**NZQA**

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EXPIRED

Achievement standard: 90963 Version 3

Standard title: Demonstrate understanding of the function of the body as it relates to the performance of physical activity

Level: 1

Credits: 5

Resource title: The effects of exercise

Resource reference: Physical Education VP-1.2 v2

Vocational pathway: Social and Community Services

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| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-90963-02-7277 |
| Authenticity of evidence | Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material.Using this assessment resource without modification may mean that learners’ work is not authentic. Assessors/ educators may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

Vocational Pathway Assessment Resource

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Learner instructions

# Introduction

This assessment activity requires you to demonstrate understanding of the function of the body as it relates to the performance of physical activity.

You are going to be assessed on how comprehensively you demonstrate your understanding of the function of the body as it relates to the performance of physical activity.

The following instructions provide you with a way to structure your work so you can demonstrate what you have learnt and achieve success in this standard.

Assessor/educator note: It is expected that the assessor/educator will read the learner instructions and modify them if necessary to suit their learners.

# Task

To be considered for the role of a paramedic, patient transfer officer or frontline volunteer, it is essential that you are physically fit.

Some of the tasks you would be doing on a daily basis are performing cardiopulmonary resuscitation (CPR) for a minimum of two minutes, lifting and transporting pieces of equipment weighing up to 20 kg, and lifting (with assistance) patients weighing 70 kg and more. Enhanced physical fitness makes you more capable of meeting the physical and emotional demands of these roles.

Your assessor/educator will take you through a number of basic fitness tests to measure your current level of fitness. Your assessor/educator will then develop an exercise programme for you to follow over a period of time (weeks or months). During your exercise programme, consider what is happening to your body and record in a log book your progress and observations in relation to:

* basic physiological responses
* basic functional anatomy
* basic principles of biomechanics.

When you are confident that you can explain what your body is doing in relation to your exercise programme, write a report of what you have learned.

You may need to either video or photograph yourself while exercising, to provide visual images in support of your written report.

Consider the following questions in your written report:

## Basic exercise physiology

* What types of energy systems did you use in your exercise programme? Use examples from your practical experience to support your answer.
* What are the short-term (acute) physiological responses to your exercise programme and why do these occur? Consider each of the muscular, cardiovascular and respiratory systems.
* If you continued this exercise programme over a period of six months to a year, what long-term (chronic) physiological adaptations might you expect to see? How would these benefit a paramedic, patient transfer officer or frontline volunteer?

## Basic anatomy

* What type of movement is occurring at your joints?
* How and why does this movement occur? Consider the joint type, movement made, and agonist and antagonist muscles.
* How and why do these muscles and movements help your performance? Give examples to support your answer.

## Basic biomechanics

Choose the two biomechanical principles from the following questions that are most relevant to your exercise programme. Explain in detail how these principles helped improve your baseline fitness tests:

* Do any of Newton’s Laws (inertia, acceleration or action/reaction) affect your exercise programme? Explain how and why.
* How does force summation relate to your exercise programme? Explain how and why, with examples.
* How do balance and stability affect your exercise programme? Explain how and why, with examples.
* What types of levers are involved in your exercise programme, and how do they affect the performance of your exercise programme?

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Assessor/Educator guidelines

# Introduction

The following guidelines are supplied to enable assessors/educators to carry out valid and consistent assessment using this internal assessment resource.

As with all assessment resources, education providers will need to follow their own quality control processes. Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material. Using this assessment resource without modification may mean that learners' work is not authentic. The assessor/educator may need to change figures, measurements or data sources or set a different context or topic. Assessors/educators need to consider the local context in which learning is taking place and its relevance for learners.

Assessors/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing learners against it.

# Context/setting

Due to the nature of the roles undertaken as a paramedic, patient transfer officer or a frontline volunteer, it is essential that they are physically fit. This activity requires learners to demonstrate comprehensive understanding of the function of the body as it relates to the performance of physical activity. They participate in an exercise programme over a period of time and keep a log that records the effects of exercise on their body.

Learners make observations and draw conclusions when developing a written report about aspects of basic physiological responses, basic functional anatomy and basic principles of biomechanics, and how each of these relate to the performance of their exercise programme.

# Conditions

Learners provide evidence of participation through their dated log entries and visual images, and then when they are ready they complete a written report.

# Resource requirements

Learners need to be shown how to monitor their heart rate, respiratory rate and blood pressure.

The exercise programme and evidence of the learner’s understanding need to incorporate aspects of exercise physiology, anatomy and biomechanics.

Learners need access to:

* equipment to record physiological responses (for example stopwatch or watch, heart monitor, blood pressure monitor or meter (sphygmomanometer)
* a camera and/or audio visual equipment.

# Additional information

Other possible modes of assessment include self-assessment, peer assessment, an electronic portfolio, blog or wiki, oral demonstration or visual portfolio (for example video or annotated photographs).

## Other possible contexts for this vocational pathway

This resource could be adapted for workers in other sectors such as fire fighters, hospital orderlies, defence force medics, personal protection officers, police officers, or security officers, who need to demonstrate understanding of the function of the body as it relates to the performance of physical activity.

# Assessment schedule: Physical Education 90963 – The effects of exercise

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner demonstrates understanding of the function of the body as it relates to the performance of physical activity by:* giving an account of and/or details of how the human body works in relation to physical activity for more than one characteristic

For example, in their written account the learner:* + describes basic functional anatomy involved in their exercise programme (e.g. anatomical movement, bones and muscles involved in the movement, agonists and/or antagonists)
	+ describes basic principles of biomechanics, depending on the context used (e.g. balance/stability, Newton’s laws, force summation, types of levers)
	+ describes how exercise physiology is involved in/affects how the body functions in their exercise programme (e.g. acute/chronic responses to training and energy systems used).

*I can complete more press-ups after my six-week programme. A chronic response to my training is that my muscles have got larger and stronger, and my resting heart rate is lower.**I was using my anaerobic energy system when doing press-ups, but when I was running 2.4 km, I was using my aerobic energy system.**When I was doing press-ups, I needed to have a wide base of support. To begin with, I had it too narrow, and it made me unbalanced and I couldn’t perform the press-up technique properly. By widening my base of support it gave me more stability and I was able to control my movement. When I performed the press-up, I had to bend my elbows (flexion) which meant that my biceps were the agonist and my triceps were the antagonist muscles.**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth understanding of the function of the body as it relates to the performance of physical activity by:* explaining how and why the function of the body is related to the performance of the physical activity for more than one characteristic

For example, in their written account the learner:* + explains basic principles of functional anatomy involved in their exercise programme (e.g. anatomical movement, bones and muscles involved in the movement, agonists and/or antagonists)
	+ explains basic principles of biomechanics, depending on the context used (e.g. balance/stability, Newton’s laws, force summation, types of levers)
	+ explains how exercise physiology is involved in/affects how the body functions in their exercise programme (e.g. acute/chronic responses to training and energy systems used).

*I can complete more press-ups after my six-week programme. An example of this is 10 press ups in week 1, and 26 in week 6.**A chronic response to my training is that my muscles have got larger and stronger. My resting heart rate is lower (it was 75 bpm in week one, and is now 68 bpm).This is because my heart is now working more efficiently at pumping blood and oxygen around the body.**I was using my anaerobic energy system when doing press-ups which is used for shorter-duration, high intensity activities lasting between 30 to 90 seconds, but when I was running 2.4 km, I was using my aerobic energy system. This is any activity over around 20 minutes using oxygen.**When I was doing press-ups, I needed to have a wide base of support. To begin with, I had it too narrow, and it made me unbalanced and I couldn’t perform the press-up technique properly. By widening my base of support it gave me more stability and I was able to control my movement.**I also applied Newton’s 1st Law ‘an object will remain at rest unless acted upon by an external force’ so my body will stay on the floor at the start of a press-up unless I apply force to my muscles to move my body up from the floor.**When I performed the press-up, I had to bend my elbows (flexion), which meant that my biceps were the agonist and my triceps were the antagonist muscles. The types of joints I used in the press-up were the ball and socket joint in my shoulder and the hinge joint in my elbow. Muscles work in pairs to produce movement, as one muscle is contracting, the other one is relaxing (in elbow flexion, the bicep is contracting and the tricep is relaxing).**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive understanding of the function of the body as it relates to the performance of physical activity by:* demonstrating depth and breadth of knowledge, including the relationship between anatomical structure and the performance of a physical activity; the use of biomechanical principles to explain the performance of a physical activity; and the relationship of physiological responses to the intensity of a physical activity

For example, in their written account the learner:* + explains in detail basic principles of functional anatomy involved in their exercise programme (e.g. anatomical movement, bones and muscles involved in the movement, agonists and/or antagonists)
	+ explains in detail the basic principles of biomechanics, depending on the context used (e.g. balance/stability, Newton’s laws, force summation, types of levers)
	+ explains in detail how exercise physiology is involved in/affects how the body functions in their exercise programme (e.g. acute/chronic responses to training and energy systems used).

*I can complete more press-ups after my six-week programme. An example of this is 10 press-ups in week 1, and 26 in week 6.**A chronic response to my training is that my muscles have got larger and stronger. My resting heart rate is lower (it was 75 bpm in week one, and is now 68 bpm). This is because my heart is now working more efficiently at pumping blood and oxygen around the body.**I was using my anaerobic energy system when doing press-ups which is used for shorter-duration, high intensity activities lasting between 30 to 90 seconds, but when I was running 2.4 km, I was using my aerobic energy system. This is any activity over around 20 minutes using oxygen.**The major energy systems that I would use as a paramedic would depend on each scenario, although I can see how all of them could be used at an accident scene. For example, if I had to lift someone up on a bench, I would be using my anaerobic CP system, as this would last under 30 seconds, but if I was to carry a patient out of danger between 30 to 90 seconds, then I would be using the anaerobic lactic system. I would be using the aerobic system if I had to apply CPR on a patient for 20 minutes or more.**When I was doing press-ups, I needed to have a wide base of support. To begin with I had it too narrow, and it made me unbalanced and I couldn’t perform the press-up technique properly. By widening my base of support, it gave me more stability and I was able to control my movement.**I also applied Newton’s 1st Law ‘an object will remain at rest unless acted upon by an external force’ so my body will stay on the floor at the start of a press-up unless I apply force to my muscles to move my body up from the floor. As my muscles got stronger, I could apply more force to produce more press-ups over time. I also considered Newtons 2nd Law ‘when a force acts upon a mass, the result is the acceleration of that mass’ so this means that the harder and faster I push my body up from the floor, the more press-ups I can complete in a set time. I am also a solid build, so I have to apply more force than others in my class because I have more mass, so it is more work for me to achieve each full press-up.**When I performed the press-up, I had to bend my elbows (flexion), which meant that my biceps were the agonist and my triceps were the antagonist muscles. The types of joints I used in the press up were the ball and socket joint in my shoulder and the hinge joint in my elbow. Muscles work in pairs across a joint to produce movement, as one muscle is contracting, the other one is relaxing (in elbow flexion, the bicep is contracting and the tricep is relaxing).**The above expected learner responses are indicative only and relate to just part of what is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.