Assessment Schedule – 2024

Science: Describe features of science that have contributed to the development of a science idea in a local context (91922)

Assessment Criteria

Achievement	Achievement with Merit	Achievement with Excellence
Describing features of science that have contributed to the development of a science idea in a local context involves: • identifying the characteristics of the features of science for an **identified science idea** • **outlining how** the FOS **contributed** to the development of the science idea.	*Explaining features of science that have contributed to the development of a science idea in a local context* involves: • **explaining** why each identified FOS was significant to the development of a science idea, which means: - giving a reason explaining why each FOS plays an important part in the development of a science idea - giving examples from the selected local context.	*Examining features of science that have contributed to the development of a science idea in a local context* involves: • **discussing** how the FOS have **interacted** in the development of the science idea, which means: - discussing with detail the relationship between the different FOS and how they interact with each other in the development of the science idea - giving examples from the selected local context.

The features of science (FOS) included in the 2024 assessment are:

- the development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems
- using specific language, symbols, or conventions
- interpreting patterns and interactions
- the influence of the development and use of technology on science
- linking new evidence to existing models, theories, and ideas.

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0–2	3–4	5–6	7–8

Sample Evidence

What follows is not a complete list of all acceptable responses, nor is it an indication of the exact wording required. Assessment judgments are based on the level of understanding shown. The overall grade for a question must be judged holistically.

<table>
<tr><th colspan="4">Science idea one: Using long-term studies to research human development</th></tr>
<tr><th>Part</th><th>Achievement</th><th>Achievement with Merit</th><th>Achievement with Excellence</th></tr>
<tr><td rowspan="2">ONE</td><td>The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems may include:
The Dunedin Study looks at data from around 1000 people of varying ethnicities. Te Kura Mai i Tawhiti adds a different perspective that may help the Dunedin Study to understand the background.</td><td>The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems may include:
It is significant to study Māori separately because they have a unique culture, which might be related to their health as adults. By studying Māori at different life stages, researchers can see what factors are important in Māori development and they might not be the same as for Pākeha or the people in the Dunedin Study.</td><td rowspan="2">The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems
AND
Linking new evidence to existing models, theories, and ideas may include:
The Dunedin Study has been gathering data for over 50 years. Each round of assessments leads to new information, which allows researchers to build on earlier data they have gathered. Over time, patterns emerge and connections are made between the participant’s health and their development. Te Kura Mai i Tawhiti is doing something similar. It is taking the earlier findings from the Dunedin Study and using those to create a Māori-only version. Gathering data over time in that study will help researchers build on knowledge from the Dunedin Study, to link new evidence with previous theories of human development. Without this new evidence for both studies, new theories on human development could not be considered or explored.</td></tr>
<tr><td>Linking new evidence to existing models, theories, and ideas may include:
Adding brain scans to the information already gathered adds to the overall picture of the participants’ health.</td><td>Linking new evidence to existing models, theories, and ideas may include:
By checking this new data over time, new patterns related to the participants’ health and development can be found. This is significant because it may be useful for early identification of health-related issues.</td></tr>
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<tr><td rowspan="2">TWO</td><td>Interpreting patterns and interactions may include:
A pattern was found between people who are in their 40s with memory problems who also have lower intelligence or slower gait speed. Patterns/interactions can show interesting things to investigate further.</td><td>Interpreting patterns and interactions may include:
The link between poor memory, low intelligence, and gait speed was significant because the study is now trying to explore the ageing process. The interaction between these things tells the researchers more about how the participants in the study are ageing.</td><td rowspan="2">Interpreting patterns and interactions
AND
The influence of the development and use of technology on science may include:
The MRI scan allowed researchers to see inside the participants’ brains and examine how their brains were ageing. They already knew information about the participants’ intelligence from previous assessments. By combining the old information with the new MRI data, they could find a pattern that also linked memory with brain ageing, gait speed, and intelligence.</td></tr>
<tr><td>The influence of the development and use of technology on science may include:
The invention of the MRI scanner allowed scientists to get a better picture of peoples’ brains, increasing their understanding of participants’ brains.</td><td>The influence of the development and use of technology on science may include:
The MRI scan was significant because it allowed a new kind of assessment to be used – the researchers could see the brains of the participants and explore how parts of the brain were beginning to age.</td></tr>
<tr><td rowspan="2">THREE</td><td>Using specific language, symbols, and conventions may include:
For example: MRI, cortical, gait, longitudinal.
Using the word “cortical” focuses scientists on data that is important / relevant to the Dunedin Study.</td><td>Using specific language, symbols, and conventions may include:
All of these terms were used by the researchers to explore the connection between how fast someone walks, their memory, their intelligence, and how much their brain was ageing. This is significant because by using commonly accepted specific language symbols and conventions, it allows other scientists to easily understand what was being studied.</td><td rowspan="2">Using specific language, symbols, and conventions
AND
The influence of the development and use of technology on science may include:
An MRI scan was used to see how the participants’ brains were ageing. MRI stands for magnetic resonance imaging. This technology allowed researchers to check the cortical thickness of parts of the brain and see if brain ageing in those areas was linked with gait (walking) speed and memory loss. The researchers would have used this shared language to discuss the data they found and develop their science idea.</td></tr>
<tr><td>The influence of the development and use of technology on science may include:
An MRI is the type of scan the participants had. It allows researchers see inside the brain, which gave more data to add to the study.</td><td>The influence of the development and use of technology on science may include:
The MRI scan was significant because it allowed researchers to measure the thickness of the cortical areas, which they knew were linked with age-related diseases. Without this technology, they would not be able to obtain this data and develop this idea.</td></tr>
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<tr><th colspan="4">Science idea two: How are the oceans affected by increasing carbon dioxide in the atmosphere?</th></tr>
<tr><th>Task</th><th>Achievement</th><th>Achievement with Merit</th><th>Achievement with Excellence</th></tr>
<tr><td rowspan="2">ONE</td><td>The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems may include:
Keeling found new evidence that the amount of carbon dioxide in the atmosphere was increasing, which he wanted to investigate.
Dr Currie was able to compare her pattern from the Dunedin coast with others who had made the same type of measurements from all over the world to see if they were the same.</td><td>The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems may include:
Dr Currie was worried about increasing carbon dioxide in the atmosphere and she thought about how this might apply to the ocean as she was a marine scientist.</td><td rowspan="2">The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems
AND
Linking new evidence to existing models, theories, and ideas may include:
Currie had a different perspective from Keeling as she studies the ocean system. She took Keeling’s evidence about the atmosphere and designed an experiment to find out whether this change in the atmosphere was having an effect on the oceans. This led her and others to discover that the increasing atmospheric carbon dioxide is causing the oceans to become more acidic. This is important as, without considering another perspective, this new evidence may not have been found.</td></tr>
<tr><td>Linking new evidence to existing models, theories, and ideas may include:
Based on the research of Charles Keeling from 1953, Dr Currie thought that if carbon dioxide in the atmosphere was increasing, then maybe this was also increasing the carbon dioxide in the oceans.</td><td>Linking new evidence to existing models, theories, and ideas may include:
When Currie studied Keeling’s results about the atmosphere, she wondered if this carbon dioxide rise was having an effect on the oceans. She decided to look for a pattern and found that it was making the oceans more acidic.</td></tr>
<tr><td rowspan="2">TWO</td><td>Interpreting patterns and interactions may include:
Keeling found a pattern of carbon dioxide in the atmosphere increasing which he thought was due to burning fossil fuels.
Dr Currie found that the ocean was becoming more acidic, so she wanted to investigate why.</td><td>Interpreting patterns and interactions may include:
Dr Currie saw that atmospheric carbon dioxide was increasing and found a pattern of the ocean becoming more acidic, so she could investigate why this may be happening.</td><td rowspan="2">Interpreting patterns and interactions
AND
The influence of the development and use of technology on science may include:
Dr Currie wanted to see if her patterns were similar to other scientists’ results, and accurate measuring devices meant that she could see a pattern over time that matched the pattern that Keeling had found. She was then able to use these patterns to explore the reason for the ocean becoming more acidic.</td></tr>
<tr><td>The influence of the development and use of technology on science may include:
Dr Currie had to build new instruments to measure carbon dioxide in the ocean, and these became better as technology improved. Before that she couldn’t have measured carbon dioxide like she wanted to.</td><td>The influence of the development and use of technology on science may include:
Dr Currie wanted to make accurate measurements over a period of time to see if there was any change. Good technology / tools meant that she could compare her results and be sure that the ocean was changing.</td></tr>
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THREE	*Using specific language, symbols, and conventions* may include: • For example: Chemical notation (CO_2), ppm, labelled axes, longitude and latitude, pH. • pH is a measure of how acidic (or basic) a solution is. By showing pH on the carbon dioxide graph, other scientists can quickly understand that the ocean is becoming more acidic over time.	*Using specific language, symbols, and conventions* may include: • Using standardised units like ppm allowed Dr Currie to compare her results with other scientists around the globe and make sure their results showed the same thing, which makes the scientists more certain of their results.	*Using specific language, symbols, and conventions* AND *The influence of the development and use of technology on science* may include: • Dr Currie wanted to see if the patterns that she found matched other scientists' results and standardised symbols and units meant that she could see a pattern over time that matched the pattern that others had found. She was then able to use these patterns to communicate the reason for the ocean becoming more acidic.
	The influence of the development and use of technology on science may include: • The new machinery built by Dr Currie allowed her to track the parts per million (ppm) of carbon dioxide so this could be communicated to other scientists.	*The influence of the development and use of technology on science* may include: • Dr Currie wanted to make accurate measurements over a period of time to see if there was any change. Good technology / tools meant that she could compare her results and be sure that the ocean was changing.	

N1	N2	A3	A4	M5	M6	E7	E8
The response shows limited understanding of FOS in the science idea.	The response shows some attempt to understand the FOS in the science idea but not enough evidence for Achievement.	The response describes FOS in the science idea, although some descriptions may be partial or weak.	The response securely describes the FOS in the science idea.	The response explains FOS in the science idea, although some descriptions may be partial or weak.	The response securely explains the FOS in the science idea.	The response examines FOS in the science idea, although some descriptions may be partial or weak.	The response securely examines the FOS in the science idea.

N0 = No response; no relevant evidence.