**NZQA**

**Approved**

Achievement standard: 90949 Version 3

Standard title: Investigate life processes and environmental factors that affect them

Level: 1

Credits: 4

Resource title: Aging well

Resource reference: Science VP-1.10 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-02-2015-90949-02-7296 |
| 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 investigate the life processes of support and movement, and excretion and environmental factors that affect them in the elderly in a rest home.

You are going to be assessed on how comprehensively you investigate these life processes and environmental factors that affect them. You need to show that you can use observations or findings and biological ideas to make significant links between the structure, function and environmental factors related to support and movement, and excretion, including the implications for senior citizens living in a rest home.

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

As the population of New Zealand ages, more and more people are moving into rest homes in their later years. At this stage of life it is important for them to keep physically active to ensure a good quality of life. The elderly also need to keep their kidneys functioning adequately, as kidney failure is a key medical issue that impacts on their quality of life.

Investigate by using drawings and diagrams, and then write a report about the two life processes of support and movement, and excretion, and the environmental factors that affect these life processes as they relate to senior citizens.

Produce a report to be used as the basis of a presentation to a group of rest home care givers.

## Keeping it moving

Draw a model of a hinged limb (such as an arm or leg) to show the structures involved when the limb functions by bending (flexing) and straightening (extending).

Use your drawing to explain how and why humans use their muscles and bones for the life process of support and movement.

Read the information in the following link about the recommended amounts of dietary calcium: <http://www.healthy.co.nz/ailment/2135-recommended-calcium-intake-for-new-zealanders.html>.

Using this information, discuss in your report how diet is an important environmental factor affecting support and movement in the elderly. Consider the importance of dietary calcium in maintaining bone strength, and the implications any weakness or fractures will have for support and movement in this age group.

## Keeping fluids in balance

Research how a human kidney works and record your findings and ideas.

Annotate the diagram of the human excretory system in Resource A to explain how and why the kidney works together with the other key parts of the excretory system.

Examine the data in Resource B, and use your findings, observations, and diagrams to explain how and why humans carry out the life process of excretion.

Discuss in your report how an environmental factor (such as the level of physical exercise or the fluids the elderly may drink) can affect how the excretory system works. Then predict what differences you might expect in the output and make-up of urine produced after any form of exercise, or lack of it.

## Submitting your findings

Use your observations or findings, and biological ideas to make significant links between the structure, function and environmental factors related to the life processes of support and movement, and excretion, including the implications of these factors for senior citizens living in a rest home.

Making significant links may involve explaining, elaborating, applying, justifying, relating, evaluating, comparing, contrasting, or analysing.

Submit your investigation in the agreed format, and hand in your own completed set of labelled drawings, diagrams, and notes.

# Resource A

Diagram of the human excretory system



# Resource B

## Approximate composition of substances in blood and urine of a healthy person

|  |  |  |
| --- | --- | --- |
|  | **Blood**(g per 100 ml) | **Urine**(g per 100 ml) |
| Water | 92 | 95 |
| Proteins | 7.5 | 0 |
| Urea | 0.03 | 2 |
| Salts | 0.4 | 1.2 |
| Glucose | 0.1 | 0 |

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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

This activity requires learners to comprehensively investigate the two life processes of support and movement, and excretion, and environmental factors (diet and exercise) that affect them in the elderly. Using the scenario of senior citizens living in a rest home provides a relevant context to help learners make meaningful links between each life process and the structures and their functions involved in both.

Learners are required to investigate the structural features of related organs and tissues by:

* drawing a model of a hinged joint
* using the resources provided and researching how a human kidney works
* using observations or findings, and biological ideas, to give reasons how and why the structure, function and environmental factors are related to both life processes and implications for senior citizens living in a rest home
* using their observations, researched information and annotated diagrams to submit their investigation in an agreed format, making significant links between the structure, function and environmental factors related to both life processes and implications for senior citizens living in a rest home.

The most appropriate context will depend on local opportunities and learners’ interests, and should be adjusted by the assessor/educator. Learners should be encouraged to weave the scenario into their responses.

# Conditions

The investigations can be carried out in pairs, but all other work is individual. Learners’ work will be individually assessed.

Learners will decide on the format of the final presentation; it could be a portfolio of written evidence, a report, or a single investigation. You may wish to take learner preferences into account in deciding on the format.

# Resource requirements

Learners may require access to computers and libraries.

# Additional information

The assessment materials can be modified to investigate any two life processes of other mammals, as long as they relate to community and social services.

You could modify the materials to choose one task from this resource (that is, one life process in an animal) and one from the life processes of plants (for example in the context of community gardening) to make up the minimum of two life processes required to achieve this standard.

Annotated diagrams and drawings are likely to provide most of the evidence in this assessment. Note that annotation of a diagram or drawing includes not only labels to identify component parts but also descriptions of colour, textures, and so on, and explanations of how parts work, both individually and together.

## Other possible contexts for this vocational pathway

Other life processes in humans can also be selected, for example, reproduction, sensitivity, growth, nutrition, and gas exchange. At least two life processes must be selected.

Other possible contexts include community organisations and/or groups involved in sporting or leisure activities such as walking, jogging, cycling, and swimming; and patient diets in hospitals.

# Assessment schedule: Science 90949 – Aging well

|  |  |  |
| --- | --- | --- |
| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner investigates two life processes and environmental factors that affect them by:* describing observations or findings about the structure, function and at least one environmental factor related to each life process of support and movement, and excretion, in an elderly person in a rest home

For example, the learner:* describes that humans can stand (are supported) because their bones are connected together with strong stringy material called ligaments *Humans can move because muscles pull against the bones.*
* identifies that bones contain a lot of calcium (calcium salts, not the metal), and the only way we can get calcium into our bodies is in our food *So to keep bones strong senior citizens need to eat dairy food like milk and cheese. Lack of calcium can be a cause of osteoporosis.*

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner investigates, in depth, two life processes and environmental factors that affect them by:* describing observations or findings about the structure, function and at least one environmental factor related to each life process of support and movement, and excretion, in an elderly person in a rest home
* using observations or findings and biological ideas to give reasons how or why the structure, function and an environmental factor is related to one life process in an elderly person in a rest home

For example, the learner explains:* *Each end of a muscle is attached to a different bone, for instance the bicep connects the shoulder bone and top of the humerus bone to the radius bone in the forearm; tendons tie the muscles to bones.*
* *A hinge joint like the knee is surrounded by cartilage which secretes synovial fluid; this fluid lubricates the joint by forming a layer between the bone ends therefore reducing friction. The cartilage is reduced with aging.*
* *Calcium is needed for making bones strong and it is recommended between 800 and 1200 mg/day should be eaten; this is partly because our bones lose calcium from their tissue as we age, so more calcium is needed to build new tissue.*
* *In arthritis, movement becomes slow and painful due to inflammation and swelling in joints like fingers.*

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner investigates, comprehensively, two life processes, and environmental factors that affect them by:* describing observations or findings about the structure, function and at least one environmental factor related to each life process of support and movement, and excretion, in an elderly person in a rest home
* using observations or findings and biological ideas to give reasons how or why the structure, function and an environmental factor is related to one life process in an elderly person in a rest home
* using observations or findings and biological ideas to make significant links between structure, function and an environmental factor related to one life process , including implications for an elderly person in a rest home

For example, the learner discusses:* *Diet is really important for the elderly – they need to eat plenty of protein because muscles and tendons are made of protein, and the muscle fibres gradually wear out and need replacing; without enough protein in the diet, the muscles will become weaker and/or stay fatigued, and people won’t recover so well from any form of exercise; muscles also need enough energy to make them contract.*
* *As women age, they need to be especially careful to eat enough calcium as their bones tend to get weaker.*
* *An older person suffering from osteoarthritis has little cartilage between the bones, causing friction and/or bone rubbing between the bones. This is felt as pain.*
* *Research has shown that one of the best ways to ensure bones are strong in all age groups is to exercise regularly.*

Making significant links may involve explaining, elaborating, applying, justifying, relating, evaluating, comparing and contrasting, or analysing.*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.