

# CHEMISTRY AND BIOLOGY

---

## SUBJECT EXPERT GROUP RESPONSE TO FEEDBACK ON THE PHASE 1 MATERIALS

The Chemistry and Biology Subject Expert Group (SEG) would like to thank those who put their time in to review the Chemistry and Biology subject content. We received 155 responses to the survey.

The feedback has been collated into main themes and the SEG has responded to each theme below. All feedback has been reviewed - those suggestions which are more discrete in nature or are too detailed to respond to as a theme will be considered by the SEG.

---

Eleven themes were identified in the feedback.

### Theme One

*Need for significant professional learning and development (PLD) around the changes*

#### Response

The Ministry is working to ensure support is available for teachers, schools, and kura to implement the NCEA changes introduced in the Review of Achievement Standards (RAS) subject content. This includes both new supports and a range of existing services which can help teachers adapt their teaching and learning to implement these changes.

Additional capability supports include materials provided that will assist teachers in using the Learning Matrix and Assessment materials. These include the glossary, Course Outlines, guidance on unpacking of the Big Ideas and Assessment Activities. Exemplars of student work, external assessments, and Teaching and Learning Programmes will be published after piloting in 2022.

[A further response from the Ministry can be found here.](#)

### Theme Two

*Respondents expressed concern regarding use of the term 'Western Science' in the Achievement Standard titles*

#### Response

As the SEG reviews the Achievement Standards they will revise the titles to ensure they reflect the intent of the standard.

Reference to 'Western Science' will be removed to address concerns raised around the exclusion of non-Western scientific knowledge. The SEG will explore how to inclusively describe the relationship between mātauranga Māori and Science knowledge, to remove barriers between these knowledge systems.

### **Theme Three**

*Respondents questioned the focus on environmental guardianship, particularly for chemistry*

#### **Response**

Explicit reference to environmental guardianship and kaitiakitanga will be removed from the Achievement Standards to address concerns that the prescription of environmental guardianship as a learning context is overly restrictive. The intention of referring to environmental guardianship was to communicate that learning should be place based, this will be explicitly clarified by the SEG when they review the subject content.

Environmental guardianship was seen by many as an exciting and powerful context, so it will be retained in the Learning Matrix as significant learning.

### **Theme Four**

*Appropriate inclusion of mātauranga Māori in the subject content*

#### **Response**

Te ao Māori is a world view that includes a broad range of scientific concepts, incorporated in mātauranga Māori. The SEG will ensure these are explicit within the subject content and will consider a wider range of mātauranga Māori contexts that may be appropriately woven into learning in Chemistry and Biology.

The Learning Matrix and Course Outlines will be revised in Phase 2 to ensure they give guidance of how mātauranga Māori can be aligned with and woven into teaching and learning. Further development of assessment materials and activities will make more explicit how mātauranga Māori is included. Experts in mātauranga Māori and mātauranga pūtaiao will be engaged to ensure the subject matter is treated accurately and appropriately.

The SEG acknowledges a disparity in engagement with mātauranga Māori across the Science Learning Area. To address consistency the Ministry has appointed Learning Area Leads to work across subjects within each Learning Area, providing curriculum oversight. They will review subject content in their Learning Area (including already published content) and will look at consistency as part of this review. However, please note that there may be some variation between subjects as bespoke content is produced to meet their individual requirements.

### **Theme Five**

*Need for significant PLD around implementing mātauranga Māori appropriately into teaching, learning and assessment*

#### **Response**

Change 2 of the NCEA Change Package calls for mana ōrite mō te mātauranga Māori. Realising this change means we ensure mātauranga Māori is equitably valued and resourced in NCEA, broadening access to mātauranga Māori pathways and increasing

teacher capability. This means incorporating mātauranga Māori, te ao Māori and te reo Māori appropriately into the new Chemistry and Biology content.

The subject content provides capability support:

- Learning Matrices and Course Outlines illustrate how mātauranga Māori can be woven through teaching and learning
- The glossary will define any kupu Māori used in the subject content
- Assessment resources, student exemplars, and examples of Teaching and Learning Programmes used in the pilot will further exemplify the integration of mātauranga Māori in the future.

[A further response from the Ministry can be found here.](#)

## **Theme Six**

*Respondents questioned whether the draft subject content is sufficient to prepare students for Levels 2 and 3 Chemistry and Biology*

### **Response**

The SEG will review the draft subject content to ensure it will meet the needs of all students, including those who will continue to study Chemistry and/or Biology at NCEA Level 2 and Level 3.

It is important to remember that the aim of Level 1 NCEA is to give learners a broad, foundational understanding of a subject area that will stand them in good stead for whatever their pathways are after they finish the course. It is not the aim of Level 1 to cover all material that will be taught in Level 2, rather, learners will be armed with the skills and understandings of scientific concepts necessary to fully engage with Level 2 content.

NCEA Level 2 and Level 3 are yet to be developed, the draft subject list is set to be released for public engagement from June. Work on NCEA Level 2 and Level 3 will progress according to the [RAS timeline](#). This will be informed by and aligned with the new Level 1 subject content, to ensure appropriate progression for students.

## **Theme Seven**

*Respondents expressed concern that a lack of specific detail in the subject content makes it difficult to give feedback and will lead to inconsistencies in teaching and learning in New Zealand*

### **Response**

The Learning Matrix outlines the most significant learning for Chemistry and Biology, that every student is expected to engage with in a full year course. This is intended to strike a balance between consistency across Aotearoa New Zealand and flexibility in teaching and learning, to allow teachers to best meet the needs of the students in front of them.

The Course Outlines further support the Learning Matrix. They are indicative of how the significant learning may be coherently incorporated into a year-long Chemistry and Biology course. These will be reviewed by the SEG during Phase 2 and republished in August

alongside the assessment materials. The glossary will also be reviewed to ensure it best supports a consistent interpretation of the subject content.

## **Theme Eight**

*Need greater clarification of the form of assessment*

### **Response**

Assessment will be clarified in detail when Phase 2 subject content is published in August. It is in Phase 2 that we develop draft Achievement Standards, Assessment Schedules, Conditions of Assessment, Internal Assessment Activities, and associated materials. Further guidance including exemplars of student work will be provided after the Pilot year in 2022.

The Phase 1 Chemistry and Biology content currently published and engaged on is foundational subject content, with an indication as to the direction of assessment. This is published early in the development process to give you the opportunity to comment on the proposed teaching and learning at a formative stage. The SEG is currently using the compiled Phase 1 survey feedback to refine the subject content.

In particular, concerns about the forms of assessment will be considered in Phase 2. The SEG fully intends to ensure that opportunities for practical work to be numerous. This is already evident in draft Course Outlines but will also be made explicit in the wider subject content.

## **Theme Nine**

*Respondents expressed concern that the focuses of the biology Achievement Standards on microorganisms and genetics are overly restrictive*

### **Response**

Chemistry and Biology is not intended to be a comprehensive biology course. The chosen subject content is considered by the SEG to be the most significant 'not-to-be-missed' learning at Level 6 of the New Zealand Curriculum.

Schools and kura are able to teach different content and contexts in a more comprehensive biology course if desired, and can consider using Science Achievement Standards for assessment if the Chemistry and Biology standards need to be complemented.

To address suggestions that a health science focus would be relevant and useful, the SEG is developing a fourth Course Outline that demonstrates how to deliver this within a Chemistry and Biology course.

## **Theme Ten**

*Respondents questioned whether the chemistry content is at the appropriate level of the New Zealand Curriculum*

### **Response**

The SEG remains confident that the Learning Matrix and Achievement Standards are at the appropriate level of the New Zealand Curriculum.

However, the Course Outlines will be reviewed to ensure they are appropriately aligned to the Curriculum, and will be republished with the assessment materials in Phase 2.

## **Theme Eleven**

*Respondents questioned the coherence of the Chemistry and Biology course*

### **Response**

Many respondents noted the separation of the disciplines, marking this as a consolidated rather than combined course. While the Course Outlines and teaching and learning guidance aim to exemplify how the content from these two disciplines can be taught together coherently, the decision was made to keep the standards separate. The SEG felt that creating integrated standards would require the covering of content that was well beyond Level 6 of the curriculum, and thought that having separate chemistry and biology standards gives schools and kura more flexibility in course design.

The standards can be used to assess learning from an integrated course, and schools are able to design courses that best suit their students. The Course Outlines are designed to show how a year long course in a single subject could be constructed but can be used as a starting point for schools, kura and teachers to design their own bespoke courses.

## **Theme Twelve**

*Respondents expressed concern about the accessibility of activities in the Course Outlines*

### **Response**

The Course Outlines are indicative only and do not mandate a particular approach to a Chemistry and Biology course. However, the SEG intends for them to be as accessible as possible, and they will be revised and republished with this in mind.