Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 1 Science RAS 2023

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

EXEMPLAR

Excellence

TOTAL 08

Page 1 – Pilot Assessment

Make sure you have the paper Resource Booklet 91922R.

INSTRUCTIONS

This task is made up of three parts. You must answer ALL three parts.

Choose ONE science idea from the Resource Booklet to complete this assessment.

Science Idea One: Rongoā in the treatment of type 2 diabetes

Read the information in the Resource Booklet for your chosen science idea and use it to answer ALL parts of the task.

TASK

For part (a), focus on the following features of science:

- 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.

(a) Using the information from your chosen science idea, discuss the following:

(i) How has new evidence contributed to the science idea?

The science idea of using rongoa in the treatment of type 2 diabetes has been contributed to by new evidence supporting that Maori might respond better to rongoa treatments compared to synthetic drugs. Scientists are aware of the increased rates of diabetes in Maori people compared to European people and have found evidence to support this claim. Figures 1 and 2 provide us with evidence of the increased rates of type 2 diabetes in Maori compared to Europeans. This led to new evidence being found to "support and verify matauranga surrounding rongoa from a molecular science point of view," Dr Koia believes that Maori could benefit from using rongoa because "it is possible that Maori genetics could process natural rakau rongoa more effectively than synthetic drugs." This is significant because the contribution of new evidence surrounding validating the use of rongoa further supports using these traditional methods to benefit Maori patients and possibly reduce the side effects they experience.

(ii) What are the varied perspectives considered in the science idea?

The varied perspective considered in the idea of using rongoa in the treatment of type 2 diabetes was the perspective of Maori. Maori have used the process of rongoa for hundreds of years to treat human health, traditionally a tohunga would decide the appropriate tikanga based of each person's health needs. Rakau rongoa uses plants with medicinal properties to treat health needs surrounding diseases and poor health. This concept of rongoa and rakau rongoa was taken into consideration when exploring new ways to reduce type 2 diabetes in Maori people as their "adaptation to a Western-style diet and lifestyle is thought to have contributed towards the higher rates of diabetes" this led to the consideration of traditional methods Maori have used for hundreds of years as their genetics allow these treatments to be more effective than synthetic drugs. Scientist are taking three different toanga plants into consideration as a result of this varied perspective because of the chemicals found in each plant may be useful to treat diabetes. This varied perspective was significant because it provided scientists with another view on a possible solution to reduce the increasing diabetes in Maori people, by taking into consideration the genetic history of Maori rongoa scientists were able to explore possible solutions that directly target Maori people and will hopefully reduce the increasing amount of type 2 diabetes in these people as a result.

(iii) How has a need OR opportunity led to the development of the science idea?

The development of using rongoa in the treatment of type 2 diabetes has been further developed by the need of a solution to reduce type 2 diabetes in Maori people. This need to reduce the increasing rate of diabetes in Maori, "especially in Maori children under the age of 15," has led to scientists further developing this idea of using rongoa to specifically support Maori people. This idea directly supports the genetic makeup of Maori people as their bodies process natural rakau rongoa more effectively than synthetic drugs. This is significant because if the need for a solution to increasing type 2 diabetes wasn't specifically for Maori people then scientists wouldn't use rongoa in the treatment and the idea would not develop further.

(iv) Give reasons why the new evidence OR varied perspectives responded to the need or opportunity in the development of the science idea.

The new evidence supporting that rongoa might be a better method of treating Maori patients for diabetes responded to the need for a solution to the increasing rate of diabetes in Maori people through the new evidence providing a possible solution to this need. The new evidence was found through exploring the genetics of Maori people. This exploration happened because there was a need for it and the need for a solution was directly connected to Maori people. This direct connection led to new evidence found surrounding the use of rakau rongoa as a more effective method of treating Maori, this concept was considered because Maori have been using these traditional methods for hundreds of years, which led scientists to look into their genetics to find evidence supporting the matauranga surrounding rongoa. This is significant to the development of the idea to use rongoa when treating diabetes because if the need for a solution to specifically decrease the type 2 diabetes rate in Maori wasn't there scientists wouldn't bother to find new evidence in order to come up with a solution for it as there would be no need to.

For part (b), focus on the following features of science:

- replicable, verifiable data collection
- the attributes of the people who carry out the science such as collaboration, creativity, critical thinking, and curiosity.

(b) Using the information from your chosen science idea, discuss the following:

(i) How has the data information shown in the resource helped in the development of the science idea?

The data information shown in the resource has helped to develop the idea of using rongoa in the treatment of type 2 diabetes through the information shown providing statistical evidence of the increase in type 2 diabetes. Both figures 1 and 2 provide us with graphs showing the rates of type 2 diabetes in Aotearoa based on age and ethnicity or ethnicity and socio-economic deprivation. Through this collected information shown in the resource scientists where able to identify the increasing rate of Maori with type 2 diabetes. This visual representation allowed scientists to develop the idea of using rongoa further through identifying that Maori was the ethnic group with a significant increase in type 2 diabetes. This is significant because if scientists did not show this information like they did it would've prevented a proper comparison being made to identify the increase in diabetes in Maori therefore stopping the development of using rongoa to treat type 2 diabetes.

(ii) Choose one of the following attributes that people who carry out science use:

○ collaboration ○ creativity ● critical thinking ○ curiosity

State with a reason how this attribute has played a significant part in the development of the science idea.

The attribute of critical thinking has played a significant part in the development of using rongoa in the treatment of type 2 diabetes through scientists proving to be think critically in order to develop the idea further and come up with a solution. Dr Koia shows this critical thinking through her concern towards the high levels of diabetes, specifically in Maori people. This concern made her think outside of what would normally would be provided as a solution to this problem, which would be to develop a new synthetic drug, and look into what has worked specifically for Maori. This use of critical thinking on Dr Koia's behalf played a significant part in the development of using rongoa in treatment because it provided a direct solution to treating diabetes in Maori people further developing the idea of adopting these traditional or rongoa methods to better Maori patients. This attribute was significant because if Dr Koia had not used critical thinking scientists today would be trying to develop a new synthetic drug that might not be as effect for Maori and therefore will not decrease the type 2 diabetes rates.

(iii) Choose ANOTHER attribute that people who carry out science use:

● collaboration ○ creativity ○ critical thinking ○ curiosity

How has this attribute and the data collection shown in the resource interacted in the development of the science idea?

The attribute of collaboration has interacted with the data collection shown in the resource in the development of using rongoa in the treatment of type 2 diabetes through scientists using work and collection of data from other scientists to further develop and validify their own collection of data. This can be seen in the resource when Professor Shepard collabs with Dr Koia to further develop the idea of Maori genetics contributing to why rongoa treatments might work better for Maori. Professor Shepard looks into the ideas the Dr Koia had surrounding Maori genetics and conducts his own to test to see if genetics truly is a factor for finding a treatment for type 2 diabetes. As a result he found, based on Dr Koia's original theory, that Maori and Pacific men have a gene that creates more insulin in their blood. This interaction between the attribute of collaboration and the data collection shown was significant because it allowed the idea to develop further through the research of multiple people. If this interaction did not happen Professor Shepard might not have made this discovery and Dr Koia wouldn't have been able to see the development of the idea from a deeper genetic point of view therefore limiting the results that could provide them with a solution.

For part (c), focus on the following features of science:

- using specific language, symbols, and conventions
- the development of science ideas in response to new evidence or varied perspectives, such as Māori and Pacific knowledge systems.

(c) Using the information from your chosen science idea, discuss the following:

(i) What are the specific language, symbols, and conventions that have been used in the development of the science idea?

The specific language used in the development of using rongoa in the treatment of type 2 diabetes includes, the use of and consideration of Maori concepts and language including; rongoa, rakau rongoa, matauranga and taonga
Specific language used to correctly name chemicals found the can be useful to treat diabetes; Asperuloside, Quercetin, Kaempferol, etc.
Symbols such as the chemical formulas provided with the names of the chemicals eg. C18 H22 O11
and Conventions used such as the graphs provided for figures 1 and 2.

(ii) Why are specific language, symbols, and conventions important in the development of the science idea?

The use of specific language to was important in the development of using rongoa in the treatment of type 2 diabetes because it allowed scientist to correctly name and explore the Maori concepts and language listed above. The use of specific language when identifying chemicals such as "Asperuloside" allowed scientists to correctly identify the chemicals found in the taonga plants tested allowing these chemicals to be used to develop the idea further. This paired with the symbols provided gives the scientists the chemical formula to the tested chemicals that could contribute to the development of the use of rongoa. The conventions used were also important as they provided scientists with visible evidence that supported the need for a solution to increasing diabetes in Maori people when was important to the development because it allowed scientists to identify the problem that was being faced. Overall the use of specific language, symbols and conventions was significant because it allowed scientists to name and symbolise different things in a proper scientific way and through contentions allowed a visual representation of data. If these were not used the development of using rongoa in the treatment of type 2 diabetes would be slower and limited because of the lack of knowledge surrounding Maori concepts if the specific language was not used, the lack of knowledge surrounding the chemical make up of possible helpful chemicals for treating diabetes and the lack of visual representation making it harder to identify the increasing rate of diabetes in Maori people.

(iii) In what ways has new evidence OR varied perspectives interacted with specific language, symbols, and conventions in the development of the science idea?

The varied perspectives of Maori interacted with the use of specific language, symbols and conventions in the development of using rongoa in the treatment of type 2 diabetes through, the Maori language and concepts used in conjunction with the symbols relating to taonga plants and the influence of increased rates of diabetes in Maori people being shown through conventions used. This direct contribution from the perspective of Maori can be seen through the use of Maori concepts in the resource such as, matauranga, rongoa and rakau rongoa. If these concepts weren't specifically used in relation to Maori perspectives scientists could've lacked the knowledge surrounding the exploration of rongoa and the traditional methods might not have been accurate therefore limiting the development of the idea. The symbols used provided the scientists with a way to correctly identify the chemical make-up of the taonga plants Maori have used for hundreds of years therefore identifying the chemicals that worked as rongoa for Maori. The conventions used connects the problem directly to Maori people as they have an increasing rate of diabetes compared to Europeans. The conventions used in figures 1 and 2 provides scientists with a visual connection to Maori and allows then to apply a Maori perspective to the problem portrayed by the graphs, therefore allowing scientists to create a solution based of Maori perspectives. Overall the varied perspective of Maori interacting with the specific language, symbols and conventions used was important because if these did not interact scientists would've lacked the consideration of Maori perspective when developing the idea of using rongoa in the treatment of type 2 diabetes which would limit how helpful the the development of this idea would actually be help to Maori people decrease the rate of type 2 diabetes.

Excellence

Subject: Science

Standard: 91922

Total score: 08

Q	Grade score	Marker commentary
1	E8	The candidate has chosen Science Idea One: Rongoā in the treatment of type 2 diabetes. The candidate has securely examined how the new evidence around rongoā and genes found in Māori has responded to the need to develop new treatment for Māori due to the increasing type 2 diabetes rate. The candidate has then justified how the interaction of these two features of science had furthered the development of the science idea.