SRFFIT005B Apply basic exercise science to exercise instruction
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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.

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

<table>
<thead>
<tr>
<th>Element</th>
<th>Performance Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Use anatomical terminology and descriptions of the musculoskeletal structure of the body when instructing clients</td>
</tr>
<tr>
<td></td>
<td>1.1 Apply the components of fitness and the function of the body systems to common fitness activities</td>
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<tr>
<td></td>
<td>1.2 Use anatomical terminology and describe and demonstrate movements of the body to clients</td>
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<td></td>
<td>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</td>
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<td>1.4 Relate the structure and function of the major joints of the body to exercise to movement when instructing clients</td>
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<td>1.5 Relate the gross structure of skeletal muscle and its relationship to movement to movements when instructing clients</td>
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<td>1.6 Relate major muscles and their prime moving movements at major joints in the body to movement when instructing clients</td>
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<td>1.7 Relate the neural control of skeletal muscle contraction to movement when instructing clients</td>
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<td>1.8 Relate basic types of neural feedback involved in the coordination of movement to movement when instructing clients</td>
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<td></td>
<td>1.9 Measure and relate the relationship between muscle size and strength to movement when instructing clients</td>
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<td></td>
<td>1.10 Explain the basic structural adaptations to musculoskeletal tissue that occur as a result of fitness training to clients</td>
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<tr>
<td>2</td>
<td>Relate the functioning of the cardio-respiratory system to exercise instruction</td>
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<tr>
<td></td>
<td>2.1 Identify and explain the structure and function of the various parts of the cardio-respiratory system, related to exercise to clients</td>
</tr>
<tr>
<td></td>
<td>2.2 Relate the process of transport and exchange of oxygen and carbon dioxide during exercise to clients</td>
</tr>
</tbody>
</table>
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
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 COMPETENCIES

<table>
<thead>
<tr>
<th>Collect, Analyse &amp; Organise Information</th>
<th>Communicate Ideas &amp; Information</th>
<th>Plan &amp; Organise Activities</th>
<th>Work with Others &amp; in Teams</th>
<th>Use Mathematical Ideas &amp; Techniques</th>
<th>Solve Problems</th>
<th>Use Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
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</tbody>
</table>

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 information**

**Communicating ideas and information**

**Planning and organising activities**

**Working with teams and others**

**Using mathematical ideas and techniques**

**Solving problems**

**Using technology**

Please refer to the Assessment
Guidelines for advice on how to use the Key Competencies.
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:

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<thead>
<tr>
<th>RANGE STATEMENT</th>
<th>CATEGORIES</th>
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<tr>
<td>Anatomical terminology</td>
<td>[all categories]</td>
</tr>
<tr>
<td>flexion</td>
<td></td>
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<tr>
<td>extension</td>
<td></td>
</tr>
<tr>
<td>rotation</td>
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<td>abduction</td>
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<td>adduction</td>
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<td>circumduction</td>
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<td>inversion</td>
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<td>eversion</td>
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<tr>
<td>pronation</td>
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<tr>
<td>supination</td>
<td></td>
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<tr>
<td>horizontal flexion</td>
<td></td>
</tr>
<tr>
<td>horizontal extension</td>
<td></td>
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<tr>
<td>Cardio-respiratory system</td>
<td>[all categories]</td>
</tr>
<tr>
<td>heart</td>
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<tr>
<td>lungs</td>
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<tr>
<td>arteries</td>
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<td>capillaries</td>
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<tr>
<td>veins</td>
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<tr>
<td>Components of fitness</td>
<td>[all categories]</td>
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<tr>
<td>cardio-respiratory endurance</td>
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<tr>
<td>muscular endurance</td>
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<tr>
<td>strength</td>
<td></td>
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<tr>
<td>flexibility</td>
<td></td>
</tr>
<tr>
<td>body composition</td>
<td></td>
</tr>
</tbody>
</table>
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
quadriiceps
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.