/efficiency to exercise performance	
5	Understand the endocrine system and its relation to exercise and health	5.1 Describe the functions of the endocrine system 5.2 Identify the major glands in the endocrine system 5.3 Explain the function of hormones including: • growth hormone • thyroid hormones • corticosteroids • catecholamines • insulin • glucagon	**5.2** Pituitary, thyroid, adrenal, pancreas, hypothalamus glands.

5	Understand energy systems and their relation to exercise	6.1	Identify the contribution of energy according to: • duration of exercise/activity being performed • type of exercise/activity being performed • intensity of exercise/activity being performed	
		6.2	Identify the by-products of the three energy systems and their significance in muscle fatigue	
		6.3	Describe the effect of endurance training/advanced training methods on the use of fuel for exercise	

Assessment

Evidence for this unit is generated through the candidate completing an OCR set test under examination conditions which is then marked by the centre assessor. The time available for completion of the test is 1 hour 15 minutes. The test comprises 6 individual sections, with each section fully addressing the relevant unit Learning Outcome. Each section of the test has a pass mark set to test full mastery of the learning outcome. The pass marks for each section are indicated on the front of the test.

Candidates who do not meet the required standard to pass a section will only be required to re-sit the section/s where they have not previously meet the required standard.

The test must be completed in full by the candidate and internally marked and verified by the centre before being sampled by the OCR External Verifier.

OCR will provide comprehensive marking guidance to Centres which must be used by Assessors to mark the paper.

The assessment materials will be available to download from OCR Interchange for all approved OCR centres at http://www.ocr.org.uk/interchange/index.html

Evidence requirements

The OCR set test fully meets all required Assessment Criteria for this unit. A detailed mark scheme is provided for centre assessors, outlining minimum requirements for each question. The OCR set test is the only accepted form of evidence for this unit. The assignment should be stored in an appropriate candidate portfolio for access by the OCR External Verifier when requested.

Guidance on assessment and evidence requirements

Candidates are required to complete the OCR – set assignment under examination conditions in accordance with *Instructions for Conducting Examinations* which can be found on the JCQ website: http://www.jcq.org.uk/jcq_top_ten/index.cfm

Where candidates have access – related requirements, additional information on how to manage their assessment can be found in the OCR Centre handbook for this qualification.

Details of relationship between the unit and national occupational standards

Instructing Exercise and Fitness 2009 NOS

Resources

Access to OCR Interchange

An examination conditions environment: Please refer to guidance on appropriate venues for controlled assessment in the OCR Centre handbook for this qualification.

Additional information

For further information regarding administration for this qualification, please refer to the OCR document '*Admin Guide:Vocational Qualifications' (A850).*