



Australian Government

Department of Education, Employment and Workplace Relations

SRFFIT005B Apply basic exercise science to exercise instruction

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit has been developed for the Fitness Industry Training Package and covers the knowledge and skills to provide the basic applied exercise science required for fitness instructors.

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Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

Elements and Performance Criteria

Element	Performance Criteria
1 Use anatomical terminology and descriptions of the musculoskeletal structure of the body when instructing clients	1.1 Apply the components of fitness and the function of the body systems to common fitness activities 1.2 Use anatomical terminology and describe and demonstrate movements of the body to clients 1.3 Relate the location and function of the major bones of the upper and lower extremities and axial skeleton to movement when instructing clients 1.4 Relate the structure and function of the major joints of the body to exercise to movement when instructing clients 1.5 Relate the gross structure of skeletal muscle and its relationship to movement to movements when instructing clients 1.6 Relate major muscles and their prime moving movements at major joints in the body to movement when instructing clients. 1.7 Relate the neural control of skeletal muscle contraction to movement when instructing clients 1.8 Relate basic types of neural feedback involved in the coordination of movement to movement when instructing clients 1.9 Measure and relate the relationship between muscle size and strength to movement when instructing clients 1.1 Explain the basic structural adaptations to musculoskeletal tissue that occur as a result of fitness training to clients
2 Relate the functioning of the cardio-respiratory system to exercise instruction	2.1 Identify and explain the structure and function of the various parts of the cardio-respiratory system, related to exercise to clients 2.2 Relate the process of transport and exchange of oxygen and carbon dioxide during exercise to

fitness outcomes when instructing clients

- 2.3 Measure client heart rates and blood pressure responses during **submaximal aerobic activity** and used to set training loads to target specific client energy system involvement
- 2.4 Use ratings of perceived exertion during **submaximal aerobic activity**, muscle endurance activities, lactate endurance and maximal strength activities to measure and adjust the work intensity of clients
- 2.5 Compare the oxygen demands for various fitness activities
- 2.6 Explain the physiological adaptations of the cardio-respiratory system as a result of fitness training to clients
- 2.7 Recognise and use symptoms and effects of specific muscular fatigue and blood lactate accumulation during muscle endurance activities to adjust exercise intensity
- 3 **Apply a knowledge of the body's energy systems to exercise instruction**
 - 3.1 Explain the effect of exercise intensity on the energy substrate to clients during fitness instruction
 - 3.2 Apply the limiting factors of the **body's energy systems** to the setting of exercise intensities when instructing fitness activities
- 4 **Use a knowledge of the lever systems of the human body and resistance equipment to set safe and effective exercise intensities**
 - 4.1 Use the common terms used to qualify the basic **principles of biomechanics** when instructing fitness activities
 - 4.2 Identify and explain the basic **lever systems** in both anatomical and mechanical lever systems to clients
 - 4.3 Use the **lever systems** in the human body and their role in movement and stability to provide safe and effective exercises for clients
 - 4.4 Take into account the use of levers and cams in **resistance** equipment to alter the force required by muscles and affect joint stability when developing programs and instructing fitness activities
 - 4.5 Take into account the effect of changes in lever length on muscle force output in both anatomical

and mechanical lever when instructing fitness activities

- 5 **Demonstrate and apply an understanding of the factors that motivate people to commence and stay with a long term fitness program**
- 5.1 Recognise and use the factors that encourage people to adhere to exercise programs when instructing clients
 - 5.2 Recognise and apply common reasons for discontinuation of fitness programs when setting program guidelines
 - 5.3 Discuss habits, lifestyle, family situation, likes and dislikes which might be relevant to writing an appropriate exercise program with the client
 - 5.4 Use the physical and the psychological characteristics that apply to each ***stage of fitness, stages of change*** and the most appropriate form of motivation at each level when instructing clients
 - 5.5 Direct clients to understand and overcome their own barriers to the continuation of an exercise program
 - 5.6 Identify the steps involved in establishing a behavioural change that results in their long term adherence to an exercise program to the client and use when instructing clients
 - 5.7 Take into account people's idiosyncrasies and behavioural patterns and ***industry standards*** when instructing clients

Required Skills and Knowledge

Not applicable.

Evidence Guide

The Evidence Guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competence for this unit. This is an integral part of the assessment of competence and should be read in conjunction with the Range Statements

Critical aspects of evidence to be considered

Assessment must confirm the integrated demonstration of all elements of competency and their performance criteria, in particular the ability to

apply a basic knowledge of musculoskeletal anatomy to exercise

apply a basic knowledge of neuromuscular anatomy to exercise

apply a basic knowledge of cardiovascular physiology to exercise

Interdependent assessment of units

This unit must be assessed after attainment of competency in the following unit(s)

Nil

This unit must be assessed in conjunction with the following unit(s)

Nil

For the purpose of integrated assessment, this unit may be assessed in conjunction with the following unit(s)

Nil

Required knowledge and skills

Required knowledge

Nil

Required skills

Nil

Resource implications

Physical resources - assessment of this competency requires access to

anatomy equipment with full sized human skeleton

functional joint models

muscle charts and maps

physiology equipment with heart rate monitors, ergometers, charts for ratings of

perceived exertion

weights gym equipment suitable for muscle size and strength assessment

biomechanics equipment with models of levers

dynamometers and weights gym equipment

Human resources - assessment of this competency will require human resources consistent with those outlined in the Assessment Guidelines. That is, assessors (or persons within the assessment team) must

be competent in this unit but preferably be competent in the unit at the level above

be current in their knowledge and understanding of the industry through provision of evidence of professional activity in the relevant area

have attained the mandatory competency requirements for assessors under the Australian Quality Training Framework (AQTF) as specified in Standard 7.3 of the *Standards for Registered Training Organisations*

Consistency in performance

Due to issues such as safety requirements and delivery of appropriate techniques, this unit of competency must be assessed over a minimum of three (3) different occasions to ensure consistency of performance over the Range Statements and context applicable to the work environment

Context for assessment

This unit of competency must be assessed in the context of fitness in Australia. For valid and reliable assessment the fitness activity should closely replicate the work environment. The environment should be safe, with the hazards, circumstances and equipment likely to be encountered in a real workplace

This unit of competence should be assessed through the observation of processes and procedures, oral and/or written questioning on required knowledge and skills and

consideration of required attitudes

Where performance is not directly observed and/or is required to be demonstrated over a "period of time" and/or in a "number of locations", any evidence should be authenticated by colleagues, supervisors, clients or other appropriate person

KEY COMPET ENCIES

Collect, Analyse&O rganise Information	Communic ate Ideas&Info rmation	Plan&Orga nise Activities	Work with Others&in Teams	Use Mathematic al Ideas&Tec hniques	Solve Problems	Use Technology
3	2	2	2	2	2	3

These levels do not relate to the Australian Qualifications Framework. They relate to the seven areas of generic competency that underpin effective workplace practices.

The three levels of performance (1, 2 and 3) denote the level of competency required to

perform the
task:

Use routine
approaches

Select from
routine
approaches

Establish
new
approaches

**Collecting,
analysing
and
organising
informatio
n -**

**Communic
ating ideas
and
informatio
n -**

**Planning
and
organising
activities -**

**Working
with teams
and others
-**

**Using
mathemati
cal ideas
and
techniques
-**

**Solving
problems -**

**Using
technology
-**

Please refer
to the
Assessment

Guidelines
for advice
on how to
use the Key
Competenci
es.

Range Statement

Range Statements

The Range Statements provide advice to interpret the scope and context of this unit of competence, allowing for differences between enterprises and workplaces. The Range Statements relate to the unit as a whole and helps facilitate holistic assessment. In addition, the following variables may be present for this particular unit of competency

RANGE STATEMENT

CATEGORIES

Anatomical terminology

[all categories]
flexion
extension
rotation
abduction
adduction
circumduction
inversion
eversion
pronation
supination
horizontal flexion
horizontal extension

Cardio-respiratory system

[all categories]
heart
lungs
arteries
capillaries
veins

Components of fitness

[all categories]
cardio-respiratory endurance
muscular endurance
strength
flexibility
body composition

	speed
	power
	agility
	balance
	coordination
	anaerobic endurance
Energy systems	[all categories]
	alactic
	adenosine triphosphate
	phosphocreatine
	lactic
	aerobic
	aerobic glycolysis
	fat oxidation
Industry standards	[all categories]
	professional associations
	government legislation
Joints	[all categories]
	joint functions
	weight bearing
	movement
	joint types
	ball and socket
	hinge
	vertebral
	synovial joints
	ligaments
	articular cartilage
	capsule
	synovial membrane
	synovial fluid
	bone

Lever systems

[all categories]

1st class

force arm

resistance arm

axis of rotation

2nd class

force arm

resistance arm

axis of rotation

3rd class

force arm

resistance arm

axis of rotation

Major bones

[all categories]

skull

cervical vertebrae

thoracic vertebrae

lumbar vertebrae

sacrum

clavicle

scapula

humerus

radius

ulna

carpals

digits

pelvis

femur

patella

tibia

fibula

tarsals

Major muscles

[all categories]

trapezius
sternocleidomastoid
latissimus dorsi
erector spinae
rectus abdominis
internal obliques
external obliques
quadratus lumborum
pectoralis major
rhomboids
deltoids
biceps brachii
triceps brachii
forearm flexors
forearm extensors
gluteals
quadriceps
vastus medialis
vastus lateralis
vastus intermedius
rectus femoris
hamstrings
semimembranous
semitendinous
bicep femoris
gastrocnemius
soleus
tibialis anterior

Major joints

[all categories]
elbow
shoulder
pectoral girdle
inter-vertebral

	sacro-iliac
	hip
	knee
	ankle
Neural feedback	[all categories] proprioception reflex loop
Principles of biomechanics	[all categories] mass force speed acceleration work energy power strength momentum force arm resistance arm axis of rotation cam pulley
Resistance	[all categories] pin loaded hydraulic air water free weights electronic/magnetic resisted/assisted
Stages of change	[all categories]

	pre-contemplation
	contemplation
	preparation
	action
	maintenance
Stages of fitness	[all categories]
	beginner
	relatively fit
	advanced fitness level
	specific to the individual and the activity
Submaximal aerobic activity	[all categories]
	intensity
	duration
Unit Sector(s)	
Not applicable.	