**NZQA**

**Approved**

Achievement standard: 90945 Version 3

Standard title: Investigate implications of the use of carbon compounds as fuels

Level: 1

Credits: 4

Resource title: Wood burning

Resource reference: Science VP-1.6 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-02-2015-90945-02-7291 |
| 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: 90945

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Learner instructions

# Introduction

This assessment activity requires you to investigate the implications of the use of wood as a fuel on global warming.

You are going to be assessed on how comprehensively you investigate the implications of the use of wood as a fuel. You need to show that you are able to process and interpret information by producing a prepared report or presentation demonstrating the link between the compounds produced from burning wood and their contribution to global warming.

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

Global warming is caused either by natural occurrences like the release of methane gas from arctic tundra and wetlands, or by man-made events like burning of fuels. Burning of fuels probably does the most damage. Fuels are carbon based compounds, called hydrocarbons. Wood is a carbon based material that is used as fuel. You are required to research and prepare a report on the implications of the use of carbon compounds as fuels on humans and/or the environment.

Confirm the format of your report or presentation with your assessor/educator. This could be, for example, a written report, a pamphlet, a poster or an audio-visual presentation.

## Conduct research

Research the implications of the use of wood as a fuel on global warming, and gather information you could use in your report or presentation.

You may work individually or in a group to conduct research but you must produce your report or presentation individually.

Process your research information, and use it as the basis for a report or presentation in which you highlight the implications of using wood as a fuel on global warming.

## Create a report or presentation

Your report or presentation should include the following information:

* combustion reactions
* production of greenhouse gases
* effects of the gases produced on global warming
* implications of burning wood for people and/or the environment.

All sources of information, images, diagrams, and data must be acknowledged and referenced in a format that enables them to be easily traced.

In your report, you should aim to elaborate, justify, evaluate, compare and contrast, or analyse the implications of the use of wood as fuels on humans and/or the environment.

Submit your report in the agreed format.

# Resources

Useful websites include:

<http://www.ucsusa.org/clean_energy/our-energy-choices/coal-and-other-fossil-fuels/the-hidden-cost-of-fossil.html>

<http://www.ems.psu.edu/~radovic/Chapter11.pdf>

<http://www.sciencedaily.com/releases/2008/05/080521105251.htm>

<http://library.thinkquest.org/CR0215471/global_warming.htm>

<http://www.nrdc.org/globalwarming/>

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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 carry out a comprehensive investigation. Learners carry out research and prepare a report on the implications of the use of wood as a fuel on global warming.

# Conditions

Learners’ work will be individually assessed.

Decide on the format of the final presentation. You may wish to take learner preferences into account in deciding on the format.

Provide instructions on referencing, as all sources of information, images, diagrams, and data must be acknowledged and referenced in a format that enables them to be easily traced.

# Resource requirements

Learners will require access to the internet for research.

# Additional information

None.

## Other possible contexts for this vocational pathway

The use of any fuel and its contribution to global warming.

# Assessment schedule: Science 90945 – Wood burning

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner investigates the implications of the use of wood as fuel on global warming by:* processing and describing implications of the use of wood as fuel on humans and/or the environment
* using chemistry vocabulary

For example, the learner:* describes that as wood burns, stored carbon is released as carbon dioxide, and this is a known greenhouse gas. Earth is getting hotter because of this. Eventually the temperature of seas will increase as well.

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner investigates, in depth, the implications of the use of wood as fuel on global warming by:* making and explaining links between complete and incomplete combustion and the implications of the use of wood as fuel on humans and/or the environment
* explaining why renewable sources of energy are more efficient
* using chemistry vocabulary

For example, the learner:* explains that as wood burns, the carbon that has been stored as wood tissue is converted to carbon dioxide*(C + O2 → CO2)* with complete combustion. The reaction between carbon and oxygen also releases energy. Carbon dioxide accumulates in the atmosphere and traps heat. The trapping of heat creates the greenhouse effect. This heat increases terrestrial temperature and the temperature of oceans thus melting ice in the polar regions and causing sea levels to rise.

*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner investigates, comprehensively, the implications of the use of wood as fuel on global warming by:* comparing and contrasting the implications of the use of wood and renewable sources
* justifying the use of renewable sources of energy as fuels to generate consistently using chemistry vocabulary

For example, the learner:* explains that as wood burns, the carbon that has been stored as wood tissue is converted to carbon dioxide *(C + O2 → CO2)* with complete combustion. The conversion of wood to energy takes a large amount of oxygen hence many other carbon compounds are also produced. Charcoal, for example, which is then used as a fuel in its own right. The burning of charcoal also produces carbon dioxide. Carbon dioxide accumulates in the atmosphere and traps heat coming in from the sun. This slowly raises the temperature of Earth, especially the atmosphere, and effects of this are changes in weather patterns. Alternatively using renewable sources of energy like solar radiation and wind are environmentally friendly by providing energy without producing pollution and green-house gases.

*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.