

From: [Doug Walker](#)
To: [Doug Walker](#); [9\(2\)\(a\)](#); [Erica Stanford](#)
Subject: Minister Stanford and Subject Association heads
Start: Tuesday, 25 June 2024 6:30:00 PM
End: Tuesday, 25 June 2024 7:00:00 PM
Location: <https://us06web.zoom.us/j/86351152610?pwd=G8DxsgwcWKqQR3Ihl79kjjnJjiO0rl.1>

NZASE is inviting you to a scheduled Zoom meeting.

Join Zoom Meeting
<https://us06web.zoom.us/j/86351152610?pwd=G8DxsgwcWKqQR3Ihl79kjjnJjiO0rl.1>

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Doug >

Sounds like you've made some changes re the extra SLO work. Thank you.

There's a PPTA subject association conference on the 15th and 16th of April, and a Teacher Development Aotearoa (TDA) Networks of Expertise conference on the 20th and 21st of May. Both could be useful opportunities to connect with Subject Associations for anyone from your office.

26 Feb 2024 at 3:33 PM

Had a call from RNZ, asking about the SLO work. I expect there'll be something in the media about it this week

Wed, 6 Mar at 1:58 PM

Hi Erica, I just wanted to thank you for the acknowledgement letter, other SA heads noted that was the first time any minister had formally thanked them

Tue, 7 May at 9:23 AM

Hi Erica, Ian Torrie mentioned you might want to catch up with the Science Subject Association heads again. We're meeting tonight at 6pm, then our next meeting will be June 4th (6pm). Let me know if you'd like a



Text Message • SMS





Doug >

Hi Erica, Ian Torrie mentioned you might want to catch up with the Science Subject Association heads again. We're meeting tonight at 6pm, then our next meeting will be June 4th (6pm). Let me know if you'd like a zoom invite to either of those. Kind regards, Doug

Tue, 7 May at 2:46 PM

Hi Doug
I would like to join but I'm back to back tonight. 4 June im speaking at an event. However perhaps you and I have a call and I can update you on a few things. Keen to get your involvement in a few things - curriculum and NCEA.

Sounds good. I'm keen to assist. Shall I let you suggest a time?

Thu, 20 Jun at 4:58 PM

Hi Erica. MoE reached put yesterday to request curriculum writers from the science subject associations. 9(2)(g)(i)

[Redacted text block containing multiple lines of greyed-out content]



Text Message • SMS





Doug >

Hi Erica. MoE reached out yesterday to request curriculum writers from the science subject associations. Not a lot of detail and no indication if many of the past issues with working on a team (eg SEGS) have been addressed. Asking for nominations that won't be vetted with a turnaround time of 6 days seems poorly thought out. I've asked for NZASEs (Science) response to be shared with you.

I wanted to keep you in the loop and reiterate that I'm happy to assist in any way I can.

Cheers, Doug

'Out

Thank you. I really need the very best writers available and I'll be here to iron out any problems.

Brilliant, thanks. Happy to help.

Sat, 22 Jun at 1:27 PM

Hi Erica, would you be willing to meet with the Science Subject Association heads for 30 minutes about suggestions for the curriculum writing group?

Yes 100%. I have officials with me on



Text Message • SMS



9(2)(a)

Yes 100%. I have officials with me on Monday for our weekly meeting and I'm going to be grilling them over the timeframes given for science. My week is crazy but I'll make time. When suits you all?

Tuesday evening 6.30pm?

I think that would be great. Will check and let you know asap

Or Monday evening same time

Either works for me

Tues 6.30pm should work. Ian Torrie will send you an email to that effect.

Sat, 22 Jun at 3:07 PM

Thanks

Send email to 9(2)(a)
9(2)(a)

Will do, thanks. I think the SA heads have got some good suggestions for how to proceed without burning teachers out. Everyone seems keen to help, just not in agreement with the details being similar to previous work with MoE.

Hope you can find some time for D&D



Text Message • SMS





Doug >

Will do, thanks. I think the SA heads have got some good suggestions for how to proceed without burning teachers out. Everyone seems keen to help, just not in agreement with the details being similar to previous work with MoE.

Hope you can find some time for R&R this weekend. Really appreciate your support and comms.

Tue, 25 Jun at 7:33 PM

Thank you again for your support. I think your involvement helped to allay the concerns of the group.

I'll keep on top of the officials. I wasn't aware of how they had approached you or the timeframes etc. I expect better.

Thu, 5 Dec at 9:24 AM

Hi Erica, thank you for your oversight of the curriculum writing group and consideration of NCEA, I greatly appreciate your involvement.

I wanted to give you a heads up that MPI are reviewing the Code for school use of animals. NZASE has managed this effectively for the last 20 years.



Text Message • SMS





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Hi Erica, thank you for your oversight of the curriculum writing group and consideration of NCEA, I greatly appreciate your involvement.

I wanted to give you a heads up that MPI are reviewing the Code for school use of animals. NZASE has managed this effectively for the last 20 years. Despite MPI approving the last code in 2019, and the MPI accredited reviewer this year finding no issue with the Code, MPI are pushing for substantial changes that would make it far more difficult for schools and individuals to educate using animals. The current Code expires on the 8th of Dec. If not renewed, there will be serious implications for schools.



Text Message • SMS



Out of scope

----- Forwarded message -----

From: <ian.torrie@gmail.com>

Date: Sun, 27 Oct 2024 at 12:17 PM

Subject: Science curriculum reference group

To: 9(2)(a)

Hi Erica

My text response to your reply about already having a reference group kept getting error messages so I have emailed it below instead.

Hmmm. Do you mean the group of three tertiary academics? If so, my understanding is that their brief is to detect any incorrect science, but given their highly specialized expertise, I suspect that they may well not cover the entire breadth of the school curriculum. And certainly they are unlikely to have much understanding of how the concepts should be developed in a school based science curriculum from yr0 to 13. My suggestion would be a panel of people like Doug Walker (NZASE), David Housden (NZIP) myself (SCENZ) and someone like Erica Jar (BEANZ) that could adequately cover all areas of the curriculum (particularly as ESSE and HATA already have their best people on the writing panel). These people not only have a depth of curriculum experience but are also more than capable of fact checking the science, which would make the role of the tertiary experts redundant, except perhaps as a final check before the draft is published.

However, such a reference group would need to have some "teeth", otherwise the Ministry can simply change the writing groups work to suit their own agenda as happened with the previous draft and the L1 standards. I am very suspicious as to why the work of the writing group is scheduled to finish at the end of this year, but the final draft is not expected to be released until the latter half of next year. What happens in that 6 month interval? Hmmm.

Regards

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From: **ian torrie** <ian.torrie@gmail.com>

Date: Fri, 30 Aug 2024 at 11:10 AM

Subject:

To: Erica Stanford 9(2)(a)

Hi Erica.

9(2)(g)(i)

[Redacted content]

Regards

Out of scope

----- Forwarded message -----

From: <ian.torrie@gmail.com>

Date: Mon, 19 Aug 2024 at 3:43 PM

Subject: A new hope? Or repeating the mistakes of history?

To: 9(2)(a), 9(2)(a)

Hi Erica and 9(2)(a)

I have recommended 9(2)(a) to you before as the go to expert when you inevitably have to move your focus on to the issue of student behaviour in our schools, so thought it would be useful to forward this post on to you as a reminder.

It would be a very productive exercise to contract 9(2)(a) to review behaviour in NZ schools and produce recommendations on how we can improve in this area.

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----- Forwarded message -----

From: <ian.torrie@gmail.com>
Date: Sat, 22 Jun 2024 at 4:55 PM
Subject: Science Curriculum issues
To: 9(2)(a)

Kia ora Erica

On Thursday the Ministry sent invitations to various organisations, including the six Science Teacher Associations, to submit up to 3 nominees for the new Science Curriculum Writing Group. Because of concerns about the nature and expectations of the process, we requested further clarification and an extension of the expected submission deadline of Wednesday which we considered unreasonable.

The Ministry responded to some of these questions on Friday but others remain unanswered.

Earlier today, the Science Teacher Associations have just finished a 70 min zui to discuss our common concerns and would like to suggest possible solutions that may be acceptable for both the Ministry, yourself and us on behalf of our teachers.

The concerns raised included:

- The Science Curriculum involves six different subjects and as such, is more complicated and extensive than either the English or Mathematics/Statistics curriculum and so needs more time and resourcing.
- The current proposed process for a single group of 12 people to cover all sciences from Yr 0 to Yr 13 means that it is entirely possible that there may only be one (or even zero) members with the specialist knowledge in a specialist subject at Yr 13. At least 3 would be expected to give a balanced view. And similarly by combining Yr 0-13 as a single package, there may be a significant number of members who had very little experience of the science curriculum below Yr 9. This is very wasteful in terms of time, money and expertise.

- Writing a full Science Curriculum from Yr 0-13 from scratch in less than 6 months is not going to produce a quality product.
- The expectation that our best teachers are prepared to be absent from their classes for 3 days per fortnight for the second half of the year is not acceptable for their students, or their Principals.
- Teachers will have equal status on the writing group with other contractors, yet their reimbursement rate is vastly different by at least a factor of three and this is inequitable.

Because the proposed solutions outlined below would require some input from yourself as Minister, we would like to offer you the opportunity to meet on-line to discuss these. We have kept 6.30pm on Tue 25th June or next weekend as possible times depending on your availability, but obviously are open to other opportunities.

Potential solutions:

- Split the Science Curriculum into two tranches – the first would cover Science from Yrs 0-10 and the second would cover the specialist Sciences from Yr 11- 13.

The first tranche would commence now and be extended slightly to the end of January. The second tranche could commence at the beginning of Term 4 once the yr 0-10 outline is established, and could then work concurrently.

The advantage of this approach is that the first working group would focus their expertise on General Science, the nature of science and the expected skills etc. It would also reduce the total amount of work to be done by the expected deadline so that it is more manageable. The second group could then be made up of a higher proportion of members with expertise at higher secondary and tertiary level.

We would also recommend that the second tranche be done in groups consisting of 3-4 members from each specialist science area. Each group could work independently but have regular on-line catch ups with all of the other working parties to ensure a consistent approach.

The sector would still be able to receive a draft Science Curriculum covering Yr 0-10 (and possibly some indicative information on the Yr11-13 Curriculum) by start of 2025 and the full outline before Term 2.

- Rather than using the model of a two day F2F + two ½ day on-line meetings per fortnight, we would suggest that the two day F2F meeting is held on a Fri and Sat and that the ½ day on-line meetings are scheduled for evenings or alternate weekends.

We would also like to suggest that block meetings of 3-4 days are scheduled for the holidays at the end of T3 and in late Term 4 after NCEA exams have begun and during the January holidays. These opportunities could mean that the Fri-Sat meetings may only be needed every 3 weeks which would be much more acceptable to both our nominees and their Principals.

- We would also suggest that the advisory role of the ERO is enhanced by accessing feedback from internationally recognised curriculum experts.

- With respect to the financial inequity, we would suggest at the very least, that all work done by members outside of school hours be paid at similar rates to any independent contractors. This was done previously with the contract for writing Subject Learning Outcomes.

Chairs of the following organisations: NZASE; BEANZ; HATA; NZIP; SCENZ (ESSE were unavailable for the meeting)

Catherine Hunter (New Zealand Association of Science Educators)

Douglas Walker (New Zealand Association of Science Educators)

Kerry Allen (Horticulture and Agriculture Teachers Association)

David Housden (New Zealand Institute of Physics)

Erica Jar (Biology Educators of Aotearoa New Zealand)

Kenneth Loh (Biology Educators of Aotearoa New Zealand)

Murray Thompson (Secondary Chemistry Educators of New Zealand)

Ian Torrie (Secondary Chemistry Educators of New Zealand)

Out of scope

----- Forwarded message -----

From: ian torrie <ian.torrie@gmail.com>

Date: Sun, 26 May 2024 at 1:43 PM

Subject: Re: Student behaviour in the classroom

To: Erica Stanford 9(2)(a) 9(2)(a)

Great thanks.

Despite the changes being made by the Ministry, I still have a concern about an aspect of their current approach which affects all subjects including the current work in Maths and English so I will outline that in an e-mail after the Budget.

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From: Erica Stanford <ericastanford@gmail.com>

Sent: Sunday, May 26, 2024 1:38:51 PM

To: 9(2)(a) ian.torrie@gmail.com

<ian.torrie@gmail.com>

Subject: Re: Student behaviour in the classroom

Thank you, we need to do some work in this area so I'll check him out. Aware we still need to catch up re science curriculum. Once Budget madness is over I'll get a time to zoom.

E

Erica Stanford | MP for East Coast Bays

PO Box 35 657 | Browns Bay | **Ph:** + 64 9 478 0208 | **Mob:** 9(2)(a)

On Sun, 26 May 2024 at 1:36 PM, <ian.torrie@gmail.com> wrote:

Hi Erica

I am sure that you are aware of our appalling international ranking in this area and at some stage you will want to look at ways in which we can address this issue.

I would suggest that you can do worse than contract somebody such as 9(2)(a)

9(2)(a) to carry out an independent review.

Apart from being an advisor in this area to the UK govt, 9(2)(a) has recently been giving lectures in Australia.

e.g a transcript of the first of three lectures at the 9(2)(a) can be accessed at

9(2)(a)

Regards

Out of scope

----- Forwarded message -----

From: **Ian Torrie** 9(2)(a)

Date: Sun, 10 Mar 2024 at 6:10 PM

Subject: Chemistry update

To: Erica Stanford 9(2)(a)

Hi Erica.

Just to let you know that the response from teachers to both the SLOs and the PLD program has been incredibly well received. We had approx 250 registrations for each of the first two sessions which is much higher than we anticipated, given that they can also access the video recording and PowerPoint at any time convenient to them. So thank you for initiating that.

However, can you clarify where the Science Curriculum refresh is up to. We are hearing different stories ranging from "complete rewrite similar to Maths & English" through to "the Ministry has continued working on version 2 along similar lines to the first draft". Obviously the latter option would be of real concern to us.

Regards

Out of scope

----- Forwarded message -----

From: <ian.torrie@gmail.com>

Date: Tue, 23 Jan 2024 at 9:00 AM

Subject: Chemistry learning outcomes

To: 9(2)(a)

As discussed.



Science Learning Outcomes For Assessment

Companion to the NCEA NZC Level 1 Chemistry and Biology Learning Matrix

This resource provides further detail to help support teachers in covering the Significant Learning in the Learning Matrix to the depth and breadth required for their students to successfully engage in the NCEA NZC Level 1 Achievement Standards.

Learning should weave together the key knowledge and skills identified in the Learning Matrix and the specific learning outcomes detailed below. These learning outcomes further unpack the Significant Learning that underpins the Achievement Standards.

All learning should be embedded in contexts which are relevant to students' lives in Aotearoa New Zealand and the Pacific, but those contexts will in most cases be determined by teachers so are not specified.

The specific learning outcomes below will not all require equal teaching time and can be built into a teaching and learning programme that best meets the needs of the students.

The knowledge and skills listed are expected learning underpinning each Achievement Standard, which ākonga will draw on in responding to an assessment task. It is important to note that assessment is always a sampling process, so not everything will be assessed in any assessment event or activity.

Achievement Standard 92021 (1.2)	Demonstrate understanding of chemical reactions in context	Credits: 6
What is being assessed	Specific Learning Outcome (Students are able to....)	
Understanding the nature of the different particles involved in chemical reactions	<ul style="list-style-type: none"> • justify the charge on a monatomic ion when it is formed from an atom to achieve a stable (full) valence shell of electrons • justify the ratio of ions (monatomic and polyatomic) in the formula of ionic compounds, by explaining how the charges of the component ions cancel out to give an uncharged compound • recognise that ionic compounds are formed when non-metal atoms gain electrons from metal atoms so that both achieve stable (full) valence shell of electrons • recognise that molecules are formed by non-metal atoms sharing valence electrons to achieve stable (full) valence shells of electrons 	
Interpreting chemical equations	<ul style="list-style-type: none"> • recognise the relevance of subscripts, brackets and coefficients in chemical formulae on the number of each type of atoms present • recognise that the ratio of reactants and products in a chemical reaction are represented by the coefficients in a balanced chemical equation • recognise that one reactant (termed the “limiting reagent”) can determine the amount of product that is formed in a chemical reaction • recognise that different proportions of reactants sometimes change the products being formed 	
Justifying conservation of mass	<ul style="list-style-type: none"> • recognise that atoms are neither created nor destroyed in chemical reactions but are rearranged to form new substances, as described by balanced chemical equations • recognise that total mass remains constant during a chemical reaction • analyse balanced chemical equations to show that there are the same number of atoms of each element on both sides of the equation 	
Describing predictable patterns in a range of chemical reaction types (using observations and equations)	<ul style="list-style-type: none"> • link observations (primary or secondary data) to chemical species • identify a type of reaction from observations and provided equations (word or balanced chemical) • link a reduction in mass in a chemical reaction to the loss of a gaseous product • link an increase in mass in a chemical reaction to the inclusion of a gaseous reactant • link colour changes in a reaction to specific chemical species supported by use of a resource sheet • link colour change of litmus or universal indicator to a change in pH of a given solution • link a solid product when solutions are mixed to the formation of an insoluble precipitate • use secondary tests to identify reaction products including carbon dioxide (limewater), oxygen (glowing splint) and water (cobalt chloride paper) 	

Interpreting patterns in neutralisation reactions	<ul style="list-style-type: none"> • use changes in pH to identify neutralisation reactions • link changes in pH to the relative concentrations of H^+ and OH^- present during a neutralisation reaction • link the formation of CO_2 gas to the presence of carbonate or hydrogen carbonate ions in a neutralisation reaction • explain the relationship between the acid and base reactants and the specific salt product of a neutralisation reaction
Interpreting patterns in combustion reactions	<ul style="list-style-type: none"> • contrast the flame colour and heat produced for complete and incomplete combustion reactions • relate the formation of carbon (“soot”), or colourless gases (carbon monoxide, carbon dioxide) to the extent of combustion occurring • justify using conservation of mass principles, how the amount of oxygen present can influence whether a fuel will undergo complete or incomplete combustion
Interpreting patterns in precipitation reactions	<ul style="list-style-type: none"> • relate solubility of ionic compounds to the relative strength of attractions between the ions and water molecules • use a table of solubility rules to predict the solubility of an ionic compound • predict and justify whether or not a precipitate will occur when two solutions of ionic compounds are mixed • identify the spectator ions present in a precipitation reaction
Interpreting patterns in combination reactions	<ul style="list-style-type: none"> • recognise that combination reactions between metal and non-metal elements will produce ionic compounds which are solids at room temperature • recognise that combination reactions between non-metal elements produce molecular compounds which are usually gaseous or liquid at room temperature
Interpreting patterns in decomposition reactions	<ul style="list-style-type: none"> • recognise that the products of a decomposition reaction depend on the types of atoms present in the reactant e.g. production of water requires H and O atoms and carbon dioxide requires C and O atoms to have been present • predict the products of a decomposition reaction using the generic equations provided e.g. a metal carbonate when heated produces a metal oxide and carbon dioxide
Justifying how each chemical reaction links to a context by referring to chemical equations, reactants, products, predictable patterns and observations.	<ul style="list-style-type: none"> • recognise that the impact of reactants and products in different contexts can depend on quantity and location eg; phosphates in soil can aid plant growth but run-off into waterways can cause algal blooms and the amount a cake rises depends on the quantity of baking soda added to the mixture. • link neutralisation reactions to people or the environment e.g. treating indigestion, soil and ocean acidification • link combustion reactions to people or the environment e.g. forest fires, LPG burners • compare and contrast the energy efficiency of complete and incomplete combustion e.g. cars, Bunsen burner • link precipitation reactions to people or the environment e.g. water treatment processes, formation of kidney stones or stalactites • link combination reactions to people or the environment e.g. formation of rust or the production of SO_2 from the combustion of fossil fuels • link decomposition reactions to people or the environment e.g. baking or lime production, carbonic acid in sodas

Instructions for completing the Subject Learning Outcomes template:

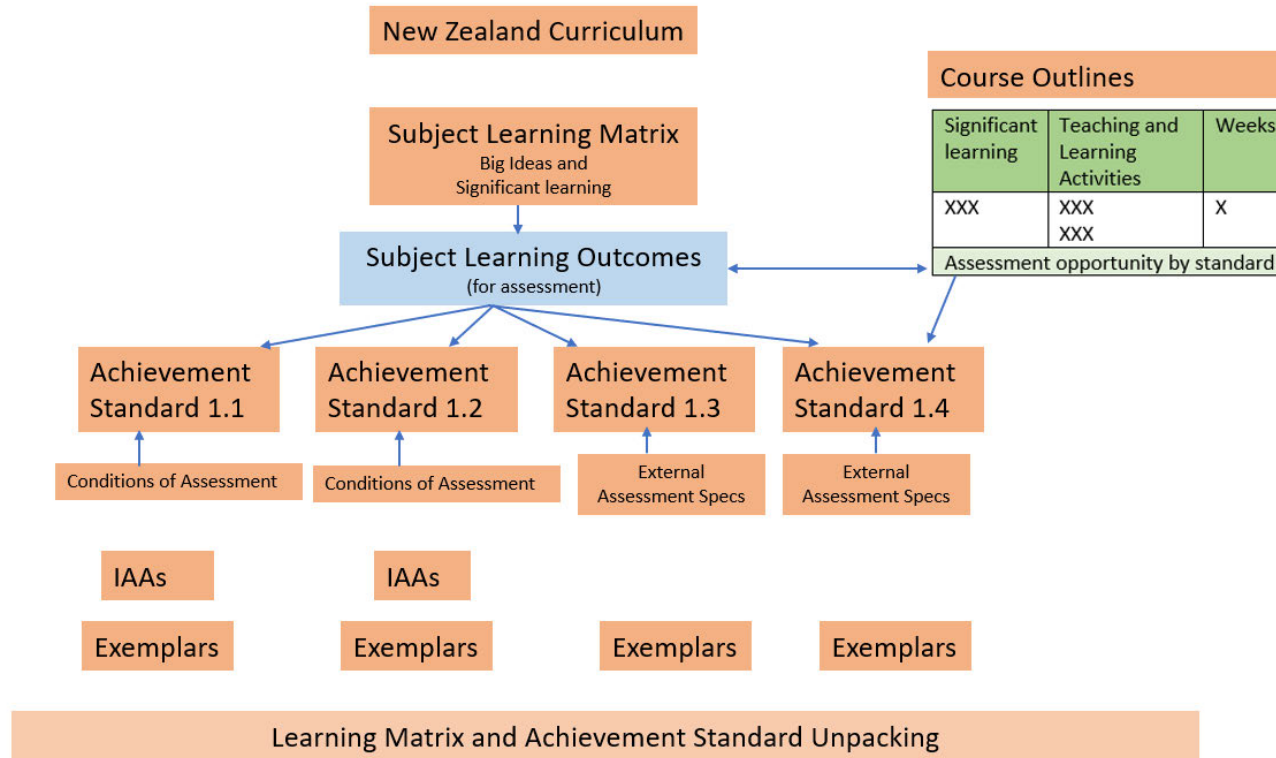
This resource is to support teachers to break down the Achievement Standards into a series of learning outcomes so it is clear to teachers what they need to include in their teaching and learning programmes leading up to an assessment. This will ensure that students gain the knowledge and skills needed to engage with the level 1 Achievement Standards for this subject. This document will sit alongside the Learning Matrix.

You will need to ensure that you draft the statements as Student **Learning Outcomes (SLOs)**. Learning outcomes describe in observable and measurable terms **what a student is able to do** as a result of completing a learning experience, whereas learning objectives describe what a teacher or learning programme **aims to do**.

1. Begin with the Unpacking on the Assessment tab of NCEA.Education and read through what competency the Achievement Standard is assessing. The Intent of the standard, Making reliable judgement and Collecting evidence sections will be useful to identify the scope and depth of learning outcomes. Use this material to guide the SLOs being as specific as possible.
2. Move to the Achievement Standard. Each Achievement Standard attests to a rich competence. Start with Explanatory Note 1 and the purpose statement followed by the other ENs to identify the evidence expected for each aspect of the competence.
3. Check the Conditions of Assessment (for internals) and the External Assessment Specifications (for externals) and capture any specific outcomes, including any specified formulae, contexts, and other aspects of scope and progression that should be included.
4. If the Standard has other requirements outlined in the Explanatory Notes for example, participation in a movement context or a drama – these should all be included as SLOs.
5. The SLOs should describe outcomes that include all three criteria – Achieved, Merit and Excellence descriptors. SLO verbs should reflect the AS criteria (apply, explain...) and not be changed.
6. For aspects of mātauranga Māori in Achievement Standards:
 - If there is a Matauranga Māori EN2 that specifies a kupu/concept, lift the item from the standard and include it as a learning outcome.
 - If there is other reference to mātauranga Māori in the standard, include that in the context in which it is used but avoid expanding on it or specifying further details.
7. Refer to the Learning Matrix and where possible include some of the key wording used in the items of Significant Learning so there is line of sight between the Learning Outcomes in the lists and the subject LM. Some items of Significant Learning will contribute to more than one Achievement Standard so may appear more than once in the SLOs. It may be possible to reword the Significant Learning that aligns with the assessment into a SLO for the purposes of this

document. It is important that no additional information or interpretation is included to avoid confusion between this document and the Achievement Standard.

The diagram below shows how the products made available to support NCEA align:



For clarification and advice contact Terry Fenn, Secondary Tertiary, Te Poutāhū. Terry.fenn@education.govt.nz



Science Learning Outcomes For Assessment

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The knowledge and skills listed are expected learning underpinning each Achievement Standard, which ākonga will draw on in responding to an assessment task. It is important to note that assessment is always a sampling process, so not everything will be assessed in any assessment event or activity.

Achievement Standard 92023 (1.4)	Demonstrate understanding of how the physical properties of materials inform their use	Credits: 4
What is being assessed	Specific Learning Outcome (Students are able to....)	
Describing physical properties of materials	<ul style="list-style-type: none"> • relate the position of an element in the periodic table to its metal or non-metal character • relate melting and boiling points to physical state (at a specified temperature) • relate melting and boiling points to the strength of attractions between particles • describe the physical properties of a material (density, thermal and electrical conductivity, melting/boiling points, solubility in water, malleability and hardness) 	
Explaining the physical properties of molecular substances in terms of the arrangement of particles and the relative strength of attractive forces between them.	<ul style="list-style-type: none"> • describe the structure and bonding of a molecular substance as discrete molecules containing non-metal atoms held together by strong covalent bonds but with only weak attractions between the molecules • explain lack of electrical conductivity in terms of the absence of mobile, charged particles • relate low melting point and softness to the energy needed to overcome weak attractions between molecules • explain solubility in terms of the relative strength of attractions between particles and water molecules 	
Explaining the physical properties of metallic solids in terms of the arrangement of particles and the relative strength of attractive forces between them.	<ul style="list-style-type: none"> • describe the structure and bonding of a metallic solid as a 3-D network consisting of metal cations attracted to a common pool of delocalised, valence electrons • explain high density in terms of the close packed arrangement of the cations (atoms) • explain conductivity (thermal and electrical) in the solid and liquid states of metals in terms of the mobility of their delocalised, valence electrons • relate malleability to the ability of the layers of cations (atoms) to slide past each other without disrupting the metallic bond • recognise that properties of alloys such as hardness and melting point differ because the different sized cations (atoms) change the packing arrangement of the metal • relate high melting points and hardness to the strength of the metallic bond 	

<p>Explaining the physical properties of ionic materials in terms of the arrangement of particles and the relative strength of attractive forces between them.</p>	<ul style="list-style-type: none"> • describe the structure and bonding of an ionic solid as 3-D networks consisting of oppositely charged ions held together by strong electrostatic attractions • explain high density in terms of the close packed arrangement of the ions • explain electrical conductivity when molten or dissolved in water, in terms of the presence of charged ions that are free to move • describe solubility in terms of the relative strengths of attractions between particles and water molecules • explain brittleness in terms of the change in ionic interactions when a stress is applied • relate high melting points to the strength of the electrostatic attractions between oppositely charged ions
<p>Explaining the physical properties of natural and synthetic polymers in terms of the arrangement of particles and the relative strength of attractive forces between them.</p>	<ul style="list-style-type: none"> • describe the structure and bonding of polymers as large chain molecules made from repeating units with strong covalent bonds between atoms within the chain, but weaker attractions between the chains • relate melting points to the stronger intermolecular attractions between larger molecules • explain lack of electrical conductivity in terms of the absence of mobile, charged particles • link malleability to the ability of the chains to slip past each other relatively easily
<p>Explaining the physical properties of covalent networks in terms of the arrangement of particles and the relative strength of attractive forces between them.</p>	<ul style="list-style-type: none"> • describe the structure and bonding of covalent network solids such as diamond and silica as 3-D (or graphite as 2-D) networks consisting of atoms held together by strong covalent bonds • relate the very high melting points and hardness to the strength of the network of strong covalent bonds (with the exception of graphite's softness resulting from the weak attractions between the 2-D layers) • explain lack of electrical conductivity in terms of the absence of mobile, charged particles (with the exception of graphite's delocalised valence electrons between the 2-D layers) • relate insolubility to the strength of the covalent bonds compared to the weak attractions to water molecules
<p>Evaluating the use of a material for a specific purpose</p>	<ul style="list-style-type: none"> • relate the use of materials to their physical properties • evaluate the most appropriate material for a specific purpose • justify why a material is used for a specific purpose

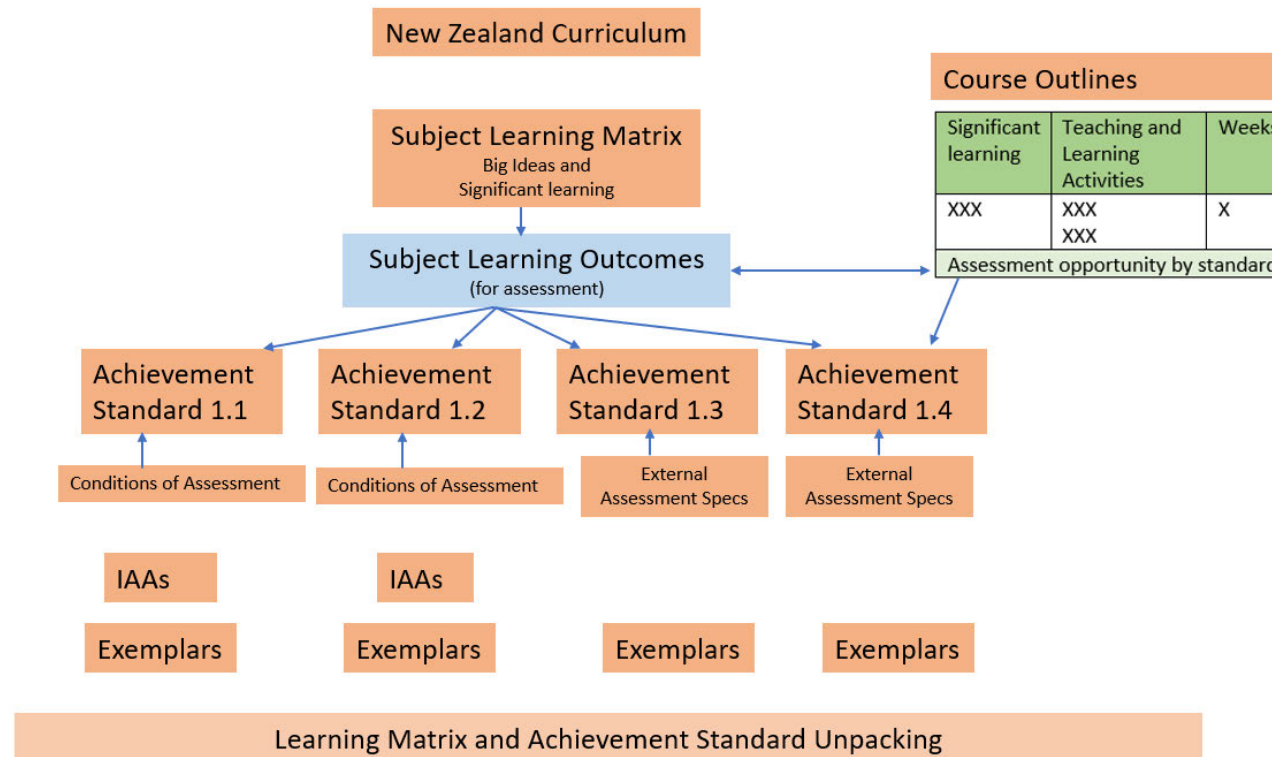
Instructions for completing the Subject Learning Outcomes template:

This resource is to support teachers to break down the Achievement Standards into a series of learning outcomes so it is clear to teachers what they need to include in their teaching and learning programmes leading up to an assessment. This will ensure that students gain the knowledge and skills needed to engage with the level 1 Achievement Standards for this subject. This document will sit alongside the Learning Matrix.

You will need to ensure that you draft the statements as Student **Learning Outcomes (SLOs)**. Learning outcomes describe in observable and measurable terms **what a student is able to do** as a result of completing a learning experience, whereas learning objectives describe what a teacher or learning programme **aims to do**.

1. Begin with the Unpacking on the Assessment tab of NCEA.Education and read through what competency the Achievement Standard is assessing. The Intent of the standard, Making reliable judgement and Collecting evidence sections will be useful to identify the scope and depth of learning outcomes. Use this material to guide the SLOs being as specific as possible.
2. Move to the Achievement Standard. Each Achievement Standard attests to a rich competence. Start with Explanatory Note 1 and the purpose statement followed by the other ENs to identify the evidence expected for each aspect of the competence.
3. Check the Conditions of Assessment (for internals) and the External Assessment Specifications (for externals) and capture any specific outcomes, including any specified formulae, contexts, and other aspects of scope and progression that should be included.
4. If the Standard has other requirements outlined in the Explanatory Notes for example, participation in a movement context or a drama – these should all be included as SLOs.
5. The SLOs should describe outcomes that include all three criteria – Achieved, Merit and Excellence descriptors. SLO verbs should reflect the AS criteria (apply, explain...) and not be changed.
6. For aspects of mātauranga Māori in Achievement Standards:
 - If there is a Mātauranga Māori EN2 that specifies a kupu/concept, lift the item from the standard and include it as a learning outcome.
 - If there is other reference to mātauranga Māori in the standard, include that in the context in which it is used but avoid expanding on it or specifying further details.
7. Refer to the Learning Matrix and where possible include some of the key wording used in the items of Significant Learning so there is line of sight between the Learning Outcomes in the lists and the subject LM. Some items of Significant Learning will contribute to more than one Achievement Standard so may appear more than once in the SLOs. It may be possible to reword the Significant Learning that aligns with the assessment into a SLO for the purposes of this document. It is important that no additional information or interpretation is included to avoid confusion between this document and the Achievement Standard.

The diagram below shows how the products made available to support NCEA align:



For clarification and advice contact Terry Fenn, Secondary Tertiary, Te Poutāhū. Terry.fenn@education.govt.nz

From: ian.torrie@gmail.com
To: [Erica Stanford](#)
Subject: Email contacts for heads of science organisations
Date: Monday, 22 January 2024 5:22:11 PM

Thanks for touching base Erica.

Here are the email contacts as discussed.

Physics (NZIP): David Housden dhousden@nzip.org.nz

Biology (BEANZ): Erica Jar9(2)(a) [Out of contact – (no electricity or internet) for the remainder of this week]

Earth and Space Science (ESSE): Mairi Borthwick

borthwickm@freyberg.ac.nz

Science (NZASE): Doug Walker doug.walker@stpats.school.nz

Regards



lan >

22 Jan 2024 at 4:33 PM

Hey lan Erica Stanford here. Just calling about the learning outcomes.

22 Jan 2024 at 7:02 PM

You can use 9(2)(a) for the details of the earth science and bio people. Thanks again

Ok thanks. Had sent them to your generic parliamentary address earlier. You might also like to know that Mairi from ESS was told that their suggested changes had your full support! 🤯

What????????????????

I know!

23 Jan 2024 at 8:13 AM

I've got the earth science docs. Any chance you have 5 to chat before 9? Just wanted to ask a couple of questions.

Sure!

21 Feb 2024 at 12:00 PM

Hi Erica
Can you call when you are free as I have had a message from the Ministry about the Learning Outcomes which is



Ian >

21 Feb 2024 at 12:00 PM

Hi Erica

Can you call when you are free as I have had a message from the Ministry about the Learning Outcomes which is quite disturbing. I have Team meeting scheduled with Rob Mills about it at 4pm today.

22 Feb 2024 at 8:13 AM

Hi Erica

Rob Mills said at yesterday's meeting that you had expressed concern about a lack of consistency between LOs from different subject areas so he had contracted NZQA to undertake a review of all subject LOs using a new set of Ministry criteria (different to the ones we were originally provided with). NZQA came back rating all standards on a 1 to 3 scale with specific changes required - most of which we disagree with and some of which don't even make sense. So we have been given a week to rewrite the LOs (with one days warning) for a contracted sum of \$5000. So this nonsense is going to cost hundreds of thousands of dollars at a time when we are crying poor and more importantly is going to cause huge grief and uncertainty in our sector yet again and for no apparent good reason. I am sure that modifications will need to be made to



Text Message • SMS





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Text Message • SMS





Ian >

22 Feb 2024 at 12:52 PM

This shouldn't have happened. Thanks for letting me know and I'm on it. I was concerned about a few of the arts subjects that weren't detailed enough that we need to add some some more detail to. I've raised right now and it's going to be sorted. Im so sorry for the frustration caused.

Ok. Just need to know whether I am meant to be hastily organising the changes now or not as only 1 week deadline!

Just hold fire and someone will be in touch. I'm really very annoyed this has happened - I made my instructions very clear. You are the exemplar!

Ok tx.

Mon, 4 Mar at 5:41 PM

Hi Erica. Just to let you know that the response from teachers to both the SLOs and the PLD program has been incredibly well received. We had approx 250 registrations for each of the first two sessions which is much higher than we anticipated, given that they can also access the video recording and PowerPoint at any time convenient to them. So thank you for



Text Message • SMS





Ian >

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However, can you clarify where the Science Curriculum refresh is up to. We are hearing different stories ranging from "complete rewrite similar to Maths & English" through to "the Ministry has continued working on version 2 along similar lines to the first draft". Obviously the latter option would be of real concern to us.

This week I am biking the high country inland from Kaikoura and around the Molesworth station area so generally don't have internet/phone connection until the evening.

Regards

Sun, 10 Mar at 6:11 PM

Just got your email. I need to talk to you about the curriculum refresh. Need all the science heads together in a meeting. Need advice.

Hi Erica



Text Message • SMS





Ian >

Hi Erica

You can ask Doug Walker (NZASE) to organise a zoom meeting for you with the heads of all the science teacher organisations as we have a monthly meeting anyway.

Will do. Thanks.

Sun, 24 Mar at 2:27 PM

I have had excellent feedback from science teachers about the learning modules - thank you. Need to work with you to sort the level one issues and look to what we do with 2 and 3.

Thanks

Thanks. The ministry does not seem to have taken on board the lesson that our organisations are much more capable of developing the standards and supporting material than the Ministry is. But an evidence based approach has never been a ministry strength in my experience sadly. So whatever is happening with ongoing development of L2 standards is not currently involving the SEG or our organisation. But frankly it is the science curriculum development that scares the beejezus out of me, knowing some of the principals within



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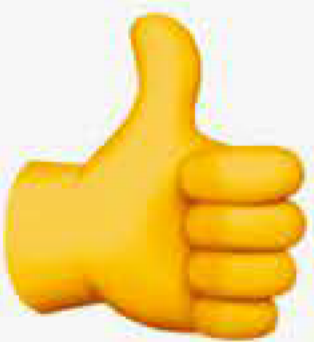




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Regards

Yes we need to do that. I'll arrange. We are taking your feedback on board to curriculum writing and NCEA changes. We want to include the associations in the changes. I agree to moe capability.



I appreciate that you have a lot of



Text Message • SMS





Ian >

I appreciate that you have a lot of issues on your hands at the moment.

Fri, 5 Apr at 2:26 PM

Thanks for your announcement today.



As you are aware we have many concerns about the direction of the current Curriculum refresh. However one aspect that particularly concerns me is that the underpinning structure for all subjects is based on the British Columbia model of Know Do Understand which makes perfect sense in terms of what we know about how the brain learns. However our Ministry has bastardised it to Understand Know Do which I believe signals their fundamental lack of understanding or acceptance of the cognitive science research. ie you can't actually understand a concept until you first know some stuff and then do something with it so that you can build some schema into your long term memory. I think the first draft of the curriculum strongly suggests the Ministry and it's "experts" do not accept that and without a quantum shift in their belief we will not make significant progress. 😞



Text Message • SMS






Ian >

Noted and agreed. We will include you in the writing to get this right. I'll call Over the weekend

Fri, 5 Apr at 4:34 PM

 Thanks

Thu, 18 Apr at 9:31 AM

A very good interview on Morning Report today. 

Thank you.

Mon, 29 Apr at 10:19 PM

A very cogent and well presented 6 point plan today thanks.

Thu, 9 May at 4:01 PM

I see you met **9(2)(a)** (and a few other St Cuths students) at the Premier Awards yesterday. The twins are amazing.

Sat, 22 Jun at 5:01 PM

Hi Erica.
Just a heads-up that to paraphrase a movie "Houston, we have a problem" wrt the Science Curriculum. The heads of the different Science Teachers Associations had a meeting



Text Message • SMS





Ian >

Hi Erica.

Just a heads-up that to paraphrase a movie "Houston, we have a problem" wrt the Science Curriculum.

The heads of the different Science Teachers Associations had a meeting earlier today about concerns with the Science Curriculum writing process and I have just e-mailed you the outcome of that meeting. At this stage I have used your 9(2)(a) but am happy to send it to the parliamentary address and copy in 9(2)(a) if you prefer.

Regards

Thanks. We have a meeting on Tuesday night with you guys and I have my officials in on Monday so I'll tell them to sort it out

Thanks.

Tue, 25 Jun at 9:13 AM

You must be doing something right if even Simon Wilson praises you. Well done!

Fri, 6 Sep at 10:45 AM

Hi Erica.

9(2)(g)(i)

[Redacted text]



Text Message • SMS





Ian >

Fri, 6 Sep at 10:45 AM

Hi Erica.

9(2)(g)(i)

[Redacted text block]

Regards

Sat, 26 Oct at 3:48 PM

Hi Erica. Any chance of a 5 min catch up on the science curriculum farce some time in the next 2-3 days.

Sat, 26 Oct at 4:59 PM

Yep I have spoken to buck too. I am across it and I am fixing it

OK thanks. The Ministry is not releasing info to us despite Ellen previously approving that. Hope you get some family time this long w/e.

Sat, 26 Oct at 6:26 PM



Text Message • SMS





Ian >

OK thanks. The Ministry is not releasing info to us despite Ellen previously approving that. Hope you get some family time this long w/e.

Sat, 26 Oct at 6:26 PM

One thing I would suggest that should be within your purview, is to establish a very small reference group of science education experts that could give regular feedback on progress with the process to both the Ministry and yourself.

I have a group but for some reason this still happened.

Thu, 7 Nov at 8:08 PM

Who is the head of the biology subject association?

It was Erica Jar erica.jar1971@gmail.com but Kenneth Loh kloh@ormiston.school.nz has recently taken over.

Thanks.



Text Message • SMS



From: [David Housden NZIP](#)
To: [Erica Stanford \(MIN\)](#)
Subject: RE: Letter from Hon Erica Stanford
Date: Wednesday, 28 February 2024 10:31:52 AM

Thanks for the kind words Erica and the actions that you and your office has taken in support of this work. It is appreciated by the physics community.

From: Erica Stanford (MIN) [mailto:E.Stanford@ministers.govt.nz]
Sent: Tuesday, 27 February 2024 3:35 PM
To: dhousden@nzip.org.nz; mg@ths.school.nz
Subject: Letter from Hon Erica Stanford

Kia ora kōrua,

Please see attached a letter from Hon Erica Stanford.

Kind regards,

Office of Hon Erica Stanford



Office of Hon Erica Stanford

MP for East Coast Bays
Minister of Education
Minister of Immigration

Website: www.Beehive.govt.nz
Private Bag 18041, Parliament Buildings, Wellington 6160, New Zealand

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NZ Institute of Physics (NZIP)
Earth and Space Science Educators (ESSENZ)

dhousden@nzip.org.nz
mg@ths.school.nz

Tēnā kōrua,

I wanted to take this opportunity to personally thank you for the extraordinary lengths you went to over the school summer holiday period, to help produce new supports for NCEA Level 1.

Your professionalism and commitment to creating these products within a short timeframe, has not gone unnoticed. I can see the passion your association, and your team, has for making positive change within our education system.

I appreciate there may still be further work required to finalise some products, but I am pleased we have been able to provide schools with helpful, practical tools and supports in time for the new school year.

The Ministry will continue to work with you if refinements are required following sector feedback and to support the development of these for Levels 2 and 3.

Please pass on my sincere thanks to everyone involved in delivering and publishing these products. It is greatly appreciated.

By working together, we've been able help schools and kura start their new NCEA journey on the right foot. Thank you again for your help.

Nāku noa, nā

A handwritten signature in blue ink, appearing to read 'Erica Stanford'.

Hon Erica Stanford
Minister of Education