**NZQA**

**Approved**

Achievement standard: 90953 Version 3

Standard title: Demonstrate understanding of carbon cycling

Level: 1

Credits: 4

Resource title: The carbon cycle and travel and tourism

Resource reference: Science VP-1.14 v2

Vocational pathway: Services Industries

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| Quality assurance status | These materials have been quality assured by NZQA. NZQA Approved number A-A-02-2015-90953-02-7305 |
| 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 your understanding of carbon cycling as it relates to the travel and tourism industry.

You are going to be assessed on how comprehensively you demonstrate understanding by producing a presentation to thoroughly explain the links between the addition, removal and storage of carbon in a travel and tourism context. Your presentation needs to use researched information supported by visual representations and data.

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

Airlines and hotel chains around the world are supporting land restoration projects to replant millions of hectares of degraded forests. The hotel that you work in uses natural gas as a fuel source for the heating system. You are heading the project to increase the use of sustainable fuel sources for the hotel. You are required to provide a presentation to staff to increase their awareness of the carbon cycle. Your presentation should include a description of the carbon cycle and addition, removal and storage of carbon.

## Gather information

Collect information from various sources related to:

* the carbon cycle - to explain the in-depth links between the addition, removal and storage of carbon
* at least two examples that show the carbon cycle in action in the travel and tourism industry.

This part of the task will not be formally assessed, but you will use the information you gather when you write and submit your presentation.

## Prepare and present your findings

Process the information you have gathered and create or select relevant illustrations and diagrams.

Report your findings in a presentation to the hotel staff, in a way that shows your comprehensive understanding of carbon cycling.

Demonstration of comprehensive understanding will include:

* data, information, or images gathered from your research
* explaining how the addition, removal and storage of carbon relates to the carbon cycle in the travel and tourism industry
* elaborating about the length of time the carbon remains in the cycle stages i.e. both in the short-term and long-term
* thoroughly explaining how the addition, removal and storage stages of the cycle are linked or interconnected.

Provide supporting evidence (such as the information in your researched notes) to demonstrate the authenticity of your work and hand these in with your completed presentation.

# Resources

Gather information, images, diagrams and data from a range of sources such as books, videos, magazine articles, appropriate notes, library research, and internet sources such as <http://www.carbonnews.co.nz/story.asp?storyID=6144>.

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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 demonstrate their comprehensive understanding of carbon cycling. To do this they will research and produce a presentation that includes appropriate scientific information to explain the in-depth links between the addition, removal and storage of carbon relating to the travel and tourism industry’s role in carbon cycling.

# Conditions

Provide opportunities for learners to collect scientific information about the carbon cycle and examples of it in action in the hotel or other travel and tourism industry sectors.

Select research contexts that are relevant to the learners, or help them select appropriate activities.

Learners may work together to gather information, but will need to demonstrate individual competence in meeting the criteria of the standard.

# Resource requirements

Access to appropriate notes, library research, and internet sources such as: <http://www.carbonnews.co.nz/story.asp?storyID=6144>.

# Additional information

None.

## Other possible contexts for this vocational pathway

Carbon cycling in the transport industry.

# Assessment schedule: Science 90953 – The carbon cycle and travel and tourism

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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 carbon cycling by:* describing the addition, removal and storage of carbon using information, visual representations and data
* providing at least two examples from the hotel or other travel and tourism industry sectors that describe the addition (respiration, excretion, decay), removal (photosynthesis, dissolving in water), and storage (short-term, e.g. by forests; long-term, e.g. by sediments, natural gas, oil, etc.) using information, visual representations and data
* arranging and connecting these examples to describe carbon cycling

For example:The hotel uses natural gas to power its heating system in guests’ rooms. Natural gas is a naturally occurring hydrocarbon gas made up largely of methane. Natural gas shows long-term storage of carbon, formed biogenically or thermogenically. When natural gas is burned to power the heating system in hotel rooms, carbon is released into the atmosphere as carbon dioxide. Carbon dioxide is used by plants to produce food.The above expected learner responses are indicative only and relate to just part of what is required. | The learner demonstrates in-depth understanding of carbon cycling by:* explaining the addition, removal and storage of carbon using information, visual representations and data
* identifying the links between the addition, removal, and storage of carbon
* presenting at least two complete examples from the hotel or other travel and tourism industry sectors that explain the addition, removal, and storage processes of the carbon cycle using information, visual representations and data
* arranging and connecting these examples to explain carbon cycling

For example:The hotel uses natural gas to power its heating system in guests’ rooms. Natural gas is a naturally occurring hydrocarbon gas made up largely of methane. Natural gas shows long-term storage of carbon because it was formed biogenically or thermogenically. When natural gas is burned to power the heating system in hotel rooms, carbon combines with oxygen to produce carbon dioxide, which is released into the atmosphere. Carbon dioxide from the atmosphere is absorbed by plants and used to produce food or other carbon-rich compounds.The above expected learner responses are indicative only and relate to just part of what is required. | The learner demonstrates comprehensive understanding of carbon cycling by:* explaining the addition, removal and storage of carbon using information, visual representations and data
* explaining thoroughly the links between the addition, removal and storage of carbon
* presenting at least two complete examples from the hotel or other travel and tourism industry sectors that thoroughly explain the addition, removal, and storage processes of the carbon cycle in the area of travel and tourism using information, visual representations and data. This includes how long carbon remains in some stages of the cycle
* arranging and connecting these examples to thoroughly explain carbon cycling

For example: *The hotel uses natural gas to power its heating system in guests’ rooms. Natural gas is a naturally occurring hydrocarbon gas made up largely of methane. Natural gas shows long-term storage of carbon because it was formed biogenically or thermogenically.* *When natural gas is burned* *to power the heating system in hotel rooms, carbon combines with oxygen to produce carbon dioxide, which is released into the atmosphere. Carbon dioxide from the atmosphere is absorbed by plants and used to produce food. It also gets absorbed by the oceans and can become part of plankton.**Over geologic time natural gas has stored a lot of carbon up in geological beds. Since carbon is a fuel, humans have burned a lot of natural gas and hence released a lot of this long-term carbon storage. This release of carbon dioxide is raising the levels of carbon dioxide in the atmosphere at a faster rate than has ever happened in the Earth’s geological history.*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.