Pilot Assessment Schedule – 2023

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**, which means - showing an awareness of the features of science (FOS) • **outlining how** the features of science **contributed** to the development of the scientific idea, which means - showing an awareness of how each FOS plays a part in the development of a scientific idea.	*Explaining features of science that have contributed to the development of a science idea in a local context* involves: • **giving a reason** why each identified feature of science was significant to the development of a science idea, which means - explaining why each FOS plays an important part in the development of a scientific 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 features of science 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 scientific idea - giving examples from the selected local context.

The response is marked holistically to fulfil the intent of the assessment criteria.

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

- the development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems
- responding to needs and opportunities
- replicable, verifiable data collection
- the attributes of the people who carry out the science, such as curiosity, collaboration, creativity, and critical thinking
- using specific language, symbols, and conventions.

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.

Cut Scores

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

Appendix – 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="3">Sample Evidence – Science Idea One: Rongoā in the treatment of type 2 diabetes</th></tr>
<tr><th>Achievement</th><th>Achievement with Merit</th><th>Achievement with Excellence</th></tr>
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The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems may include:

Dr Koia wanted to explore medicines that Māori had traditionally been using to find more suitable treatments.
Dr Koia wanted to see if medicines traditionally used in her Māori culture could be useful for treating people with diabetes.

Responding to needs and opportunities may include:

Dr Koia noticed that too many Māori children were being diagnosed with diabetes.
Dr Koia noticed that too many Māori children were being diagnosed with type 2 diabetes, and she wanted to research plants that Māori had traditionally used as rongoā.

Replicable, verifiable data collection may include:

Researchers collected data on the ethnicity of people who had diabetes.
The data shows patterns among people of different ethnicities.
The data shows how diabetes varies by age groups.
Knowing the chemical formulae helps researchers find useful chemicals in plants.

The attributes of the people who carry out the science may include:

Collaboration
Dr Koia worked on her own and with other researchers at the University of Auckland.

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The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems and / or
Responding to needs and opportunities and / or
Replicable, verifiable data collection may include:

Dr Koia identified the need, as diabetes had increased since Māori people started eating a Western diet. She is exploring traditional Māori medicines that have fallen out of use as a good place to start in looking for treatments that may be more helpful to Māori people.
Dr Koia found some of the medicines for treating diabetes were present in traditional Māori rongōa, so she is exploring whether these medicines may work better on Māori people, as they have been used by Māori for a long time.

The attributes of the people who carry out the science may include:

Collaboration
Dr Koia is focused on the use of rongoā and is also working with other researchers at the University of Auckland so she could draw on the expertise of others.
Creativity
Professor Shepherd studied 172 Māori and Pacific men so he could see how their genes relate to diabetes.
Critical thinking
Dr Koia knew about diabetes and rongoā, and is exploring the connection between the two, looking for new strategies and treatments.
Curiosity
Dr Koia wondered why the diabetes data for Māori children is so poor, which prompted her to explore how rongoā could help with diabetes.

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The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems and / or
Responding to needs and opportunities may include:

Dr Koia knew that many Māori children were diagnosed with type 2 diabetes and that rates of this disease in Māori children had been going up since they started eating a more Western diet. Dr Koia wanted to help treat people with type 2 diabetes so she decided to try and find better treatments. She thought that it may be better to find treatments for Māori using traditional Māori rongoā, as Māori have been using these treatments for centuries and they might be more suitable for them. Her understanding of rongōa as a treatment for Māori meant that she might be able to find suitable new treatments more easily.

Replicable, verifiable data collection and / or
Using specific language, symbols, and conventions may include:

Dr Koia wanted to use rongoā to help identify medicines that could help treat type 2 diabetes in Māori people. Dr Koia thought that rongōa could be more effective on Māori as they have been using these medicines for many generations. The researchers needed to identify the molecules in rongoā that may be useful, and to describe the molecules using standard chemical symbols.

The attributes of the people who carry out the science may include:

Collaboration
Dr Koia is an expert on the taonga plants and their active chemicals. The University of Auckland researchers have expertise about how diabetes is caused by body changes.

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• *Creativity* Professor Shepherd studied 172 Māori and Pacific people. • *Critical thinking* Dr Koia knew about diabetes and rongoā. • *Curiosity* Dr Koia wondered why the number of Māori children with diabetes was increasing. *Using specific language, symbols, and conventions* may include: • The researchers use standard symbols for atoms in chemical compounds. • The graphs have clearly labelled axes. • The vertical axis on each graph has regular intervals. • The line graph uses colours and a key to separate the different ethnicity information. • Photos of plants have titles above them.	*Using specific language, symbols, and conventions* may include: • The chemical symbols are understood by most researchers so are important for sharing and communicating information. • Graphs are easier to understand and show clearer patterns when they follow conventions of labelled axes and clearly spaced numbers.	Together, they could combine their knowledge to explore the data and see what new ideas they can come up with. • *Creativity* Dr Koia and Professor Shepherd have different experience and skills, so working together means they can share their knowledge and information to come up with new ideas and understandings. • *Critical thinking* Professor Shepherd's data showed that the Māori and Pacific men studied had more insulin in their blood than other men, suggesting their bodies weren't effectively moving insulin into body cells. This data could be used to make new connections between rongoā and diabetes. • *Curiosity* Being curious about Māori children and their diabetes rates meant Dr Koia was alert to patterns in the data that might help explain the numbers. This may have helped her to focus on the rongoā that might have the best effect on diabetes.

Sample Evidence – Science Idea Two: Sampling eel (tuna) numbers in the environment		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems may include: • Eel numbers are declining and we need to know why. • Preserving eel numbers to support Māori motivated NIWA to explore a range of sampling methods. • Needing to know more about eels has led to different ways of trapping them. • Eels are significant to Māori because they help to understand how healthy rivers are / they are a treasured food source. • Māori consider eels to be a taonga that should be preserved. • Businesses that farm eels will want to know how to stop eel numbers from dropping. *Responding to needs and opportunities* may include: • The life cycle shows where the eels live at different stages. • The photos show different eel trap designs. • The chart of glass eels caught using fyke nets shows the numbers of each type of eel caught over time. *Replicable, verifiable data collection* may include: • The life cycle diagram shows the stages of eel growth. • Shows number of types of eels sampled. *The attributes of the people who carry out the science* may include: • *Collaboration* Various scientists would have to work together to trap eels. • *Creativity* Different eel trapping methods have different shapes and materials.	*The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems* may include: • NIWA wanted to know more about eel health and waterways and looked at Māori fishing techniques and environmental knowledge to find out why eels were declining. *Responding to needs and opportunities* may include: • In order to figure out why eel numbers are declining, researchers needed to better understand eels. One way to do this was to trap them and study the glass eels to see what their body chemistry was doing and check how they were growing. • Because eels spend part of their life cycle in rivers, they can be caught and examined / tested to provide data that will help to understand them. *Replicable, verifiable data collection* may include: • Sampling period from July to October would be when eels are moving into fresh water. • NIWA collected data on different times to get a large data set to compare. *The attributes of the people who carry out the science* may include: • *Collaboration* Various researchers would have to work together to trap eels with fyke nets and take measurements of their body parts; it couldn't have been done by just one researcher. • *Creativity* Different eel trapping methods have pros and cons so choosing the best option for studying glass eels is important. • *Critical thinking* Iwi know that eel health is a sign of ecosystem health, so	*The development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems* and / or *Responding to needs and opportunities* may include: • Numerous groups want eel numbers to improve. Businesses want to have more eels to catch and sell to make money. Māori want to preserve their sacred kai source. NIWA want to know more about eel health and what affects them. To find out why eel numbers are declining, eels have to be trapped and studied. This has led to the use of traditional Māori hinaki and other modern technologies. By using a range of trapping techniques, eels can be caught at different sizes and life stages for analysis. *The attributes of the people who carry out the science* may include: • *Collaboration* Working in a team to catch and sample eels to take measurements and eel numbers means the team of researchers have first-hand knowledge of the data generated. • *Creativity* Depending on the river conditions, it might be important to choose the best catching method or even modify a catching method for the environment which would require creative thinking. • *Critical thinking* By combining the iwi knowledge of eel health and the measured data from the researchers it may be possible to find new patterns or new knowledge about what is affecting eel numbers. • *Curiosity* Being curious about eels and their life cycle means scientists are alert to patterns in the data that might help explain the numbers. This could help them to focus on

• *Critical thinking* Iwi know that eel health is a sign of ecosystem health. • *Curiosity* By sampling eels to measure ear bones, body chemistry, and what they've been eating, researchers generate useful data to help understand eel behaviours. *Using specific language, symbols, and conventions* may include: • The two types of eels have different names. • The life cycle shows the appearance of the different stages of the eel. • The diagram shows what type of water the eels live in at different stages. • The graph has a sentence title to describe the data. • The graph has clearly labelled axes. • Colour and / or a key is used on the graph to help us see longfin and shortfin eel differences.	focusing on how well eels are tells them more about other parts of the ecosystem. • *Curiosity* By sampling eels to measure ear bones, body chemistry, and what they've been eating, researchers generate useful data to help understand eel behaviours. *Using specific language, symbols, and conventions* may include: • The life cycle would be understood by most researchers so is important for sharing and communicating information. • Graphs are easier to understand and show clearer patterns when they follow conventions of labelled axes and clearly spaced numbers.	the actions that might have the best effect on eel populations. *Replicable, verifiable data collection* and / or *Using specific language, symbols, and conventions* may include: • By understanding the life cycle and having names and descriptions of each stage, the researchers can identify the glass eels for their sampling, and they can ignore the adult eels. The life cycle diagram shows the stages of eel growth.