**NZQA**

**Approved**

Achievement standard: 90950 Version 3

Standard title: Investigate biological ideas relating to interactions between humans and micro-organisms

Level: 1

Credits: 4

Resource title: Wood rot

Resource reference: Science VP-1.11 v2

Vocational pathway: Primary Industries

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| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-90950-02-7299 |
| 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

Achievement standard: 90950

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Learner instructions

# Introduction

This assessment activity requires you to investigate biological ideas relating to interactions between humans and wood decay fungi.

You will be assessed on how you comprehensively investigate biological ideas relating to interactions between humans and micro-organisms. You will create a PowerPoint presentation on the biological ideas related to how two decay fungi affect untreated wood in the forestry industry, and how humans are affected by this.

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

You are an apprentice helping your boss collect the wood required to complete an order for the construction of a large house in an urban area. At a timber merchant, you found some timber you thought was suitable for fascia board. Your boss checked the markings on the end of the timber and asked you to return it to where you found it. He explained that the timber was not ‘treated’ to withstand the effects of weather and rot.

The chief culprits of wood rot are wood decay fungi. These are not normally a problem at the saw mill or timber yard as long as stock is moved to sale fairly quickly. Problems occur when timber used in construction is from untreated stock held for a long period. The kinds of rot can be classed as either ‘dry’, ‘wet’ or ‘soft’.

You are to investigate these kinds of rot and create a PowerPoint presentation for a group of building apprentices on how fungi affect untreated timber. You need to emphasise the importance of selecting the correct grade of timber in construction.

You will work individually to gather and process information to present your report.

Complete both parts of this task.

## Part 1: Collect and process information

Carry out your research on two different decay fungi causing rot in untreated wood and the effect on humans.

Use a range of resources to collect your information, for example resource sheets, photos, videos, websites, and reference texts.

Before you begin, draw up worksheets to record the details of your research. Use a separate worksheet for each decay fungus causing rot in untreated wood.

### Worksheet guidelines

Head each sheet with your name, and the name of each decay fungus causing rot in untreated wood.

For each decay fungus causing rot in untreated wood:

* describe the decay fungi’s lifecycle
* describe biological ideas as to how and why the fungi causes rot in untreated wood. This may include their life processes and how they affect humans.

The information you research should allow you to:

* make links between the specific life processes of the decay fungi and their effect on wood
* use biological ideas to explain how and why people limit the effects of decay fungi on wood.

Processing your information usually involves:

* selecting relevant information (sifting, sorting, photocopying, printing, or making notes)
* summarising the relevant information by highlighting text, writing notes, and circling useful diagrams/illustrations
* organising your information
* providing references for all your sources, for example website URL(s), magazine articles or book titles and authors.

## Part 2: Present a PowerPoint

You now need to use your collected and processed information to produce a PowerPoint that investigates the biological ideas relating to how two decay fungi cause rot in untreated wood and how humans are affected by this.

* The PowerPoint can include illustrations, diagrams, and graphs, if appropriate.
* You will also need to include supporting information to show discussion of the significant links about the interactions between humans and both wood decay fungi.

Use your findings and biological ideas to explain how or why the two wood decay fungi you are investigating cause rot in untreated wood and how this affects humans.

You need to consider:

* biological ideas that could include the structure and life processes of the two decay fungi
* the effect the life processes that these two wood decay fungi have on humans.

Make significant links about the interactions between humans and the two wood decay fungi, including the impacts of this knowledge on humans’ personal actions or everyday life.

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

Acknowledge all your sources of information.

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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 biological ideas relating to interactions between humans and two wood decay fungi causing dry, wet or soft rot in untreated timber and how humans are affected by this, by creating a PowerPoint with supporting information.

# Conditions

Learners will work individually.

# Resource requirements

Learners will need information from a variety of sources such as resource sheets, photos, videos, websites, and reference texts. You could provide learners with the source material or require them to research their own.

## Useful internet links

<http://www.insights.co.nz/products_processes_wpre.aspx#a>

<http://en.wikipedia.org/wiki/Biological_interaction>

<http://www.consumerbuild.org.nz/publish/leaky/leaky-timber.php>

# Additional information

Mutual exclusion exists between this standard and the externally assessed Achievement Standard 90927 (Biology 1.3) *Demonstrate understanding of biological ideas relating to micro-organisms*.

## Some common decay fungi and their effect on wood:

* Dry rot – attacks timber with low moisture content; the common name for *Serpula lachrymans*, one of the brown rots. Not often found in New Zealand.
* Wet rot – attacks timber with high moisture content, associated with damp and wet conditions; the common name for all other brown and white rots, not as serious as dry rot. For example, *Coniophora puteana,* often called ‘cellar rot.’ Untreated *Pinus radiata* timber stored in damp conditions may show evidence of wet rot in just three weeks.
* Soft rot – attacks mainly wet timber, softening the structure, which can be easily confused with brown rot because they can produce similar cube-like patterning and darken the timber. The main difference is that they tend to attack the surface layers by digesting the cellulose and leaving chains of cavities. This weakens the timber.
* Sapstain fungi and moulds– probably have the most serious issues for the timber industry. These do not weaken the wood, but can devalue it by causing discolouring or ‘staining’. They are quick to attack untreated timber, often within 24 hours of felling. Their attack is often assisted by the boring and tunnelling activities of bark beetles and borers.

## Other possible contexts for this vocational pathway

Why wood requires treatment; recognition and prevention of wood decay.

The effectiveness of different treatments used on wood.

End uses of treated wood identified from building specifications.

Investigate the effect of decay fungi on non-treated wet wood, identify and record what decay fungi grow and how long this takes.

A parallel investigation with a treated *Pinus radiata* timber, at least H3 CCA treated.

# Assessment schedule: Science 90950 – Wood rot

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner investigates biological ideas relating to interactions between humans and micro-organisms by:* using observations or findings and biological ideas to describe how humans are affected by two different decay fungi causing rot in untreated timber
* providing all relevant evidence in their final report.

For example, the learner:* describes dry rot caused by Serpula lachrymans: *A network of tubes called hyphae forms a mat-like structure called the mycelium growing over the timber as well as within it. The hyphae digest the wood, thereby weakening its structure, and changing its appearance.*
* describes environmental factor(s) that affect the life functions of the decay fungus, including its lifecycle on and in untreated wood and its effect on it
* uses biological ideas to describe how dry rot over time can affect the safety and value of timber manufactured for the building industry.

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner investigates, in depth, biological ideas relating to interactions between humans and micro-organisms by:* using observations or findings to explain in-depth how and why two different decay fungi cause rot in untreated timber
* using these findings and biological ideas to give reasons for how or why humans are affected by decay fungi causing rot in untreated timber
* providing all relevant evidence in their final report.

For example, the learner:* uses wet rot caused by Coniophora puteana to explain how environmental factor(s) affect the life functions of the decay fungus, including its lifecycle on and in untreated wood and its effect
* uses biological ideas from the ‘leaky homes’ crisis to explain how and why wet rot is a major concern for architects and builders who do not keep to professional standards
* uses biological ideas to explain how ‘leaky homes’ can affect the health of humans.

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner investigates, comprehensively, biological ideas relating to interactions between humans and micro-organisms by:* using observations or findings to explain how humans are affected by two different decay fungi causing rot in untreated timber
* using findings and biological ideas to make significant links about the interactions between humans and decay fungi causing rot in untreated timber, including the impacts of this knowledge on a human’s personal actions or everyday life
* providing all relevant evidence in their final report.

For example:The learner uses biological ideas of a named decay fungus, elaborating on the links between how key environmental factor(s) affect the life functions of the fungus, how its lifecycle includes untreated timber, and its effect on the properties, value and uses of timber in wood manufacturing.*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.