

Queensland response to the draft senior secondary Australian Curriculum

English, Mathematics, Science and History

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1. Introduction

The Queensland Studies Authority (QSA), in partnership with Education Queensland (EQ), Queensland Catholic Education Commission (QCEC) and Independent Schools Queensland (ISQ), appreciates the opportunity to provide feedback on the draft *senior secondary Australian Curriculum for English, Mathematics, Science and History*. Queensland appreciates the depth and scope of the work to date and understands the challenges facing the Australian Curriculum, Assessment and Reporting Authority (ACARA). Queensland is positive and supportive of the notion of an Australian Curriculum that will provide consistent and explicit curriculum expectations across the nation.

Queensland's feedback is based on the position that the Australian Curriculum must be able to be incorporated into our current P–12 Syllabus design principles.¹ These principles were developed based on international research. The paper, *Development of a set of principles to guide a P–12 syllabus framework*² focuses on the technical features of syllabus documents that contribute to high quality/high equity outcomes. QSA has spent significant time and resources on developing low definition syllabuses that align teaching, learning and assessment, and focus on informed prescription and informed professionalism.

The Queensland system of externally moderated school-based assessment and senior syllabuses are held in high regard. As Matters (2006, p. 20) notes:

... QSA senior syllabuses possess all the components of a rigorous curriculum framework as defined in the education literature, they are comprehensive in their coverage (from content prescription to equity statement),³ and they have been studied and deemed worthy of note by educationists in other countries.

The senior secondary Australian Curriculum must meet the standards already set for Queensland's current syllabuses.

This paper is a summary of the collated Queensland feedback submitted from:

- state feedback sessions
- representative committees of the QSA
- the three school sectors, representing and advocating for 1400 EQ schools, 292 Catholic schools and 188 Independent schools.

Queensland's consultation identified strengths and a range of issues and concerns for ACARA's consideration when redrafting the *senior secondary Australian Curriculum for English, Mathematics, Science and History*.

¹ Queensland Studies Authority 2008, *P–12 syllabus design principles*, QSA, Brisbane, accessed 17 July 2012, <www.qsa.qld.edu.au/downloads/approach/syll_design_principles.pdf>.

² Luke, A Weir, K & Woods, A 2008, *Development of a Set of Principles to Guide a P–12 Syllabus Framework*, Queensland Studies Authority, accessed 10 July 2012, <www.qsa.qld.edu.au/downloads/publications/qa_p-12_principles_dev_ppr.pdf>.

³ Matters, G 2006, *Assessment Approaches in Queensland Senior Science Syllabuses*, Australian Council for Educational Research, p. 20, accessed 10 July 2012, <www.qsa.qld.edu.au/downloads/publications/research_qsa_science_assess.pdf>.

The Queensland response is organised in the following way:

- key strengths of the draft senior secondary Australian Curriculum and broad issues and concerns
- specific feedback for each learning area, with suggested ways forward and examples
- specific feedback for each subject.

2. Strengths

The Queensland consultation participants identified the following strengths in the draft senior secondary Australian Curriculum.

- There has been a significant improvement in many of the subjects since the previous draft; much of Queensland's feedback has been heard.
- The draft senior secondary Australian Curriculum is clear in its design.
- The 14 subjects are differentiated and specialised. They acknowledge that Year 11 and 12 students have varying learning interests and needs.
- The content in the subjects represents what is typically expected in senior secondary.
- The subjects generally align with the current suite of the equivalent senior subjects offered in Queensland.
- The standards used in the draft Australian Curriculum are analytic. They attempt to provide descriptions that give teachers guidance about the characteristics of different levels of achievement.
- The achievement standards:
 - apply to a folio of student work
 - have five levels of achievement
 - are designed using dimensions and specific assessable elements
 - attempt to differentiate student performance by changing variables, applied together or separately
 - attempt to provide consistent descriptors associated with each letter grade
 - are written in positive language.

3. Key issues and concerns

3.1 Alignment of teaching, learning and assessment

Queensland's system of externally moderated school-based assessment is based on confidence and trust in the professionalism of teachers verified by moderation processes within each school, within each region and evaluated externally for the whole state. A number of national projects have found this system produces a high level of consistency in teacher judgments about student performance.

Research shows that quality learning outcomes for students are best produced when what is taught informs what is assessed, and when what is assessed forms the basis of what is reported. Queensland's syllabus design principles establish the alignment of teaching, learning and assessment through:

- dimensions which are the most important characteristics of the subject
- objectives that state what students should achieve by the end of the course of study grouped by dimensions
- exit standards that state how well students have achieved the objectives within each dimension
- subject matter that should be taught to students, including core and mandatory requirements
- assessment requirements and advice for achieving the objectives in each dimension and demonstrating exit standards.

Queensland senior syllabuses require that the judgments about the quality of student achievement are made using pre-stated standards that describe how well students have achieved the objectives in syllabuses. The standards are developed from student work and describe the characteristics of student work.

Queensland's system of school-based, standards-based assessment recognises the key role of classroom teachers to make professional judgments about student responses to assessment instruments and decisions about levels of achievement.

Integral to Queensland's system for making valid, consistent, comparable and accountable judgments about student achievement is the clear alignment between learning objectives and standards that describe how well students have achieved the objectives. This alignment of teaching, learning and assessing is the basis for:

- the design by teachers of effective assessment instruments that provide opportunities for students to demonstrate achievement of the objectives and the range of standards
- teacher engagement in professional dialogue to discuss and evaluate judgments based on the match between syllabus standards and the qualities in student work, key to the processes for making consistent and comparable judgments about students' achievement within and between schools
- moderation processes to promote consistency of teacher judgments that are based on evidence of student achievement matched to syllabus standards.

In order for Queensland to maintain the logic and coherence of its syllabus design principles and system of externally moderated school-based assessment, the senior secondary Australian Curriculum needs to ensure that there is clear alignment between the key aspects of the curriculum — in particular the learning outcomes of the subjects and the achievement standards.

Way forward

Revise learning outcomes to ensure they are organised using the same dimensions as the achievement standards.

- The learning outcomes are the broad descriptions of intended learning of each unit. Without matching these to achievement standards a teacher cannot make a determination about whether a student has achieved these outcomes.
- In order to show the alignment of the learning outcomes to the achievement standards, these should be clearly matched, one-to-one, and organised under the same dimensions. (See section 5.4.1 Way forward for an example.)

3.2 Unit structure

ACARA's design specifications for the senior secondary Australian Curriculum are:

- subject — a set of specifications for content and achievement standards developed by ACARA
- course — a set of specifications that details the requirements for the implementation of a subject and includes the national specifications for content and achievement standards, and state and territory requirements for assessment and certification
- program of learning — developed by a school to show how the school's program meets the requirements outlined in the course.

In their current form the senior secondary Australian Curriculum subjects will pose significant issues for the operation of Queensland's senior secondary assessment and certification system.

Queensland has consistently argued against the inclusion of “units” in the senior secondary Australian Curriculum. Units that organise the content in a defined way are incompatible with the definition of a subject and ACARA's charter to develop content and achievement standards.

Decisions about units, contexts, topics and choices should be made by jurisdictions as part of the development of a “course”. This would address many of the issues raised in Queensland's feedback on the senior secondary subjects, in particular:

- the inflexibility of the unitised structure which artificially divides the subject
- the level of prescription about when content must be taught, which is not a feature of Queensland's system of externally-moderated school-based assessment underpinned by informed professional judgment
- the negative impact that the inflexible, unitised approach will have on the capacity of schools to offer composite classes in low candidature subjects and in regional and remote schools.

The senior secondary subjects are structured as four units of approximately 50–60 hours. These semester units artificially fracture the subjects and create unnecessary inflexibility. This inflexibility limits teachers' ability to use their professional judgments — judgments which are valued in Queensland and that allow for a diversity of approaches to curriculum and pedagogy, allowing teachers to develop programs and practices that provide the best possible outcomes for their cohorts of students.

The unitised structure of the senior secondary subjects will limit the flexibility in how courses are delivered, a flexibility supported in Queensland's current system of externally moderated school-based assessment.

ACARA has stated that state and territory assessment and certification authorities are able to incorporate the senior secondary Australian Curriculum subjects into their own design specifications. This could include “unpicking” the unitised structure.

In Mathematics and Science in particular, this raises the question of the need for units at all. These subjects are built around topics. The “unit” offers little to assist in the design of courses and programs of learning. At best it suggests that the topics should be taught in the same semester.

In English the unitised structure is artificial and unnecessary given the way that teachers engage with and teach English subjects. The core understandings and skills in the English learning area are taught concurrently and in an integrated way.

In History the allocation of units to particular year levels is illogical. The only difference between the units is the topic studied, that is, the content. For example, there is nothing inherently more difficult about the post-1945 world than the Enlightenment. The increase in complexity comes from the development of the historical skills.

Feedback has consistently criticised this level of prescription as irrelevant, unhelpful and limiting.

3.2.1 Composite classes

Composite classes are common in small, often remote Queensland schools. They are also common in bigger metropolitan schools with small cohorts in particular subjects. Currently, senior secondary syllabuses in Queensland provide advice on organising curriculum for composite classes that is based on teaching common content and differentiating processes and assessment for Year 11 and 12. Developing programs of learning for composite classes will be a major issue, if not an impossibility, with the unitised structure of the senior secondary curriculum.

Issues raised specifically include:

- a required sequential unit structure will have significant implications for the operation of composite classes
- school-based responses to student needs and resourcing will be adversely affected with mandated sequencing of units. For example, large cohorts often require rotating through the available resources
- teachers’ capacity to organise programs and contextualise units for student clientele will be limited. For example, in northern Queensland the weather plays a significant role in when best to deliver aspects of a course — some of the prac/excursion/field work for Biology is done at certain times in the south east and different times in North Queensland because of the weather.

Way forward

- Provide a clear statement about the difference between the Australian Curriculum subject, a state and territory assessment and certification authority course and a school program of learning.
- Provide an explicit written statement about the nature and scope of the flexibilities available to state and territory assessment and certification authorities that will allow them to organise the Australian Curriculum to best meet the design requirements of their courses.
- Revise the approach to the organisation of the content descriptions, to either:
 - organise the content descriptions as Year 11 and Year 12, without units, as is the case in the F–10 Australian Curriculum, or
 - keep the units but do not tie a particular unit to a particular year level.

3.3 Achievement standards

The achievement standards were a significant focus of much of the feedback. Feedback consistently stated that the achievement standards are not useable in their current form and are not acceptable to Queensland teachers. This feedback emphasised the following key concerns. The draft achievement standards:

- do not show a clear alignment between the learning outcomes, content descriptions and aims of subjects which is an essential feature that underpins externally moderated school-based assessment in Queensland
- do not support teachers to design effective assessment instruments that provide opportunities for students to demonstrate achievement of the learning outcomes
- do not describe clearly the nature and scope of the sort of evidence that would be required in a student response or folio. In their current form it will be difficult to determine how well students have achieved the learning outcomes
- do not support teachers to make consistent, comparable, transparent and defensible judgments about the match between the qualities in a student response or folio and the standards descriptors
- are misaligned and potentially inequitable as there are learning outcomes and content descriptions that are articulated only in the A standard.

The following sections articulate key concerns consistently raised about the achievement standards across the learning areas.

3.3.1 Design of the achievement standards

Differentiation in student performance based on standards relies on changing variables, applied together or separately:⁴

- the concept/skill that students should understand/be able to do
- a verb (e.g. explain, evaluate, describe) to indicate the level of cognitive demand
- a degree or quality word — that is “how well” (terms such as: comprehensively, accurately, informed, coherent, logical, reasoned, relevant, sustained, clear, concise, reference to evidence, controlled, some, minimal, and limited).

In general, when moving up from E to A the variables increase in complexity and/or abstractness and/or cognitive demand and/or decreases in familiarity.

The design of the draft senior secondary Australian Curriculum achievement standards in terms of the variables (concept/skill, verb/cognition and degree/qualities) is strongly supported.

However, there are significant issues in the application of this design in the draft senior secondary Australian Curriculum, in particular, the tendency to only use the first two variables — the concept/skill and the verb/cognition.

⁴ Matters, G 2006, *Assessment Approaches in Queensland Senior Science Syllabuses*, Australian Council for Educational Research, accessed 10 July 2012, <www.qsa.qld.edu.au/downloads/publications/research_qsa_science_assess.pdf>.

Alignment of standards to learning outcomes The learning outcomes of a subject are the desired results of intended learning. In order to see the level to which a student has attained this learning, each element of the standard needs to be directly aligned to a learning outcome. Standards that are not aligned do not provide evidence that a student has attained the learning outcomes.

The draft senior secondary Australian Curriculum achievement standards are made up of elements that are not directly aligned to the learning outcomes. They will not provide adequate evidence that a student has met the intended learning of the subject.

Revised achievement standards need to ensure that there is actual alignment between the learning outcomes and standards for them to work effectively in Queensland's system of externally moderated school-based assessment. This alignment needs to be obvious to teachers as they plan their programs of learning and design their assessment instruments.

3.3.2 The dimensions

The organisation of achievement standards under dimensions is strongly supported. However, there are two significant issues about how the dimensions have been written.

First, the link between the dimensions of the achievement standards and how they relate to the rest of the curriculum is unclear. ACARA clearly has a rationale and explanation for why the particular dimensions were chosen in each learning area. This should be articulated in the curriculum. The sections on the structure of each subject include, at most, two sentences explaining the dimensions used to organise the achievement standards. Given the importance the dimensions play in the curriculum this is insufficient.

Second, a consistent issue raised in feedback relates to the use of two dimensions for the achievement standards. No rationale has been provided for using only two and is not supported.

Dimensions can be characterised as the salient properties or characteristics of distinctive learning for a subject.⁵ Dimensions should be described through learning outcomes that students should have the opportunity to learn. To collapse these learning outcomes into two rather than three dimensions works to conflate and thereby reduce the complexity and breadth of this learning, privileging some of this learning while diminishing or losing others. This privileging will influence how well comparable, consistent and defensible on-balance judgments can be made about a folio of work.

Making a consistent, reliable and defensible on-balance judgment using two dimensions is problematic. For example, consider the following:

- Student 1 achieves an A in dimension 1, and a B in dimension 2, but the overall evidence, on balance, matches an A.
- Student 2 achieves an A in dimension 1, and a B in dimension 2, but the overall evidence, on balance, matches a B.

It will not be immediately clear to Student 2 why they did not receive the same level of achievement as Student 1.

To overcome this scenario state and territory curriculum and assessment authorities will need to develop “rules” that are more about profiling, rather than matching student work to the achievement standards.

⁵ Queensland Studies Authority 2010, *Using standards to make judgments about student achievement in Authority and Authority-registered subjects*, QSA, Brisbane, accessed 11 July 2012, <www.qsa.qld.edu.au/downloads/approach/qa_policy_standards.pdf>.

3.3.3 Alignment of verbs/cognitions

It is recognised that there is an attempt to be consistent within the letter grades of the draft standards. However, the choice of particular higher order cognitions as an A standard descriptor is problematic. “Evaluates” and “analyses” are frequently used to describe an A and “identifies” to describe a D or E. These are also terms that are used in the content descriptions. This suggests that particular content descriptions are “A standard” and others are “D or E standard”. As such, the achievement standards are potentially inequitable and again this demonstrates the lack of alignment between the outcomes, content and achievement standards.

Further, this is inconsistent with the F–10 Australian Curriculum achievement standards, which describe “typical student performance”. In Year 10 Science, for example, a typical student can “evaluate”, “analyse”, “explain”, and “describe” science understandings. Yet in Years 11 and 12 it is only the A student who “evaluates” and “analyses” science understandings. This suggests that the Australian Curriculum would expect the same of the typical Year 10 Science student in terms of cognitions as it does of the highest performing senior secondary science students.

3.3.4 Verbs/cognitions used to differentiate between levels

In documentation ACARA provided during the consultation period, the Australian Curriculum achievement standards are described in the following way:

The achievement standards provide an ordered sequence of descriptions from the highest level of achievement (described as an ‘A’) to the lowest level of achievement (described as an ‘E’)...

Each statement in the standards includes two elements that together **indicate the expected quality** of performance at each level:

- the concept/skill that students should understand/be able to do
- a verb (e.g. explain, evaluate, describe) to indicate the level of cognitive demand.⁶

The two variables to “indicate the expected quality of performance”, do not describe qualities. As such, this description conflates these variables (concept/skill and verb/cognition) with the notion of degree or qualifier (the how well). It assumes incorrectly that the “level of cognitive demand” is the only valid basis for differentiating levels of achievement in student work.

Relying solely on this approach means the achievement standards do not describe “better quality” work, that is, they do not describe how well the student evaluates or analyses or describes. Rather, they describe “more” and “different” work.

Where the standards vary by articulating different concepts/skills and verb/cognitions across the levels A–E, this often results in what is being assessed at a particular level is different from what is being assessed in the other levels of the standard. Rather than providing a basis for differentiating between levels A–E as to how well the same concept/skill has been demonstrated, each of these standards is about a different concept/skill and verb/cognition.

⁶ Australian Curriculum, Assessment and Reporting Authority 2012, “Senior secondary achievement standards overview.docx”, ACARA meeting paper, unpublished, 16 July 2012. Emphasis added.

For example, in the *English* draft achievement standards, Dimension 1:

- A: “**evaluates how choices** of text structures, language features, stylistic features and types of texts **influence or persuade** audiences”
- B: “**analyses** text structures , language features, stylistic features and types of texts **that influence or persuade** audiences”
- C: “**analyses the use of** text structures, language features, stylistic features and types of texts **when considering** audience”.

This assumes that regardless of the quality of the evaluation, the student should be awarded an A. Differentiating between B and C relies on the differences in “influence or persuade audiences” and “considering audience”. Taken together it suggests three different tasks would be required to allow students to demonstrate the standards.

When verbs/cognitions are used to differentiate between levels, they need to be aligned with one another. For example, “explain” is aligned to “describe”, but “analyse” and “evaluate” ask students to do something completely different.⁷ From the draft *Biology* achievement standards, Dimension 1:

- A: “**evaluates** the origins and significance of key findings and the role of technologies, debate and review in the development of biological concepts, theories and models”
- B: “**explains** the origins and significance of key findings and the role of technologies, debate and review in the development of biological concepts, theories and models”.

In order to assess this, a teacher would have to ask the student to do two different things. Setting a task that requires “evaluation” is different to one that requires “explanation”.

Much of this goes back to the issues outlined in the alignment (section 3.3.2). A one-to-one alignment of the achievement standards to learning outcomes would solve this issue. Starting with the learning outcomes, the associated standard descriptors for each level of achievement describe “how well” and to “what degree” the student achieved the learning outcome.

3.3.5 Minimal use of quality words

When an assessment asks students to “evaluate”, it is reasonable to expect that some students will only provide evidence of a “partial evaluation”, while others will be “comprehensive” (for example). If the standards descriptors do not reflect this in some form, there will not be clear “point-at-able” differences that have a matching standard descriptor.

No standards descriptors can describe qualities in student work in their entirety. However, ruling out quality words provides even less of a description of what is seen in student work, and is therefore likely to be less valid and reliable. Teachers reach a common understanding of what qualities in student work look like at different standards through a process of moderation, and examples of student work that match the standards. This process is the only reasonable way of reaching a common understanding between teachers as to what different standards look like in student work.

⁷ Based on the definitions provided in: Australian Curriculum Assessment and Reporting Authority 2012, *Foundation to Year 10 Achievement Standards Glossary of verbs*, ACARA, Sydney, accessed 11 July 2012, <www.australiancurriculum.edu.au/Static/docs/history/3.0/Glossary%20of%20Verbs%20-%20F-10%20Achievement%20Standards.docx>

As noted in a recent Australasian, Curriculum, Assessment and Certification Authorities (ACACA) review of Queensland's processes:⁸

One of the most important and impressive strengths of the Queensland system is that comparability is not established through some a priori comparison of assessment forms, but through an intense focus on actual evidence of standards demonstration from student work. Assessment results do not depend on what is purported to be measured, but on what knowledge and skills are actually demonstrated through actual student evidence.

This approach to comparability has been found to be highly reliable in allocating Levels of Achievement to student folios. It is comparable with the highest levels reported for experienced markers of essays on external examinations and suggests exceptional inter-marker consistency in the interpretation of standards and criteria.⁹ As Sadler (1989) points out, determining the quality of a complex work (such as a folio of student work) requires a skilled, qualitative judgment made directly by the appraiser.¹⁰ Qualitative judgments, by definition, can be described using qualitative words.

The intent of minimising the number of words used in the standards is understandable, but not to the point of sacrificing the ability of standards to describe the “point-at-able” differences that are actually seen in student work; or of teachers to write assessments that capture the full range and depth of expected learning in a subject.

3.3.6 Other issues

Other issues with the achievement standards include:

- The stem of the descriptors in the achievement standards is “The student”. This is inappropriate. Judgments are not directly made about the student. Judgments are made about the evidence of achievement in the student’s folio of work.
- The pitch of some descriptors has been frequently raised in feedback. (See, for example, section 5.4.2 in Mathematics.)
- The inconsistency of language used within some standards and between the standards for Units 1 & 2 and Units 3 & 4. (See, for example, section 5.4.2 in Mathematics.)
- Some of the elements in the achievement standards are not appropriate. (See, for example, section 6.4.2 in Science.)
- Some of the Year 12 standards add material that is not included in the Year 11 standards as a way of indicating a change in level. This indicates that this material will not be assessed in Year 11 despite being part of the Year 11 content. (See, for example, section 7.4 in History.)

⁸ Marion, S Peck, B & Raymond, J 2011, *Year-to-year comparability of results in QSA senior secondary courses that include school-based moderated assessment: an ACACA sponsored review*. Queensland Studies Authority, p. 4, accessed 15 July 2012, <www.qsa.qld.edu.au/downloads/publications/report_acaca_comparability.pdf>.

⁹ Masters, G & McByde, B 1994, *An Investigation of the Comparability of Teachers' Assessments of Student Folios*, Tertiary Entrance Procedures Authority (Qld), p. 32, accessed 15 July 2012, <www.qsa.qld.edu.au/downloads/publications/research_tepa_masters_mcbryde_94.pdf>

¹⁰ Sadler, R 1989, *Formative assessment and the design of instructional systems*, *Instructional Science* 18, pp. 119–144, accessed 14 July 2012, <<http://michiganassessmentconsortium.org/sites/default/files/MAC-Resources-FormativeAssessmentDesignSystems.pdf>>.

Way forward

- The achievement standards must:
 - state what students are expected to know and be able to do for each exit level of achievement
 - describe the qualities that teachers should look for in student responses and use to make judgments about each level of achievement
 - provide a meaningful way for teachers to report on student learning and achievement to parents and carers for the outcomes of the subject
 - provide students with guidance for their learning and allow them to monitor their progress
 - provide transparency so that students, parents and carers understand how teacher judgments are made.
- Fully explain the dimensions of each subject in the sections on subject structure of the curriculum.
- Reconceptualise the learning outcomes and achievement standards under three dimensions. Three dimensions give a better balance to the learning outcomes and achievement standards.
- Revise the dimensions to ensure they are the salient characteristics of the subject. This is a significant issue in English.
- Align the learning outcomes to the achievement standards one-to-one. (See section 5.4.1 Way forward, for an example of the how this could be done in *Mathematical Methods*.)
- Write standards that describe the level to which the student has achieved each learning outcome in each pair of units. Each learning outcome should be evident — one-to-one, in the range of standards, A–E. If this cannot be done then the learning outcome should be reconsidered.
- Ensure the variables are effectively stepped A–E. Pay particular attention that the same concept/skill is being assessed across the levels. Change the variables together or separately:
 - the concept/skill
 - a verb/cognition
 - a degree/quality word.

In general, when moving up from E to A the variables increase in complexity and/or abstractness and/or cognitive demand, and/or decreases in familiarity. The step down to D and E should describe characteristics in student work that do not demonstrate the learning outcomes (but are still aligned to them).
- Consider how teachers would be able to find evidence of these descriptions in student work and whether they could realistically determine the difference between these and make a defensible judgment, A–E.
- Revise the standards ensuring the expectations at each level of achievement are comparable, as reflected by the use of similar degree words.
- Scan across all 14 subjects to ensure the approach to the achievement standards described above is consistently applied and the expectations at each level of achievement are comparable.
- Change the stem of the achievement standards. Do not refer directly to “the student”. The achievement standards relate to a folio of work. Therefore they should describe the characteristics of the work, not the characteristics of the student.
- Produce a teacher resource that explains the logic of the construction of the achievement standard for each learning area.

4. English

This section summarises feedback and recommendations for the four English subjects.

4.1 Strengths

The following strengths were identified in consultations about all four English subjects.

- There has been an improvement in the four English subjects since the previous draft; some of Queensland's previous feedback is represented in this draft of the four subjects.
- The development of four English subjects acknowledges that Year 11 and 12 students have varying learning interests and needs, and gives students the potential to study more than one English subject.
- The amount of content is generally more appropriate and somewhat less prescriptive than the previous drafts. However, this remains an issue in *English as an Additional Language or Dialect (EAL/D)*.
- The removal of unit titles is more consistent with the way English teachers work with understandings about texts, language and contexts across all units.
- It is clear that the sample text lists are not meant to be prescriptive.
- General capabilities and cross-curriculum priorities that naturally fit with the different English subjects are generally appropriately represented.
- Achievement standards are organised in distinct bullet points across five levels for Units 1 & 2 and for Units 3 & 4. This broad model is generally supported.
- The overall design is consistent across the four subjects to include unit descriptions, learning outcomes and content descriptions.

4.2 Rationale and aims of the subjects

The following summarises feedback about the rationales and aims of the four English subjects.

4.2.1 Rationales

- The rationales generally provide clarity about each subject's broad scope. However, feedback expressed disappointment that the rationales for *English* and *Literature* are not sufficiently clear about the distinctive nature of these subjects. Feedback on the *Literature* rationale expressed concern that it provides no real justification for the subject, outlining a broad overview of what is to be covered but not why.
- *English as an Additional Language or Dialect (EAL/D)*
 - the rationale provides a clear outline of language as an emphasis and this is a strength
 - the focus on the teaching of the structure, linguistic features and sociolinguistic and sociocultural aspects of Standard Australian English is strongly supported
 - a clearer link to how language is used (rather than acquisition) is needed
 - the inclusion of imaginative and analytical texts is too specific, and out of scope for a rationale. It suggests a particular assessment regime.

- The practical focus outlined in the rationale for *Essential English* is supported.

4.2.2 Aims

- The inclusion of aims that are common across the four English subjects is supported.
- Feedback recommended that the alignment between rationale and aims and learning outcomes be made clearer to reflect the distinctive nature and salient features of the subjects.
- The unit descriptions and many of the learning outcomes and content descriptions across the four units in all four subjects appear to derive from the context-text model of language. An overarching framework using this model needs to inform the rationale and aims more clearly and more explicitly.
- The purpose and meaning of the third aim, “understanding and appreciation of different creative processes” is unclear. The term is vague, and it is not clear whose “creative processes” are referred to, nor why “creative processes” are valued over other equally important processes senior secondary students need to learn about.
- Feedback on the *English* aims stated that the wording is vague and the F–10 English aims are much more descriptive.
- Feedback expressed concern that the only mention of language is in terms of general skills and that the modes are privileged over language skills.

Way forward

- Make clearer the distinctive nature and salient features of these senior secondary English subjects in the rationales.
- Use the salient features of English subjects to inform the aims to achieve a clearer alignment between the rationale and aims and learning outcomes.
- The context-text model of language appears to inform the unit descriptions and learning outcomes. This then should be made more explicit and inform a revision of the aims. The following are ways of doing this:
 - The *EAL/D* dot point “understanding of the relationship between language, texts and ways of thinking, knowing and learning” and the *Essential English* dot point “understanding of the ways in which context, purpose, audience, register and language interact to make meaning” could be used in framing the aims of all four subjects.
 - Include in the aims and rationale of all four subjects reference to the work that texts do (in terms of attitudes, values, beliefs, assumptions etc.).
 - Reframe the aims to make clear that students create AND respond to texts.
 - Include more clearly in the aims the development of student understanding and control of textual features in a variety of contexts.
- In order to show more clearly that senior secondary students are building on skills they have already learned, the English rationale should use the same wording used in the Aims, i.e. “develop these skills” rather than “learn to speak” as used in the draft rationale.
- Provide more theoretical underpinning and highlight metacognition and self-reflection in the *Literature* rationale.
- *EAL/D* rationale:
 - provide more information about the range of learners
 - remove references to students creating increasingly complex imaginative and analytical texts.
- *EAL/D* Aims:
 - extend the stem to become “EAL/D aims to develop students’ acquisition and use of Standard Australian English to:”
 - rephrase the fifth *EAL/D* aim to read “demonstration of higher order thinking skills” to be consistent with the more general qualities of the other aims
 - include some reference to level (or acquisition) of proficiency.

4.3 Structure

The following summarises feedback about the structure of the four English subjects.

4.3.1 Strengths

- The content descriptions are generally broad statements which are supported. However some content descriptions are overly specific.
- Feedback mostly agreed that the unit structure for *English* and *EAL/D* is generally clear. There is some internal logic across the four units for these subjects.
- There was agreement that generally the units across the subjects of *English*, *Literature* and *EAL/D* contain an appropriate amount of content, that is, can be taught within 50–60 hours. Feedback on *Essential English* expressed concern that the amount of content in each of the units was too much for one unit.

4.3.2 Issues

- The unit descriptions and many of the learning outcomes and content descriptions across the four units in all four subjects appear to derive from the context-text model of language. A clearer overarching framework using this model is needed to make explicit the distinctive features of the learning of senior secondary English subjects. Feedback on *Essential English*, for example, expressed concern that what makes this a senior secondary English subject is not evident.
- As noted in section 3.3.2, there is a lack of alignment between the learning outcomes and the achievement standards. This means that the achievement standards cannot be used to make a direct judgment about student work with respect to the learning outcomes.
- The distinctive features of the knowledge, understanding and skills that are core to senior secondary English subjects should inform the dimensions. The dimensions should be framed around the stated learning outcomes.
- The dimensions of “responding to oral, written and multimodal texts” and “creating oral written and multimodal texts” do not represent the salient features of the distinctive learning of senior secondary English subjects; they derive from a literacy framework and could be applied to any subject.
- The unit descriptions and learning outcomes describe understanding and skills that should be core to every unit. The learning outcomes need to be the same for all four units and should inform the dimensions.
- The expected learning in each unit description is not always aligned with the learning outcomes for that unit. For example, in *English* Unit 2 the unit description states: “analysis of how language and structural choices shape perspectives in and for a range of contexts is *central* (our emphasis) to this unit”. Yet this does not appear explicitly in the learning outcomes for Unit 2.
- The learning outcomes for each unit imply assessment requirements by specifying texts that students will create. Assessment requirements are the responsibility of the state and territory assessment and certification authorities.
- Queensland has consistently argued against the inclusion of “units” in the senior secondary Australian Curriculum, and argued that decisions about units, contexts, topics and choices should be made by jurisdictions as part of the development of a “course”.

- In the English subjects the unitised structure is artificial and unnecessary given the way that teachers engage with and teach English subjects. The core understandings and skills in the English learning area are taught concurrently and in an integrated way.
- The senior secondary courses are structured as four units of approximately 50–60 hours. These semester units artificially fracture the courses and create unnecessary inflexibility. This inflexibility limits teachers' ability to use their professional judgments — judgments which are valued in Queensland as they allow for a diversity of approaches to curriculum and pedagogy, allowing teachers to develop programs and practices that provide the best possible outcomes for their cohorts of students. Feedback from teachers on the four unit structure of *Essential English*, for example, stated that their students would struggle with this subject because it is not flexible enough.
- Feedback consistently stated that the developmental nature of subjects, in particular *English*, *Essential English* and *Literature*, is not evident. The relationships between and across units is not clear. For example, feedback about *English* found some evidence that Unit 3 builds on Unit 1, and Unit 4 builds on Unit 2. How Unit 2 builds on Unit 1 and how Unit 4 builds on 3 is not clear.
- There needs to be more clarity and consistency about what makes subsequent units more cognitively demanding. For example, feedback for *English* found that Units 3 & 4 are not more cognitively demanding than Units 1 & 2.
- Feedback on *Essential English* and *Literature* found a lack of internal logic and coherence in the four unit structure. The purpose of what is to be achieved in the units is unclear; units provide a broad account of what is to be taught but not why.
- Links to the three strands of F–10 Australian Curriculum: English appear to be cursory and it is not sufficiently clear how they are included, consolidated and extended in the senior secondary English subjects.

Way forward

- Ideally the approach to the organisation of the content descriptions should be revised by removing the four unit structure.
- If the unit structure is retained:
- Use an overarching framework such as the context-text model of language to identify the core knowledge, understanding and skills that are the important and valued characteristics of distinctive learning in senior secondary English learning area subjects.
 - Use these characteristics of the distinctive learning in senior secondary English subjects to reconceptualise the dimensions. The revised dimensions should be framed around the stated learning outcomes.
 - Revise the learning outcomes to ensure they align with the expected learning in the unit descriptions and describe the understanding and skills that are core to every unit.
 - Make the revised learning outcomes the same for each unit. This will help make the developmental nature of the subjects more evident.

4.4 Content and achievement standards

4.4.1 Content

The following summarises the general feedback about the content of the four English subjects.

- That the content descriptions are generally broad statements is supported. Broad rather than prescriptive statements work towards allowing teachers choices about how they will deliver the content.
- It is unclear why the content descriptions are organised under headings in the way they are. Many of the content descriptions and headings overlap.
- The nature of the content of English subjects seems to be unresolved; the content descriptions range across learning experiences and possible assessment.
- The units contain content descriptions and learning outcomes that should be common to all units. There are core aspects of the content that necessarily complement each other and cannot be separated into arbitrary units.
- The amount of duplication of and the number of similarities in the content descriptions across the four units in all four subjects indicates that in English subjects content cannot be treated discretely. The arbitrary distribution of content into four separate units runs counter to how English subjects are taught.
- Some content descriptions are overly specific and work to restrict and limit choices teachers should have on how to deliver the subject. For example, the content description in *English* Unit 2 “Investigate and analyse the representation of ideas, attitudes, and voices in texts . . . **including the effect of humour and satire**” is unnecessarily prescriptive. In the same way, the following content description in *English* Unit 4 is too specific and prescriptive: “Analyse and evaluate how texts can influence audiences’ perspectives through ... the selection of language features that **create empathy**.”
- Feedback consistently expressed concern about the amount of implied assessment indicated by the heading “Create a range of texts” that appears as an organiser of content descriptions in each unit. Creating a range of texts is not a content description.
- There does not appear to be a clear framework that provides coherence and an overarching context for the learning described in the content descriptions in *Essential English* and *Literature*.

Way forward

- Revise the organisation of the content descriptions so as to allow teachers choices about how they will deliver that content within the broader framework of learning outcomes that are common to all units and are directly aligned with the achievement standards.
- Revise those content descriptions that are overly specific so as to ensure they illustrate rather than prescribe ways teachers might deliver the content.
- Revise the content description headings so that “create a range of texts” is not included as content. It needs to be clearer that it is through creating texts that students demonstrate the knowledge, understanding and skills outlined in the content descriptions.

4.4.2 Achievement standards

Feedback on the draft achievement standards of the four English subjects consistently stated that the achievement standards are not useable in their current form and are not acceptable to Queensland teachers.

Queensland's system of school-based, standards-based assessment recognises the key role of classroom teachers to make professional judgments about student responses to assessment instruments and decisions about levels of achievement.

Feedback emphasised the following key concerns.

- There is not a clear alignment with the learning outcomes, content descriptions and aims of the subjects. For example, “analyses how values, attitudes and assumptions are implied by texts” in the standards for *English* Units 3 & 4 does not align with any of the learning outcomes in either of these units.
- The achievement standards in their current form do not support teachers to design effective assessment instruments that provide opportunities for students to demonstrate achievement of the learning outcomes.
- Nor do they describe clearly the nature and scope of the sort of evidence that would be required in a student response or folio. This is particularly so where the standards vary by articulating different concepts/skills across the levels A–E. This often results in what is being assessed at a particular level is different from what is being assessed in the other levels of the standard. Rather than providing a basis for differentiating between levels A–E as to “how well” the same concept/skill has been demonstrated, each of these standards is about a different concept/skill and verb/cognition.

For example, in the *English* draft achievement standards, Dimension 1:

- A: “**evaluates how choices** of text structures, language features, stylistic features and types of texts **influence or persuade** audiences”
- B: “**analyses** text structures, language features, stylistic features and types of texts **that influence or persuade** audiences”
- C: “**analyses the use of** text structures, language features, stylistic features and types of texts **when considering** audience”.

This assumes that regardless of the quality of the evaluation, the student should be awarded an A. Differentiating between B and C relies on the differences in “influence or persuade audiences” and “considering audience”. Taken together it suggests three different assessment tasks would be required to allow students to demonstrate the standards.

- Judgments about the quality of student achievements are made using standards that describe how well students have achieved the learning outcomes in a subject. The achievement standards in their current form frequently do not use any descriptors or qualifiers and so do not support teachers to make consistent, comparable, transparent and defensible judgments about the match between the qualities in a student response or folio and the standards descriptors.

For example, in *English* Dimension 2 “**experiments** with text structures” is the A standard with no indication of “how well” or to what effect. Most students, regardless of their level, would be able to “experiment with text structures” and without a qualifier that describes the evidence of how well this has been done “experiments” cannot be used to make a judgment about the “quality of performance”.

- Degree or qualifier words (how well) are not used to describe the element (what is being assessed) in any consistent way. In *English*, for example:
 - A: “makes **perceptive** selections” while B: “selects **relevant** contextual and textual examples”
 - A: demonstrates “**fluent, precise and nuanced** language” and B: demonstrates “**effective and controlled use** of language”.
- Degree words, when they are used, are not effectively stepped A–E in a meaningful way. For example:
 - A: creates texts that are “**pertinent** to purpose, context and audience”
 - B: creates texts that are “**relevant** to purpose, context and audience”
 - C: creates texts “**appropriate** to purpose, context and audience”.
- Some elements of the achievement standards are potentially inequitable as there are learning outcomes and content descriptions that are articulated only in the A standard. For example, “evaluating” is part of the content descriptions in all four units in English, but it appears only in the A standard.
- The dimensions used to organise the achievement standards (“Responding to oral, written and multimodal texts” and “Creating oral written and multimodal texts”) do not represent the salient and valued features of distinctive learning in senior secondary English subjects; rather, they derive from a literacy framework and could be applied to any subject.
- The achievement standards in their current form do not address understanding and control of textual features in any meaningful or significant way.
- A consistent issue raised in feedback relates to the use of two dimensions for the achievement standards. To collapse the learning outcomes into two rather than three dimensions works to conflate and thereby reduce the complexity and breadth of this learning, privileging some of this learning while diminishing or losing others, for example, understanding and control of textual features.

Way forward

Before they could work effectively in Queensland’s system of externally moderated school-based assessment, the achievement standards for the four English subjects will need to be significantly revised. This could be achieved by:

- reconceptualising the dimensions used to organise the standards so that they are the most important and valued characteristics of English subjects and can be used to organise the learning outcomes in an integrated way; for example, an overarching framework such as the context-text model of language could be used to identify the core knowledge, understanding and skills that are the important and valued characteristics of distinctive learning
- reconceptualising the learning outcomes and achievement standards under three dimensions to give a better balance to the learning outcomes and achievement standards, particularly in terms of “understanding and control of textual features”
- revising the learning outcomes to ensure they are organised using the same dimensions as the achievement standards
- ensuring that there is actual alignment between learning outcomes and achievement standards, that is, that they are clearly matched, one-to-one; the draft achievement standards in their current form are not consistently directly aligned to the learning outcomes and are not clearly and consistently matched, one-to-one
- ensuring that each of the standards articulates the element (the what) and the degree or qualifier (the how well).

4.5 General capabilities and cross-curriculum priorities

4.5.1 Representation of the general capabilities

The following summarises the feedback about the representation of the general capabilities in the four English subjects.

- Feedback on *English*, *Essential English* and *EAL/D* indicated that the general capabilities that naturally fit with these subjects are appropriately represented.
- Feedback on *Literature* stated that critical and creative thinking is not given sufficient emphasis in Units 1 & 2.

4.5.2 Representation of the cross-curriculum priorities

The following summarises the feedback about the representation of the cross-curriculum priorities in the four English subjects.

- The cross-curriculum priorities that naturally fit with these subjects are appropriately represented.
- *EAL/D* explicitly values writers and texts from Indigenous and backgrounds other than English. This is very important for *EAL/D* cohorts and is strongly supported.

Way forward

- Strengthen the links to and representation of the general capability “Critical and creative thinking”, in the English Curriculum, particularly the subject *Literature*.

4.6 Glossary

The following summarises the feedback about the glossaries in the four English subjects.

- Feedback on the glossary for *Essential English* indicated that the outlined comprehension strategies reflect what teachers could work with and provided a useful summary.
- “Aesthetic” is thinly and poorly defined.
- The concept of “voice” is narrowly defined as authorised voice. There is no mention of intra-textual or extra-textual voices, privileged and marginalised voices.
- Cognitive verbs used in the achievement standards need to be defined.
- There needs to be consistency in the definition of terms across F–12 Learning Areas and subjects.
- The meaning of the term “sustained”, in the context it is used in the draft curriculum, is not clear. It needs to be defined in the glossary.

4.7 Feedback specific to each English subject

4.7.1 English

Comments specific to *English* are summarised below:

- There are content descriptions that are not reflected in the achievement standards. For example, students are asked to reflect, but it is not valued in the achievement standards.

- Language skills are missing from the unit focus.
- Some of the content descriptions are not about content at all — producing a variety of texts is not a content description.
- The lack of specificity in Unit 3 is a very good thing. It is undesirable to impose specific content for English teachers in different parts of the country.

Achievement standards

- There is not sufficient difference between the standards — the difference between an A and B or a B and C is not clear.
- D-standard work can still include evaluation. It is how well students evaluate or analyse that needs to be described.
- In terms of cognitive demand within the standards descriptors, the demands at standards A and B seem appropriate.
- The C, D and E achievement standards are pitched too high. For example, the D standard looks quite proficient. “Explain” and “communicate” sounds fairly competent, yet a D level of achievement would not allow *English* to contribute to the Queensland Certificate of Education.
- Verbs need to be defined in the glossary.

Way forward

- Revise the learning outcomes and achievement standards to ensure that control of textual features is addressed in a more balanced and integrated way.
- Revise the pitch of the achievement standards, particularly for C, D and E.
- Define key terms such as verbs and descriptors like “nuanced” and “sustained”.

4.7.2 English as an Additional Language or Dialect

Comments specific to *English as an Additional Language or Dialect* are summarised below:

Units 1 & 2 and Units 3 & 4

- Some of the content descriptions are overly prescriptive. Specificity of content leads to too much content for one unit.
- Aspects of Unit 1 (e.g. references to “culturally accepted politeness”) are culturally insensitive.
- Unit one needs more reference to analysing. The idea that students gain an understanding of texts and their purposes is sound and a good place to start for ESL students who will have had less exposure to the “context, purpose, audience” aspects of English.
- Increasing complexity needs to be described in the intersection of task demand and text complexity.
- The progression of understanding and skills across units needs to be more clearly conceptualised.
- There is a concern that aspects of the document appear to be dictating pedagogy, for example, references to explicit teaching, and appear to be setting assessment requirements, for example, the reference to collaborative investigation in Unit 4.

Bridging Units 1 & 2 and Units 3 & 4

- Unit descriptions clearly describe the focus and scope for these units.
- The unit outcomes describe clearly the expected learning for these units but are not consistent across the 4 units.
- Units contain relevant and appropriate content (knowledge, understanding and skills) and an appropriate amount of content.
- The Bridging Units are logical and the learning outcomes are better than 1–4 (*EAL/D*) and there is a progression from Bridging Units 1–4.
- The inclusion of references to explicit teaching such as, “engage in group work” from communication skills should be removed as it is about pedagogy, not language. The inclusion of how to teach is not the place of a curriculum document.

Achievement standards

- The standards need qualitative descriptors to describe the differences across the standards. However, qualitative descriptors are included in aspects of standard D and E.
- The meaning of Dimension 2, standard E is not clear. It is not clear which text is meant and from whose point of view.
- Number and range of sources cannot be a differentiation across standards.

Way forward

- Revise aspects of Unit 1 that are considered to be culturally insensitive.
- Remove reference to “engage in group work” from communication skills as it is about pedagogy rather than language.
- Remove references to “explicit teaching” etc.
- Revise the achievement standards.

4.7.3 Essential English

Comments specific to *Essential English* are summarised below:

Units 1 & 2 and Units 3 & 4

- The unit description clearly describes the focus and scope for these units.
- There is not a clear informing framework that provides an overarching context for the learning outlined in the units, its purpose, and relevance for students.
- There is not a clear sense of what real-life learning for the 21st century needs to be for students. It needs to be clearer how this subject provides the flexibility to cater for a range of students.
- The amount of content to be covered in one semester unit is a concern across all units.
- There is concern about the amount of implied assessment in the number of texts to be created in each unit.
- There is not a clear sense of the connection or alignment between content descriptions, learning outcomes and their purpose and relevance both within individual units and across units. For example, Unit 4 outline mentions “synthesise” but does not relate this to anything in the content descriptions.
- There is not a clear sense of development across the four units.

- Many content descriptions appear to be a list of disconnected decontextualised skills. For example, in Unit 3, “distinguishing between facts and opinions” (which is addressed in the primary years) should be framed in a more cognitively challenging way and should be more complex than this.
- The opportunities for students to engage in critical thinking in Unit 4 should be happening in all units.
- Opportunities for students to engage with literature need to be more evident. Students should be able to understand themselves in their world and should have an opportunity to reflect through literature, as is the case in *English*.
- Feedback on the four unit structure for *Essential English* identified the following issues:
 - connections between the aims and units, specifically the unit descriptions, learning outcomes and content descriptions, are unclear
 - connections between and across the content descriptions are unclear and internal coherence is not evident
 - community, local and global texts should be woven through all four units, not just in Unit 4
 - opportunities for engagement with imaginative, persuasive, interpretive texts across different real-life contexts should be incorporated in all units.

Achievement standards

- Achievement standards are problematic in that the cognitive demands are different for different levels.
- There seems to be a hidden assumption about those taking the subject that places a “lid” on expectations and possibilities for students.
- There are no standards descriptors that distinguish between qualities or describe “how well”.

Way forward

- Revise the unit descriptions, learning outcomes and content descriptions so that there are clear connections between them; ensure that the learning described is real-life, developmental, relevant and meaningful for a range of students.
- Revise the achievement standards.

4.7.4 Literature

Comments specific to *Literature* are summarised below:

Units 1 & 2 and Units 3 & 4:

- There is no sense of developing complexity. For example, there is a large leap between Year 11 and 12. Units 3 & 4 seem to thrust students into concepts such as language in relation to power without the foundations being laid in Year 11.
- Feedback on the internal logic and coherence of the four unit structure of the draft *Literature* curriculum identified the following issues:
 - unit design encourages breadth rather than depth

- the current four unit structure relies on a knowledge-silo approach to learning that leads to studying aspects of literary endeavour in isolation with no sense of progressive skills development. The development of skills or the deepening of understandings is not evident. For example, Unit 4's focus on close textual analysis is something that should have been developed throughout the entire course as it is integral to literary studies
- considerations of form, contexts, intertextuality and representation should be addressed in every unit, with a gradual development of knowledge and skill sets pertaining to these areas of literary study. A sense of separateness does not encourage development of a sophisticated program
- close reading needs to be evident from the beginning, especially with the emphasis on “evidence based” argument
- the structure is not generative; concepts such as representation, for example, are covered in Year 8 and it needs to be clear these concepts are to be built on.
- The underlying rationale for the construct of the units and the order in which they occur is not clear.

Achievement standards

- There is not a clear alignment between rationale, learning outcomes, content, and achievement standards.
- The absence of qualities associated with different descriptors at different levels is a significant concern.
- There is little evidence of cognitive step-downs between different levels.

Way forward

- Improve the sequential development of the units so that there is increasing complexity and a clear sense of the developmental nature of the subject.
- Revise the achievement standards.

5. Mathematics

This section summarises feedback and recommendations for the four Mathematics subjects.

5.1 Strengths

The following strengths were identified in consultations about all four Mathematics subjects.

- Much of Queensland's previous feedback has been heard.
- The overall design is consistent. The draft senior secondary Mathematics curriculum is comprehensive and well presented.
- A clear overview of the subjects is provided in the organisation section.
- The combination of four courses caters for a diversity of needs and ability levels.¹¹
- The topics that are to be taught are clear.
- The topics and content of the courses are comprehensive.
- The courses have the potential to be rigorous and provide a sound basis for further study.

5.2 Rationale and aims of the subjects

The following summarises feedback about the rationales and aims of the four Mathematics subjects.

5.2.1 Rationales

- The rationales of the Mathematics subjects are generally viewed favourably. In most cases, they provide clarity about the focus of the subjects, their broad scope, nature and importance.
- The intended audience for *General Mathematics* is unclear. The rationale nominates "... students who have a wide range of educational aspirations...university or TAFE, as well as students wishing to undertake industry based traineeships or apprenticeships." This includes almost all students.
- The reference to discrete mathematics in *General Mathematics* assumes the reader understands the term "discrete" in this context.

5.2.2 Aims

- The aims are clear and succinct.
- The aims are broadly aligned to the dimensions of the Mathematics achievement standards.
- The aims are quite broad and as a result they do not give a full indication of the learning intended within the subject.

¹¹ However further work is needed in *Essential Mathematics* and *General Mathematics* in particular, to meet the needs of the students identified in their rationales. See sections 5.4.1, 5.7.3 and 5.7.4.

- The aims are not always reflected in the learning outcomes for each unit. For example, the use of appropriate technology is missing in most of these.

Way forward

- Further clarify the intended audience for each mathematics subject, in particular *General Mathematics*.
- Explain “discrete mathematics” in the rationale for *General Mathematics* when it is first used.
- Strengthen the links from the aims to the learning outcomes and the dimensions of the achievement standards.

5.3 Structure

The following summarises feedback about the structure of the four Mathematics subjects.

- The senior secondary Australian Curriculum mathematics is very compartmentalised which is inconsistent with the structure of the F–10 curriculum.
- There are concerns the four unit structure limits the internal coherence and logic of the subjects. For example, feedback about *General Mathematics* suggested Shape and Measurement would be better placed in Unit 1, while Matrices, which are currently in Unit 1, could potentially create a range of issues for students. There were a range of opinions on whether the study of matrices was appropriate to the needs of the target audience of *General Mathematics* at all. See section 3.2 for further issues with the unitised structure of the curriculum.
- The list of topics become conceptually more challenging in Units 3 & 4 compared to Units 1 & 2.
- *General Mathematics* arguably should have the strongest links to the F–10 curriculum. Whilst links can be found, the structure of *General Mathematics* shows minimal integration with the three strands of the F–10 curriculum.
- *Mathematical Methods* shows the clearest links to the F–10 Australian Curriculum.
- The learning outcomes for the units often do not refer to the aims related to the use of technology.
- As raised in section 3.3.2 the learning outcomes are not directly aligned to the achievement standards.

Way forward

- Organise the Mathematics subjects in topics in each Year level only. Remove the reference to Units.
- Strengthen the links to the F–10 curriculum.
- Review the content in each subject with further consideration given to the intended students, in particular *General Mathematics*.
- Write learning outcomes that more directly reflect the aims of each course. Pay particular attention to the “appropriate use of technology”.
- Organise the learning outcomes so they relate directly to the dimensions of the achievement standards and are directly aligned.

5.4 Content and achievement standards

5.4.1 Content

The following summarises the general feedback about the content of the four Mathematics subjects.

- There is too much content in all subjects.
- The learning outcomes are not directly aligned to the achievement standards. Without this alignment they are of very little value in the curriculum and will not be used to design assessment or learning experiences. See section 3.3.2 for more on this issue.
- Some of the content in *Essential Mathematics* and *General Mathematics* is not relevant to the students the rationales have identified.
- There is an overemphasis on distinguishing statistics as different from mathematics, especially in *Mathematical Methods*.
- Content descriptions are inconsistently written. Most have verbs that ask students to perform an action, such as: “construct and interpret position such as time graphs, with velocity as the slope of the tangent”, and others are just statements of content: “the natural logarithm $\ln x = \log_e x$ ”.
- There is a lack of consistency in importance or amount time required to teach each content description. They are of different orders. Some will take a series of lessons whilst others could be done within a lesson.
- Some content descriptions are too specific. For example: “the diagonals of a parallelogram meet at right angles if and only if it is a rhombus”.
- Use of digital technologies to meet the requirements of the content descriptions needs to be clarified.

Way forward

- Further refine the content descriptions to reduce the content. Depth is preferred to breadth.
- Align the learning outcomes directly to the achievement standards, organising them under the same dimensions: Concepts and Techniques, and Reasoning and Communication. For example, in Unit 2 of *Mathematical Methods*, the learning outcomes would look like:
 - **Concepts and Techniques**
By the end of this unit, students:
 - understand and apply concepts and techniques in algebra, functions, graphs, calculus and statistics to solve problems
 - use digital technologies to solve problems, and to graph, display and organise mathematical and statistical information
 - represent functions and relations in numerical, graphical and symbolic form
 - solve practical problems using mathematical and statistical models.
 - **Reasoning and Communication**
By the end of this unit, students:
 - solve problems that require the interpretation of mathematical and statistical information
 - analyse and interpret the reasonableness of results and solutions to problems
 - analyse results with consideration of the validity and limitations of the use of mathematical and statistical models
 - communicate observations and decisions

- recognise the inter-relatedness of different representations of mathematical and statistical information.
- When there is a one-to-one match between the learning outcomes and the achievement standards, the learning outcomes become a valuable set of statements for teachers to refer to when designing learning experiences and assessment tasks.
- Further refine the topics in *Essential* and *General Mathematics* in order to better meet the needs and interests of the students who would likely be undertaking these subjects.
- Further refine the content descriptions to be of a similar order and to be written consistently.

5.4.2 Achievement standards

The following summarises the general feedback about the achievement standards of the four Mathematics subjects.

On the whole, the elements addressed in the achievement standards do a reasonable job of capturing the aims of the subjects, including an attempt to qualitatively address the proficiencies of the subjects.

The use of the complexity (simple/multi-step) and/or familiarity (non-routine/non-standard, routine/rehearsed) of the problem or situation solved or investigated, to differentiate between levels of achievement is supported. This reflects the standards used in current Queensland Mathematics Syllabuses.

The dimensions

The link between the dimensions of the achievement standards and rest of the subject is unclear. From the section on the structure of the Mathematics subjects:

The achievement standards have been organised into two dimensions, 'Concepts and Techniques' and 'Reasoning and Communication'. These two dimensions reflect students' understanding and skills in the study of mathematics.

The statement that the dimensions reflect understanding and skills is misleading. It might be read that "Concepts and techniques" are understandings, and "Reasoning and Communication" are skills — similar to the organisation of the F–10 achievement standards. Both dimensions have a mix of understandings and skills, broadly: Concepts (understanding), Techniques (skill), Reasoning (understanding) and Communication (skill).

This is an inadequate description of each dimension. Each dimension should be given its own description as, for example, with the proficiency strands of the F–10 curriculum. Without this, demarcation between elements in the achievement standards is sometimes difficult.

As an example, consider the following achievement standard descriptors under the dimension, Concepts and Techniques:

- *Essential Mathematics*: "represents mathematical and statistical information accurately and precisely in numerical, graphical and symbolic form"
- *Mathematical Methods*: "represents varied functions and relations, accurately and precisely in numerical, graphical and symbolic form..."

These seem to be more appropriately placed under Reasoning and Communication. "Representing" information "accurately" and "precisely" is about skills in communication, more so than techniques. It is certainly not black and white as to which dimension they belong in. A four or five sentence description of each of these dimensions would help clarify them and demarcate between the two.

Alignment to learning outcomes

As is noted in section 3.3.2, the standards are not directly related to the learning outcomes. In order to ascertain to what level a student has achieved the learning outcomes of the subject, it is essential the elements of the standards are directly aligned.

Pitch

The pitch of the achievement standards is generally too high. In particular the C, D and E descriptors are of concern and require further refinement.

- In *Essential* and *General Mathematics* the concern is across A–E.
- In *Mathematical Methods* and *Specialist Mathematics* the concern is across C–E.
- The inclusion of the need to find the solution at D and E is problematic.

Two examples from *Mathematical Methods*:

- Reasoning and Communication C standard — Students at this level are unlikely to demonstrate the full range of the descriptor: “analyses results with consideration of the validity and limitations of the use of any mathematical or statistical models”.
- Reasoning and Communication E standard — Students at this level are unlikely to make “reasonable observations based on mathematical and statistical information”. They might “make statements about mathematical and statistical information”.

Some of the descriptors seem to describe a level of achievement that is difficult to distinguish relative to each other. For example, from *Specialist Mathematics* Units 3 & 4 Concepts and Techniques:

- reproduces and adapts previously seen proofs
- constructs proofs in familiar situations.

One of these is a C descriptor, the other a B. It is not clear which is which as “familiar situations” tends to be a C level descriptor, as does “reproduces and adapts”. Yet these are mixed across both B and C.

Quantitative degree words

There is an overreliance on using “quantitative” words to differentiate levels of achievement in the standards. That is, the standard descriptors refer to “how much” a student has done rather than “how well”.

- A: “understands and applies concepts and techniques”
- B: “understands and applies **most** concepts and techniques”
- C: “understands and applies **some** concepts and techniques”
- D: “**limited** understanding and application of **some** concepts and techniques”
- E: “**limited familiarity in**”.

This does not relate to a quality, but rather a quantity. It does not encourage the use of higher order thinking or applying mathematics to complex or unfamiliar situations. It asks teachers to track the number of concepts that a student is able to understand and apply.

Consistency and clarity

There are inconsistencies with the use of language in standards. Some examples include:

- “non-standard problem” versus “non-routine problems”

- “non-routine problems” used to describe A level performance in *Specialist Mathematics* and B level performance in *Mathematical Methods*, *General Mathematics* and *Essential Mathematics*.
- *Mathematical Methods* Standard A:
 - Units 1 & 2: “uses differential calculus **efficiently** and **effectively**” (3rd descriptor)
 - Units 3 & 4: “uses differential and integral calculus **effectively**” (3rd descriptor)
 - Units 1 & 2: “unfamiliar **contexts**” (4th descriptor)
 - Units 3 & 4: “unfamiliar **situations**” (4th descriptor).

It is not clear that there is an intended difference between any of these examples cited above, and if there is, why, and what it is, and how it is to be applied. All these terms need to be defined.

The different standards between Units 1 & 2 and Units 3 & 4 are not consistently organised in a way that will enable teachers to recognise and understand the subtle differences between them.

From *Specialist Mathematics* Concepts and Techniques dot point 2:

- A: “uses digital technologies **appropriately** and **skilfully** to solve non-routine problems, and to display and organise information **effectively**”
- B: “uses digital technologies **appropriately** to solve non-routine problems, and to display and organise information **effectively**”.

These descriptors are identical apart from the addition of “skilfully” in the A descriptor. It is unclear as to what the difference in student work would be between these two descriptors. Solving a non-routine problem is, by definition, skilful.

Some of the standards include: “...to solve a wide range of problems”. It is not clear if this refers to a range of complexity, a range of contexts/situations, or both.

Way forward

- Produce descriptions for each dimension that clearly explain their construct and delineate between the two.
- Given the different standards between Units 1 & 2 and Units 3 & 4, write and organise the standards descriptions consistently. They should be organised in the same order and use precisely the same terms to enable teachers to recognise and understand the subtle differences between them.
- Explicitly align the elements of the achievement standards with the learning outcomes.
- Review the pitch of the descriptors. In many cases they are pitched too high.
- Review the use of quantitative descriptions (some/most) to make decisions about a standard.
- Review the descriptors for consistency and clarity. The fewer descriptions for the same standard, the better.

5.5 General capabilities and cross-curriculum priorities

The following summarises the feedback about the representation of the general capabilities and cross-curriculum priorities in the four Mathematics subjects.

5.5.1 Representation of the general capabilities

- The general capabilities are not adequately or explicitly represented within the subjects. Beyond the front end of the curriculum, the descriptions of each unit do not incorporate the general capabilities. This seems limiting.
- *Intercultural understanding* and *Personal and social capability* are not given explicit opportunities to be developed.
- There are many lost opportunities across the four mathematics subjects to include examples of the *ICT capability*.
- There will be insufficient time to fully address the *ICT capability* in these subjects due to the volume of content to be taught.
- Aspects of *Numeracy* could be further strengthened and should perhaps incorporate reasoning and statistical analysis.

5.5.2 Representation of the cross-curriculum priorities

- The cross-curriculum priorities are not appropriately represented, and the curriculum states that they are “not overtly evident”. Feedback suggested these should be explicit, and that it would be useful to have more specific descriptions/examples of how these priorities can be incorporated into Mathematics. They cannot be called “cross-curriculum” priorities if one of the main learning areas does not deal with them.

Way forward

- Strengthen the links to and representation of the general capabilities and cross-curriculum priorities in the Mathematics Curriculum. The F–10 Australian Curriculum achieved this.

5.6 Glossary

The inclusion of a glossary is viewed very favourably. Further comments include:

- The glossaries are useful and comprehensive for terms in the content descriptions.
- The glossary does not contain the terms used to differentiate between levels of achievement in the standard. Terms such as “non-routine”, “effective” and so on, should be included.
- Terms defined differently in different states have are not being included. These should be included to develop a consistent understanding.

Way forward

- Expand the glossary to included terms used to differential levels of achievement in the achievement standards.

5.7 Feedback specific to each Mathematics subject

5.7.1 Specialist Mathematics

Comments specific to *Specialist Mathematics* are summarised below:

- What is expected to be taught is clear.
- Units 3 & 4 are more challenging than Units 1 & 2.
- There is too much content in the subject overall.
- Some of the content, such as the very difficult proofs covered in Unit 2 Topic 3, are a concern. Not because they are too hard but because there is no clear purpose for why students should be learning them.
- The inclusion of graph theory is questionable. This difficult content takes away from the time students could be devoting to developing a deep understanding of other topics.
- Overall there is too much emphasis on content and this limits the scope for establishing depth of understanding or coverage of application of content in context.

Unit 1

- Assuming the topics are taught in the order they appear in each subject, there is a concern that solutions of trigonometric functions is studied in *Specialist Mathematics* before it is in *Mathematical Methods*.
- The topic Circle properties is unnecessarily long.
- Content that is less engaging (e.g. recurrence relations) could be left until further in the course and not be at the beginning.
- There is too much emphasis on proof for the sake of proof.
- The unit description does not make links to the content descriptions as strongly as it should.

Unit 2

- There are 18 separate subheadings in this unit. Under these 18 subheadings are 70 separate content descriptions — which are intended to be taught in one semester. Given the nature of the content described, this is far too much. It is unrealistic to expect this to be taught in 50–60 hours to any depth.
- Topic 1, Trigonometry, places too much emphasis on proofs. Five are mandated.
- There is a concern that the content description: “find all solutions of $f(x-b)=c$ where f is one of \sin , \cos or \tan ” is taught in *Specialist Mathematics* before *Mathematical Methods*.
- Topic 4 contains too many content descriptions to be covered in the indicative time. A cursory coverage is all that would be possible for this topic. The relevance of this topic has consistently been questioned.
- There is too much content without a clear purpose. It is not clear, for example, why students should learn about “transformations in the plane” in this unit.
- Far too many basic trigonometric functions are covered in this unit.
- There is a significant emphasis on proofs, but with minimal use of modelling opportunities.

Unit 3

- This Unit has 57 separate content descriptions. There are too many to treat with any real depth.
- As was mentioned in section 5.4.1, there are inconsistencies in the expression of the content descriptions.
- Some of the content, such as “integration using the trigonometric identities”, could be considered to be of little interest to many senior secondary students.

Unit 4

- The volume of content required to be covered is unrealistic if depth is preferred over breadth.
- There will not be enough time to incorporate digital technologies.
- There is a lack of consistency in the importance or intent of individual content descriptions. For example:
 - constant and non-constant force
 - use digital technologies to carry out simple permutations of the response values in the collected data and calculate slopes to estimate the probability of obtaining the original observed slope or greater (in absolute value) assuming there is no linear relationship between explanatory and the response variable.
- The placement of statistics — Topic 2 — in Unit 4 of this subject is a concern. It bears little relationship to other topics in *Specialist Mathematics*. Moreover, there is a focus on statistics in *Mathematical Methods*. This is the last Unit and Topic of *Specialist Mathematics*. Topic 1 appears to be a culmination of the prior learning of the subject. Topic 2 seems to be an *ad hoc* addition.

Achievement standards

- In terms of cognitive demand within the standards descriptors, the demands at standards A and B seem appropriate.
- The C, D and E achievement standards are pitched too high.
- “Unfamiliar contexts” and “non-routine problems” are both used to describe the A standard. The intended difference is unclear.
- It is not clear if “a variety of situations” refers to the range of complexity or the ability to translate across contexts and/or applications.
- The C descriptor in Reasoning and Communication reads: “reproduces and adapts previously seen proofs”. To adapt a proof suggests to extend upon or modify. This is an overly ambitious C standard descriptor. This is further confused by the B description: “constructs proofs in familiar situations”. The “adapts” of the C descriptor is more challenging than the “constructs” used in the B, and the difference between “previously seen” and “familiar situations” seems marginal at best.
- The D standard descriptors such as “solving routine problems” and “recognising reasonableness of results” are too high in Reasoning and Communication.
- Care should be taken to use the qualifiers (analyse, solve, recognise, interpret, communicate, reasonable observations, etc.) consistently.
- The E standard descriptor “uses digital technologies to undertake routine calculations to solve familiar problems” in Concepts and Techniques is too high.
- Standards do not capture students’ creative, critical and independent thinking abilities.

Way forward

- Reduce the number of content descriptions to allow more time to focus on problem solving and reasoning.
- Revise content descriptions considering their relevance and purpose in the subject.
- Further refine the content descriptions to be of a similar order and to be written consistently.
- Reduce the number of subheadings with the topics to allow links between content descriptions to be seen more easily — such as, Complex numbers and The complex plane.
- Circle geometry is already covered in Year 10 A so remove from the Unit 1 of the senior curriculum and replace with Vectors from Unit 2 and include 3D vectors.
- Review sequencing in *Specialist Mathematics* and *Mathematical Methods*.

5.7.2 Mathematical Methods

Comments specific to *Mathematical Methods* are summarised below:

- The general development and makeup of *Mathematical Methods* was viewed very favourably, if overly devoted to statistics. It seems to provide a good preparation for students moving into various university courses that use Mathematics.
- The rationale was viewed favourably, with only two minor issues:
 - The rationale begins by creating a false dichotomy and treating mathematics and statistics as separate. Statistics is a subset of mathematics. The second paragraph captures the nature of this subject better — calculus and statistics.
 - It is very utilitarian and could further emphasise the inherent elegance of mathematics.
- The aims should include a statement about constructing mathematical models.
- Units 3 & 4 demonstrate an appropriate increase in cognitive demand from Units 1 & 2.
- Given that *Mathematical Methods* deals only with algebra, functions, calculus and statistics, the content (volume, depth and sequence) seems appropriate.

That being said, some feedback suggested there is an over-representation of statistics in the subject. The inclusion of inferential statistics (standard error and confidence intervals) and exponential probability density functions could be considered unnecessary in an over-crowded curriculum (even if they are examples of very useful mathematics).

- As noted in section 5.4.2 there are significant issues with the consistency of language used in the achievement standards and that the C, D and E achievement standards are pitched too high.
- Other comments include:
 - Unit 1 is well sequenced and explained through the content descriptors.
 - The topics in Unit 2, 3 & 4 that involve statistics could be labelled Statistics 1, Statistics 2 and so on, for consistency.

Way forward

- The rationale should recognise statistics as a subset of mathematics. The last sentence of the first paragraph should be changed to “Mathematics provides a framework ...”
- The statements in the F–10 Rationale and Aims — paragraph 2 — about the value and elegance of the subjects could be incorporated. “Mathematics has its own value and beauty and the Australian Curriculum: Mathematics aims to instil in students an appreciation of the elegance and power of mathematical reasoning.”
- Reconsider the over-emphasis on statistics in the subject.

5.7.3 General Mathematics

Comments specific to *General Mathematics* are summarised below:

- The rationale was viewed positively. However it was felt the content descriptions do not align to the intent of the rationale. Those who could successfully attain the content do not fit the described audience.
- There is conflicting information in the rationale and *Implementation Considerations* information statement.

The Implementation Considerations document states:

General Mathematics is designed for students who wish to undertake further studies in areas such as agricultural, health and social sciences, business and education, where mathematical knowledge facilitates problem solving and decision making.¹²

The rationale states:

The subject is designed for students who have a wide range of educational and employment aspirations, including continuing their studies at university or TAFE, as well as students wishing to undertake industry based traineeships or apprenticeships.

It is unclear who this subject is designed for.

- Using the term “discrete mathematics” to differentiate assumes people know what it means, which they may not.
- The aims do not really clarify the “level” of learning and how *General Mathematics* might be different to other mathematics subjects in the suite.
- The inclusion of a “use of technology” outcome would be more in keeping with the overall aims for the subject, particularly when the unit descriptions indicate access to technology is necessary to support the computational aspects of topics.
- The scope of each unit could be better explicated in the unit descriptions.
- The unit learning outcomes provide a broad expectation of the learning intended in the units. They are, however, not directly aligned to the achievement standards. As a consequence assessing to what degree a student has attained the learning outcomes is problematic (see section 3.3.2 and 5.4.1).

¹² Australian Curriculum Assessment and Reporting Authority 2012. *Draft Senior Secondary Curriculum – Implementation considerations*. ACARA, Sydney, accessed 22 May 2012, <www.acara.edu.au/verve/_resources/Info+Sheet+-+Implementation+Considerations.pdf>

- Units 3 & 4 are more challenging than Units 1 & 2. However, some parts of Units 1 & 2 are considered too demanding for some students in their present structure.
 - There are concerns with matrices and networks in Unit 1. These would be better placed in a later unit. Some of the matrices content (e.g. inverse matrices) seems to be at quite a high level for what appears to be the intended level of the course. Anything above their use for storage and basic manipulation applications is not appropriate for the intended cohort.
 - Shape and measurement could be better placed in Unit 1 to enable student success and engagement in the early stages of the course. This seems more in keeping with the rationale.
- Graph and networks goes too far (Euler paths and cycles, Hamilton paths and cycles, Prim's and Kruskal's algorithms) for this cohort of students.
- Some content descriptions ask students to “calculate” and others “determine”. The difference, if any, is unclear.
- There is a general consensus that the final structure should encourage early student success in the *General Mathematics* subject.

Unit 1

- A reference to the use of technology is missing from the learning outcomes.
- The relevance and appropriateness of including matrices in this unit is questionable.
- There are concerns with relevance and depth of Graphs & Networks 1. This topic seems superfluous to the needs of the students this subject is aimed at. The practical applications given do not necessarily require network theory.
- Students may become disengaged with the depth involved in matrices, graphs and networks in this unit. As such there are doubts over their likelihood of success.

Unit 2

- This unit is relevant and appropriate, the volume of content is reasonable and the content descriptions are specific. It is suggested that Unit 2 or much of its content would be better placed as Unit 1.
- The third learning outcome about statistical investigation, which states: “...requiring the comparisons of data collected for two or more groups”, seems very specific when compared to others.
- It is not clear if the emphasis in Statistics 1 should be placed on students being “users” or “creators” of statistical information.
- Some elements of Statistics 1 are thought to be too complex for the students likely to participate in this subject.
- There needs to be a greater indication of the scope of use of technology for calculation processes (rather than tedious algebraic manipulations).

Unit 3

- The content within this unit was not considered relevant and appropriate to the post school pathways described in the rationale.
- Topic 1: Statistics 2: Associations. The content seems to be of a very high level for the students this subject appears to be aimed at. Many content descriptions, such as associations, are not particularly relevant to students continuing on to a trade based career.

- Any statistics at this level should have a focus which is from the point of view of the consumer, rather than the producer, of the statistics.
- The use of arithmetic and geometric progressions at a fairly elementary level is appropriate. To extend it to include the Leslie matrices to calculate population changes and distributions over time seems out of proportion. Students taking an ecology course in a science degree might have a use for this, but not in a subject titled *General Mathematics*.
- Topic 2: Geometry and trigonometry. There is too much expected for the intended audience. This will become an exercise in number crunching and following rules. It is difficult to see the necessity in these students doing much of this work. Limit this to the trigonometry related to right angled triangles and simple applications to navigation, using bearings to true north, angles of elevation and depression.
- Topic 3: Modelling: discrete growth and decay. The content description “deduce a rule for the n^{th} term of a particular arithmetic sequence from the pattern of the terms in an arithmetic sequence and use this rule to make predictions” is not appropriate for the students intended to undertake this subject.

Unit 4

- Topic 1: Financial mathematics 2: Investments, loans and asset revaluation. The content description is considered to provide a good coverage of relevant and useful mathematics. For example, all financially literate persons must have some understanding of “Reducing balance loans (compound interest loans with periodic repayments)”. As is annuities and the concept of revaluing assets over time.
- This unit needs to make clear that financial applications should be technology-driven at this level and not focused on algebraic manipulations.
- Topic 2: Statistics 3: Time series analysis, is too demanding for the intended students. There is concern that students would disengage from learning with these challenging content descriptions. The learning emphasis for these students should be on the practicalities and interpretation of data.
- Topic 3: Graphs and Networks 2. Directed graphs and their applications is of a very high level. The depth of analysis involving adjacency matrices and finding the k^{th} power of a matrix is inappropriate. Analysing time series data is too complex for this level.
- 50–60 hours is insufficient time in which to teach this unit.

Way forward

- Clarify who this subject is designed for by providing a consistent description of the subject wherever it is described.
- The choices of topics and content descriptions should better reflect the intent of the subject as described in the rationale.
- Reduce the volume of content. Depth is preferred over breadth.
- Reduce the learning demands of many of the topics and content descriptions identified as too high level and/or irrelevant.
- Include a reference to the use of technology in learning outcomes when it is relevant to the unit.
- Any statistics at this level should have a focus which is from the point of view of the consumer, rather than the producer, of the statistics.

5.7.4 Essential Mathematics

Comments specific to *Essential Mathematics* are summarised below:

- There has been a significant improvement in this subject since previous drafts. In particular the rewriting of content descriptions which now do not specify the context in which the units are to be taught. The core content should be prescribed, but teachers should exercise their professional judgment in choosing contexts which suit their students' interests.
- The "Examples in context" section for each of the topics was viewed very favourably. Teachers should now have the flexibility to teach the agreed content in a context that will be relevant to their students; and they have clear examples for the types of contexts that would be relevant to the content.
- *Essential Mathematics* does not emphasise enough the many opportunities where hands-on learning could be included.
- If this subject is intended for all students then numeracy should be discussed in the rationale.
- There are many instances where the requirements of the subject would appear to be above those of the expected strengths and skills of the intended students. For example: "interpret and obtain the equation for a straight line graph in the form of $y = mx + c$ ". It is appropriate that students are able to interpret a straight line graph, but it should not be necessary for them to obtain it.

This is the lowest level of mathematics offered in the senior secondary Australian Curriculum, but it is still too high for many students. The curriculum needs to be much clearer about its intended target audience.

- The volume of content in the two years is far above what can reasonably be expected to be covered with deep understanding, especially in Units 2 and 3. Less content and more appropriate content is preferred.
- This course should provide students with lots of opportunities to engage with technology to support their mathematical understandings. Feedback has asked for more guidance on the use of technology in this subject.
- The aims imply that statistics is half of the subject. This is not the case and creates a false dichotomy. The topics within *Essential Mathematics* align more closely to the F–10 strands Number and Algebra, Measurement and Geometry, and Statistics and Probability.
- Very little financial mathematics has been covered in the subject, which contradicts the rationale of developing competent citizens. Given the lack of coverage of financial mathematics in the F–10 curriculum this subject should have a very high emphasis on this.

Unit 1

- There is an over emphasis on conversions of units.
- The level of content and time is appropriate if digital technologies are used.
- One of the aims of the subject is "capacity to choose and use technology appropriately". Technology is only specifically incorporated into Topic 4: Graphs. This sends a confusing message. The other topics do not explicitly state that technologies should be used, when of course, they could be, and given the aims, should be.
- There is concern about Topic 3: Algebra. It should be made clear that this remains at the level of substituting values into expressions and formulae.

- Topic 2: Measurement, involves students finding areas of triangles and rectangles. This would be done using formulae. Therefore, it would make the sequence more logical to place Topic 3: Algebra before Topic 2.

Unit 2

- This unit has a logical progression of topics.
- The whole unit is far too big, with too many concepts for students to learn. There will be little time for developing a deep understanding and applying to relevant real-life situations.
- There is concern about the step up of the statistics from Year 10.
- There is too much emphasis on outliers. Most of the statistical interpretation is too abstract for this level of mathematics.
- Summarising and interpreting grouped and ungrouped data can be tedious and is covered in Year 10.
- Quartiles are also content covered in Year 10 Mathematics, as are box plots and using them to compare data sets.
- The need to convert rates such as km/hr to m/s is questioned.

Unit 3

- Unit 3 contains interesting mathematics that should be relevant and engaging for students. However, there are too many concepts for students to learn in the time given.
- There is no need for students in this subject to find the equation of a line parallel to another line.
- Content descriptions that ask to solve problems with sine/cosine are inappropriate.

Unit 4

- There appears to have been an attempt to acknowledge that there is less time available in schools for the last unit in Year 12.
- The contexts appear to be incomplete. There is no reference to Topic 2.
- There is no opportunity to explore credit options or insurance. There is an over-emphasis on compound interest. Financial literacy is not well covered in the F–10 Mathematics curriculum and should be more developed in this subject.

Achievement standards

The achievement standards are pitched far too high.

- The standard for an A is too high as there is a great deal of higher order thinking required.
- The standard for a B is too high because of the requirement for non-routine, consider complex familiar which would be more achievable.
- The inclusion of “reasonableness of a result” at a D standard is inappropriate.
- There is a significant step up from Units 1 & 2 to Units 3 & 4. The achievement standards in Units 3 & 4 would be very difficult for students to achieve higher than a C.
- The use of many complex descriptors in each statement makes them difficult to interpret.

- Some of the words used to distinguish the A from the B do not clearly show the difference, for example the use of the terms “non-standard” problems versus “non-routine” problems.

Way forward

- Revise *Essential Mathematics* to emphasise the many opportunities where hands-on learning could be included.
- Remove the reference to mathematics and statistics as separate entities.
- Clarify the students for whom this subject is designed.
- Review the volume and level of difficulty of content.
- Further develop the financial mathematics. Remove the emphasis on compound interest and replace with more important financial literacies.
- Clarify the use of digital technologies including calculators.
- Move to Year 12 some of the representing and comparing data in Unit 2.
- The three examples in context for algebra are really using formulae for Topics 1 and 2. This suggests that Topic 3 should either:
 - come first (although there is an understanding that starting with algebra could disengage students)
 - or
 - be taught simultaneously with Topics 1 and 2.
- Remove right-angled triangles from Unit 3: Topic 2.
- Remove straight line graphs from Unit 3: Topic 3.

6. Science

This section summarises feedback and recommendations for the four Science subjects.

6.1 Strengths

The following strengths were identified in consultations about all four Science subjects.

- It is clear that much of Queensland's previous feedback has been heard.
- The overall design is consistent across all senior sciences. It is comprehensive and well presented.
- A clear overview of the subjects is provided in the organisation section.
- The statement "the three strands of the Australian Curriculum: Science should be taught in an integrated way" is an important inclusion. This reinforces links to the F–10 Science curriculum and is an important aspect of a high quality and engaging science education.
- Generally the rationale and aims articulate why students should study the Science subjects.
- The Science Understanding strand addresses most of the typically expected content and issues in the respective subjects. There has been an attempt to address contemporary issues, research and applications.
- There are clear links in content between F–10 and senior secondary.
- Science Inquiry Skills are written for an entire unit based on the generic science inquiry skills. The generic Science Inquiry Skills and the subject specific descriptions work well.
- Achievement standards are organised in distinct bullet points across five levels for Units 1 & 2 and for Units 3 & 4.
- The Science Inquiry Skills achievement standards are common across the suite and Units 1 & 2, and 3 & 4, and link to the Science Inquiry Skills strand.
- The Science as a Human Endeavour component of the "Concepts, models and applications" dimension of the achievement standards are the same across all subjects. These are organised in terms of the nature of science and the application of science and are the same in all the science subjects and pairs of units. It is recognised it is the content and context to which they are applied that is different.

6.2 Rationale and aims of the subjects

The following summarises feedback about the rationales and aims of the four Science subjects.

6.2.1 Rationales

- The rationales read well for each subject and have significantly improved on previous versions. They clearly communicate the purpose, intent and scope of each subject.
- Some language is convoluted at times, with sentences that run for three lines. These could be more direct.

6.2.2 Aims

- The aims have significantly improved on previous versions.
- The aims represent an appropriate and achievable set of broad outcomes that appear to be pertinent to science students in the senior phase of learning.
- The aims generally follow on logically from the rationales. There is further opportunity to tighten this up. For example, the *Chemistry* aims refer to “principles”, “laws”, and “theories”, but there is no mention of this in the rationale.
- Aims that relate to scientific literacy or generic science understandings and skills are well supported. However, some feedback argued that subjects could include some more specific aims. The aims in *Chemistry*, for example, could further articulate the unique aspects chemistry and the types of thinking process required to understand chemical concepts.
- The last aim of all the science subjects is partially about communication. They are inconsistent with one another for no obvious reason.
 - *Biology*: “appropriate language, nomenclature and representations”.
 - *Chemistry*: “appropriate representations, language and nomenclature”.
 - *Earth and Environmental Science*: “appropriate language, nomenclature and representations”.
 - *Physics*: “appropriate genres including reports, essays and multimedia presentations”.

Of all the aims across the senior sciences this one should be the same. The *Physics* aim refers to specific genres (reports, essays and multimedia presentations). This is inappropriate.

Way forward

- Further strengthen the links of the aims of a subject to the rationales.
- Where possible and appropriate, further articulate the unique nature of a subject in the aims.
- Rewrite the last aim of each science subject so they are identical in their description of the elements of scientific communication. Do not refer to specific genres as is the case in *Physics*.

6.3 Structure

The following summarises feedback about the structure of the four Science subjects.

- There is a clear link between the draft Australian Curriculum senior secondary science subjects and the F–10 Science Curriculum.
- The content descriptions of the Science Understanding, Science as a Human Endeavour and Science Inquiry Skills strands have been written so that integration is possible in each unit.
- As noted in section 3.3.2 there is a lack of alignment between the learning outcomes and the achievement standards. This means that the achievement standards cannot be used to make a direct judgment about student work with respect to the learning outcomes. The learning outcomes are of limited use in the unit.

- The design specifications of the curriculum do not make clear what the relationships are between the key elements: aims, the unit learning outcomes and the achievement standards at the end of each pair of units.
- There are issues with the sequencing of content. These issues would disappear if the curriculum was not organised in units.
- There is diminished flexibility with the current unit structure. A year level structure would allow schools to select a context that draws on content from other topics.
- There is still too much content to properly follow an inquiry approach. This is especially problematic in Unit 4, which is significantly shorter in time. The removal of the unit structure would go some way towards ameliorating this. Schools would have further flexibility to balance the content in Year 12 in a way that suits their circumstances.
- The content descriptions generally indicate an increase in complexity and challenge from Units 1 & 2 to Units 3 & 4. However there is rarely a match in the concepts, topics and content from Units 1 & 2 to Units 3 & 4. As such, composite classes are impossible using the current subject structure. There is no capacity to differentiate content in composite classes, or develop teaching programs that use the same context for Year 11 and 12 students at the same time.

In looking at the topics within these units, there is no fundamental reason this has to be the case. Each unit could be described at Year 11 and Year 12 level of cognitive demand to allow units to be applied more flexibly over the two years. This has been successfully achieved in Queensland's current suite of senior science syllabuses and would allow the senior secondary Australian Curriculum science subjects to be offered to smaller cohorts in composite classes.

- A scope and sequence for each subject — similar to that provided for F–10 — would be useful in helping show how the major concepts have been developed through the content descriptions.

Way forward

- Remove the unit structure and write content descriptions for Year 11 and Year 12. These could still be organised as topics.
- If the unit structure is to remain. Provide a clear and unambiguous statement in the curriculum that the units and topics within the units are able to be re-ordered. So long as the content descriptions and achievement standards for Units 1 & 2 are taught and assessed in Year 11 and those for Units 3 & 4 are taught and assessed in Year 12.
- Provide a scope and sequence for the content descriptions, as has been done for the F–10 curriculum.

6.4 Content and achievement standards

6.4.1 Content

Feedback has consistently stated that the senior secondary Australian Curriculum: Science is too prescriptive and lacks flexibility. It will limit opportunities for students and teachers to choose contexts that are personally relevant. This is at odds with the recommendations found in science education literature and reports. From a recent report that investigated the decline in the proportions of high school students choosing senior physics, chemistry and biology courses in Australia and the influences on Year 10 students' decisions about taking science subjects in Year 11:

Recommendation 2: That the Australian Curriculum, Assessment and Reporting Authority (ACARA), federal, state and territory education authorities and others relevant stakeholders ensure the new National Science Curriculum reflects teachers' and students' recommendations for increasing enrolments by making school science learning experiences more interesting, practical and personally relevant.¹³

The basis of this recommendation was the finding that more than half of the students that did not continue with science in Year 11 found junior high school science to be uninteresting. Science teachers' recommendation was that science classes need to be relevant, interesting and enjoyable. Contextualised learning and students' recommendations about the types of things they would like to investigate, the experimental and practical work they would find enjoyable, should be taken into consideration.

The draft senior secondary Australian Curriculum includes content descriptions, in particular in the Science as a Human Endeavour strand, that are intended to contextualise learning. However, this fundamentally misunderstands the issue by conflating learning in context with learning content.

Meaningful contexts by definition cannot be prescribed. Attempts to do this in science education have failed. For example, when technology and industrial tasks were introduced into chemistry curriculum in order to introduce meaningful and relevant contexts, their success was limited. Chemistry teachers' own experiences meant they were being asked to teach using contexts that were largely unfamiliar to them. As a consequence they focused on the task itself rather than providing an opportunity for students to experience the work of a chemist.¹⁴ This research demonstrates the challenge of introducing contexts that are meaningful.

Contexts are given meaning when there is a shared understanding, between all involved, of the context. When the context is not familiar, the limited understanding of the context means teaching and learning will be artificial and cursory.

The level of prescription found in the Science as a Human Endeavour content descriptions means there will be many teachers who will be asked to teach contexts that are unfamiliar to them. There have been improvements, most content descriptions are phrased using "such as" and "for example". However, Science as a Human Endeavour is still too specific and will be limiting for schools when developing units of work.

¹³ Lyons, T & Quinn, F 2010, *Choosing Science: Understanding the declines in senior high school science enrolments*, University of New England, Armidale, pp. ii–iii, accessed 5 Aug 2011, <www.une.edu.au/simerr/pages/projects/131choosingscience.pdf>

¹⁴ Corrigan, D 2006, *No wonder the kids are confused: the relevance of science education to science*, Australian Council for Educational Research, Camberwell, accessed 10 Oct 2010 <http://research.acer.edu.au/research_conference_2006/6>.

Consider the following example from *Physics Unit 2, Models of force and linear motion*:

Newton's laws of motion inform the design of, and safety legislation for, vehicle construction, and enable prediction and analysis of the relative safety and efficacy of vehicle structures under a range of circumstances (for example, collisions)

Car safety is a context for learning about the physics of motion. It should not be specified content. As the research above suggests, forcing teachers and students with no interest in vehicle safety, construction and legislation, to learn about motion in the context of cars, will result in a superficial and cursory treatment of the subject matter.

This is further compounded by the other Science as a Human Endeavour content description in this topic:

Accepted approaches to scientific inquiry change over time as new approaches are shown to provide valid, reliable data and contribute to model and theory development (for example, Galileo's use of reductionism, thought experiments and experimental data to develop an explanation of motion and its causes challenged the dominant Aristotelian explanation)

We now have two different mandated Science as a Human Endeavour statements that require teaching the same Science Understandings in two different ways. It would be far preferable for a teacher to choose one of these Science as a Human Endeavour statements to develop a deeply contextualised program of learning, rather than one that superficially touches on both of these.

A sample of comments received on this issue includes:

- There is no choice within the content. There is no choice for professional teachers in the way they choose the *Physics* concepts to present to students.
- Many schools have resourced particular contexts and now with this curriculum there will be no choice. Many schools will need to buy new equipment (which they may not be able to do) or not do the topic. Many schools will have to abandon the high quality, engaging and rigorous units they have developed over many years.
- There is no flexibility or room for tailoring learning to local contexts. Mandate the key understanding and allow schools the flexibility to decide on the rest.
- There has been some improvement since the last version we saw, especially the use of "for example", instead of "including". This approach should continue.
- Science as a Human Endeavour content descriptors should be more overarching, relevant to the whole unit as with the Science Inquiry Skills, rather than for each section with each unit.
- Specific Science as a Human Endeavour examples should be provided, but not mandated.

Other feedback related to the content of the science learning area included:

- As the learning outcomes are not matched one-to-one to the achievement standards they serve no real purpose.
- There are flaws in the sequencing of content. (The removal of the unit structure would go a long way to dealing with this issue. See sections 3.2 and 6.3.)
- Some content descriptions are too specific and some are too general.
- The amount of content may not allow time to do extended scientific investigations (see section 6.7).

- Some content descriptions name specific equipment and investigations. This is of serious concern. Many of these require equipment/resources unavailable in some schools. This is a particular issue for distance education students. Including specifics like Geiger counters, data loggers, gas spectroscopy, and similar, would preclude distance education students from doing the subject. Content descriptions that name equipment should be changed from “including”, to “such as”.
- Specific discussion of sources of experimental error should be included somewhere — especially systemic and random errors. This is evident in the F–10 Science curriculum and needs to be carried through to senior secondary.

Way forward

- Do not mandate contexts. Many of the Science as a Human Endeavour descriptors have been improved, however, the requirement to teach them all means the likelihood of delving into any one of them to any depth is unlikely.
- Mandate the Science Understanding and Science Inquiry Skills, but not all the Science as a Human Endeavour content descriptions. Instead, require that a minimum number of them be taught. Specify that the Science as a Human Endeavour content descriptions are intended to be used to develop contextualised learning.
- Consider using an organisation similar to that provided in *Essential Mathematics*, which mandates the content within separate topics, and states that: “It is intended that the topics be taught in a context relevant to students’ needs and interests.” Each topic in *Essential Mathematics* has an associated section called “Examples in context”. These are not prescribed but provide teachers with excellent examples of how the content could be taught. This approach would be very successful in the sciences.
- Remove the reference to units and write content descriptions for Year 11 and Year 12.
- Write learning outcomes that match the achievement standards one-to-one.
- Further refine the content descriptions with the view of reducing the content. Depth is preferred to breadth.
- Further refine the content descriptions to be of a similar order and to be written consistently.
- Revise content descriptions that name equipment or investigations from “including”, to “such as”.

6.4.2 Achievement standards

The following summarises the general feedback about the achievement standards of the four Science subjects. The issues raised in section 3.3 apply to the science subjects.

The dimensions, Concepts, Models and Applications, and Inquiry Skills are supported. It is appropriate and logical; linking to the strands Science Understanding, Science as a Human Endeavour and Science Inquiry Skills. That being said, the use of two dimensions is problematic (see section 3.3.2).

The unified approach to the achievement standards across all four sciences is supported. Using systems, models and theories to describe the aspects of Science understanding, in the Concepts, Models and Applications dimension, works well.

Keeping the same aspects of the achievement standards for Science as a Human Endeavour and Science Inquiry Skills in Units 1 & 2 and Units 3 & 4 is supported. Feedback recognised that the increase in complexity and demand should come naturally from the subject matter being studied or the context.

Concept/skill

Changing the concept/skill needs to be considered carefully. This can be an effective way of discriminating student performance. However the variations in the concepts from A–E need to be aligned and correctly nested. This is often not the case. Consider the first two descriptors of the Physics Concepts, Models and Applications standards:

C	D
<ul style="list-style-type: none">describes the relationships between components and properties of physical systems qualitatively	<ul style="list-style-type: none">describes how components of physical systems are related
<ul style="list-style-type: none">describes energy transfers and transformations in physical phenomena and associated technologies qualitatively	<ul style="list-style-type: none">describes the observable properties of physical systems and how they are affected by change

The concept at D in the second descriptor no longer matches the C. If anything it now matches the descriptor above it. As a consequence it is not aligned and is close to redundant.

Verbs/cognitions used to differentiate between levels

Where a given achievement level descriptor only differs by one of the verbs to define the level, there is insufficient difference to provide a basis for decision making. Consider the following A and B descriptors from *Chemistry*:

- A: “**analyses** the relationships between structure, properties and interactions of matter at the macroscopic, molecular and atomic scales including energy transfers and transformations”
- B: “**explains** the relationships between structure, properties and interactions of matter at the macroscopic, molecular and atomic scales including energy transfers and transformations”.

The difference between the A and B is the difference between “analyses” and “explains”. “Analyse” means: “consider in detail for the purpose of finding meaning or relationships, and identifying patterns, similarities and differences”. “Explains” means: “provide additional information that demonstrates understanding of reasoning and/or application”.¹⁵ Distinguishing between these in student work will be challenging and is problematic.

This is further compounded in that adhering to the definitions above, these terms are asking the student to do two different things. Setting a task that requires “analysis” is different to one that requires “explanation”.

Minimal use of quality words

The achievement standards for Concepts, Models and Applications do not use degree words to differentiate levels of achievement. They rely solely on changing the verb and concept. This is problematic. It will likely lead to closed recipe style, follow the procedure and obtain the known results style of investigations, if scientific reports or extended scientific investigations are used for assessment purposes.

¹⁵ Australian Curriculum Assessment and Reporting Authority 2012. *Foundation to Year 10 Achievement Standards Glossary of verbs*, ACARA, Sydney, accessed 11 July 2012, <www.australiancurriculum.edu.au/Static/docs/history/3.0/Glossary%20of%20Verbs%20-%20F-10%20Achievement%20Standards.docx>

These descriptors essentially provide a list of things related to the content that should be in a student's report. In giving students advice about their work, a teacher would be remiss in not ensuring all their students cover all aspects of the A descriptor.

These descriptors do not give sufficient indication of the complexity or depth of the situation they should be applied to. Consider an investigation that requires students to “analyse energy transfers and transformations in physical phenomena and associated technologies qualitatively and quantitatively”, specifically an assessment that asks a student to quantitatively and qualitatively analyse the energy transfers and transformations involved in the Giant Drop amusement park ride at Dreamworld.

Automatically this is at the “A standard”. It is quantitative (Gravitational Potential Energy lost ($mg\Delta h$) = Kinetic Energy gained ($\frac{1}{2}mv^2$)). It is qualitative (make statements about transformation of energy and the associated free-fall of the ride). It is a physical phenomenon (free-fall) and associated technology (amusement park ride). This meets the A description for the draft Australian Curriculum achievement standards, but is a simple scenario. Queensland physics teachers would not consider this to be an example of high level work as it would not meet Queensland's current description of the A standard.

The complexity of the concept and the level of the cognition should remain as one of the variables that can differentiate a level of achievement. However, it is essential that teachers can make a judgment about “how well” a student has analysed or evaluated or explained a concept using their science understandings (for example). Not just whether they did it or not.

Other issues

Other points raised in feedback about the science achievement standards include:

- Some of the descriptors used in the standards are not clear in terms of what a student would need to do to achieve them. For example, in *Chemistry*: “explains how chemistry has been used to meet diverse needs and inform decision making; and the social, economic and ethical implications of these applications.” This is an overly broad description. It is difficult to envision what one would see in student work that demonstrates this descriptor.
- By using “evaluate” as a key cognition, some A descriptors in Concepts, Models and Applications are unrealistic. Consider:
 - evaluates the theories and models used to describe chemical systems and processes; the supporting evidence; the phenomena they can be applied to; their limitations and assumptions
 - evaluates the origins and significance of key findings and the role of technologies, debate and review in the development of concepts, theories and models.

Evaluate means: “examine and judge the merit or significance of something”. A student could not realistically evaluate an established scientific model. It has been argued that most actual scientists don't evaluate scientific models.¹⁶ The same problem exists with the second descriptor above. Asking this of Years 11 and 12 students is completely unrealistic.

These would be more appropriate in an undergraduate history and philosophy of science subject, and even then most students would find this challenging. The B descriptor uses “explains”, which is more reasonable. It is also reasonable to ask that students use a scientific model to explain phenomena or evaluate a claim related to phenomena.

¹⁶ Kuhn, T 1962, *The Structure of Scientific Revolutions* (3rd ed.), University of Chicago Press, Chicago.

- It is not clear if the first standard descriptor in Science Inquiry Skills: “designs and conducts safe, ethical investigations that enable the collection of valid data in response to a specific question, hypothesis or problem” relates to the actual data collected or for students to actually collect primary data. It could be interpreted that students only need to design and conduct an investigation that *could* collect data.
- The Science Inquiry Skills “design and conduct” standard is problematic in its scaling from E to A.
- It is difficult to see how teachers could realistically differentiate between the A and B for the final standard of Science Inquiry Skills:
 - A: “communicates clearly and accurately in a **wide range of modes**, styles and genres (including scientific reports) for specific audiences and purposes”
 - B: “communicates clearly and accurately in a **range of modes**, styles and genres (including scientific reports) for specific audiences and purposes”.

In both cases the student has demonstrated they can communicate clearly and accurately, for specific audiences and purposes. The increase from a “range of modes” to a “wide range of modes” is not an appropriate discriminator.

- The E standard in many cases is too high. “Identify” should be used as the verb in the E descriptors, not “describe”.
- Key language used inconsistently across standards, e.g. “Laws” is only used in Year 12. It is not clear why only theories and models are used in Year 11.

Way forward

- The key concept standard descriptor should remain constant as one moves up and down from the C descriptor. This will ensure alignment and appropriate nesting. The following from *Earth and Environmental Science* serves to illustrate this point:

	A	B	C	D	E
Current standards descriptors for Units 1 & 2	analyses how the components of the Earth system have changed over time, and how these changes have been shaped by interactions between the Earth spheres	explains interactions between the Earth spheres and how the components of the spheres have changed over time	describes the components of the Earth spheres	identifies the components of Earth spheres	identifies some parts of the Earth system
Standards descriptors rephrased, keeping the key concept the same A to E	analyses the components of the Earth spheres , their interactions and how they have changed over time	explains the components of the Earth spheres , their interactions and how they have changed over time	describes the components of the Earth spheres , their interactions and changes over time	identifies the components of Earth spheres	identifies some components of Earth spheres

- Use quality words in the Concepts, Models and Applications dimension to appropriately differentiate levels of achievement.
- Ensure the concepts are more complex when moving up from C to A, not just that there are more of them.
- Rewrite the achievement standards taking into account the reasonableness of expecting students to be able to demonstrate the descriptor. Pay particular attention to “evaluate” in the Concepts, Models and Applications A descriptors.
- Write a Science Inquiry Skills standard that clearly asks students to collect primary data.
- For the final standard of Science Inquiry Skills, consider using for the A, B and C descriptors:
 - A: “communicates clearly, accurately and purposefully in a range of modes, styles and genres (including scientific reports) for specific audiences”
 - B: “communicates accurately and purposefully in a range of modes, styles and genres (including scientific reports) for specific audiences”
 - C: “communicates accurately in a range of modes, styles and genres (including scientific reports)”.
- Use “identify” as the verb in the E description, not “describe”.
- Check for language consistency.

6.5 General capabilities and cross-curriculum priorities

The following summarises the feedback about the representation of the general capabilities and cross-curriculum priorities in the four Science subjects.

6.5.1 Representation of the general capabilities

- The opportunity for the science subjects to continue to build students literacy and numeracy seems understated.
- *Critical and creative thinking* emphasises critical thinking, with limited reference to creative thinking skills relevant to science.
- *ICT capability* does not mention the opportunities in science related to data loggers.
- It is not clear why *Intercultural understanding* and *Personal and social capability* do not get their own descriptions. It was possible to do this for them with the F–10 Australian Curriculum.
- The content descriptors do not obviously identify the general capabilities.

6.5.2 Representation of the cross-curriculum priorities

- The cross-curriculum priorities do not “naturally fit” into some subjects. *Earth and Environmental Science* deals with them the best.
- Indications of specific links in the content to specific priorities (as in the F–10 curriculum) are important.
- The links to *Sustainability* could be made more explicit in the unit or content descriptions.

Way forward

- Strengthen the *Literacy* and *Numeracy* descriptions.
- Expand the descriptions of *Critical and creative thinking* and *ICT capability*.
- Write a description for *Intercultural understanding* and *Personal and social capability*. If it is possible for teachers to “...develop the general capabilities of *Intercultural understanding* and *Personal and social capability*...” it should be possible to write a description for each of these, as has been done for the other general capabilities.
- Identify in the curriculum content descriptions, where there are opportunities to deal with the general capabilities and cross-curriculum priorities.

6.6 Glossary

The inclusion of a glossary is viewed very favourably. Further comments include:

- It is comprehensive with the exception that all terms used as discriminators in the achievement standards are not included.
- It is important to explain whether the word “including” means a mandatory requirement or a suggestion.
- The definition of “law” is weak.
- Theory refers to “proven” hypotheses. This mischaracterises science. Hypotheses can never be “proved”.
- Research should include some reference to attributing ownership.
- Simulations can represent idealised situations.

Way forward

Expand the glossary to include terms used to differentiate levels of achievement in the achievement standards.

Consider the following revisions to these glossary entries:

- Hypothesis: A tentative explanation for an observed phenomenon, expressed as a precise and unambiguous statement, that can be supported or refuted by experiment.
- Law: A statement describing invariable relationships between phenomena in specified conditions (frequently expressed mathematically).
- Qualitative data: Information that is descriptive and not numerical in nature.
- Research: To locate, gather, record, attribute and analyse information in order to develop understanding.
- Simulation: A representation of a process, event or system which imitates a real or idealised situation.
- Theory: A group of concepts, claims and laws that can be used to precisely, accurately and coherently explain and predict natural phenomena. A theory should include a mechanism that explains how it works.
- Trend: General direction in which something is changing or characteristic pattern or relationship between variables.
- Expand the description of System to include “closed” and “open”.
- Provide a description for “causal relation”.

6.7 Extended Scientific Investigations

Queensland's current senior secondary science syllabuses have a once a year mandated open ended extended experimental investigation. This aligns with the draft senior secondary Australian Curriculum statement:

The Senior Secondary Science subjects have been designed to accommodate, if appropriate, an extended scientific investigation with each pair of units. States and territories will determine whether there are any requirements related to an extended scientific investigation as part of their course materials.

This statement in the curriculum is strongly supported. However, the current unitised design of the science subjects, and the volume of content expected to be covered, would make offering a meaningful extended scientific investigation challenging.

The report, *The Status and Quality of Year 11 and 12 Science in Australian Schools* found that many senior secondary science teachers and students feel their current state and territory curriculums are overcrowded and content-laden, with little room for flexibility. This content-laden curriculum encourages science in Year 11 and 12 to be taught in a “traditional” way; the majority of science students spending every lesson copying notes from the teacher and never or seldom having chance to pursue a self-determined area of interest.¹⁷ The design of the senior secondary sciences will only exacerbate this.

The same report notes that teachers in states that currently offer assessable open-ended student investigations have concerns with the demands of these on both students and teachers.

While the report clearly identifies the impact of an overcrowded and abstract curriculum in Year 11 and 12 science courses, it also challenges us to consider the purpose of science learning during these senior years of secondary education.

¹⁷ Goodrum, D Druhan, A & Abbs, J 2011, *The Status and Quality of Year 11 and 12 Science in Australian Schools*, Australian Academy of Science, accessed 10 July 2012, <<http://www.science.org.au/reports/documents/Year-1112-Report-Final.pdf>>.

This has been a significant feature of Queensland's current suite of senior secondary science syllabuses and resources.¹⁸ Queensland places high value on informed prescription and informed professionalism. Science syllabuses outline a common core set of learnings, and provide enough flexibility in how this is organised so teachers can exercise their professional judgment to shape and modify their programs, pedagogy and assessment. In science this relates directly to developing authentic and engaging contexts for learning; and the ability for students to have the time to conduct meaningful scientific investigations.

The draft senior secondary science subjects, through their rationales, aims, and strands, also make clear the value they place in providing opportunities for students to engage in doing science in an authentic context. Through their structure, however, they will make this overly challenging, if not impossible.

The Australian Academy of Science Report, *The Status and Quality of Year 11 and 12 Science in Australian Schools*, recommends that the senior secondary Australian Curriculum Science subjects include a realistic amount of content for the time available. It also recommends that state and territory curriculum and assessment authorities evaluate the value, impact and implementation of open-ended investigations as assessment.¹⁹ If the first recommendation is not heeded, there will be significant issues in implementing extended scientific investigations. As a consequence there will be pressure on state and territory curriculum and assessment authorities to not include them as a part of their courses, to the detriment of science education in Australia.

Way forward

The ways forward proposed here mirror those in section 6.3 and 6.4.1.

- Keep the current reference to extended scientific investigations.
- Organise the content descriptions as Year 11 and Year 12 to allow greater flexibility in how teachers can organise their programs to enable the time to implement a genuine open-ended investigation.
- Do not mandate contexts or particular investigations as content. Remove all references to “including” in the content descriptions that relate to contexts or particular investigations. Replace with “for example” and “such as”.

6.8 Feedback specific to each Science subject

6.8.1 Biology

Comments specific to *Biology* are summarised below:

- The content of the units lacks hierarchy, continuity and interconnectivity between them.
- There is an imbalance towards ecology across the course.
- The sequence of units will cause issues with field study requirements. In particular the demands on areas where ecology field studies are undertaken by all schools at the same time.

¹⁸ See for example, Science Teachers Association of Queensland (STAQ), “The role of inquiry in senior secondary science” *The Queensland Science Teacher*, Volume 36, No 1, 2010, pp. 2–8, accessed 10 July 2012, <www.qsa.qld.edu.au/downloads/publications/paper_snr_sci_roleofinquiry.pdf>.

¹⁹ Goodrum, D Druhan, A & Abbs, J 2011, *The Status and Quality of Year 11 and 12 Science in Australian Schools*, Australian Academy of Science, pp. 52–54, accessed 10 July 2012, <www.science.org.au/reports/documents/Year-1112-Report-Final.pdf>.

- Increasing complexity from Units 1 & 2 to Units 3 & 4 seemed to be defined in terms of amount of content rather than cognitive demand.
- Unit 2 is more demanding than Unit 4. Unit 4 should follow Unit 1 in both logic and complexity.
- There is some inconsistent usage of content versus concepts. Some content descriptions are lists of scientific facts, while others have a more conceptual focus.
- The Science as a Human Endeavour content descriptions are too prescriptive and will be limiting.
- The examples of technology given are not future-proof. Advances in technology will take place over the life of the curriculum.

Unit 1

- There is too much content.
- This unit is more about ecology than biodiversity.
- The content descriptions are somewhat disjointed and the hierarchy is not evident. There is no obvious overarching conceptual framework which could tie this unit together.
- The timing of field work across the country is an issue.

Unit 2

- The building of ideas in this unit works. Systems are covered well for both plants and animals.
- It lacks modern content in the Science as a Human Endeavour content descriptions and feels conservative. Science Understanding and Science as a Human Endeavour are working from two perspectives in terms of currency.

Unit 3

- The unit description is disjointed and provides a narrow description of evolution.
- The learning outcomes are very large. There are multiple outcomes in a single point.
- There is too much content — genetics as well as evolution.
- The content is too specific. It reads as a list of definitions or statements of fact, rather than concepts and ideas, as is the case in Units 1 & 2.
- Science as a Human Endeavour content descriptions contain many contexts within one point.

Unit 4

- There is too much content in this unit.
- There is minimal mention of physiological homeostasis in the unit description. It is mainly ecology. It contains a lot of different ideas and seems as if whatever did not fit anywhere else has been put into this unit.
- The unit content reads as a list of definitions rather than concepts.
- There is no flexibility around issues relevant to students.
- The dynamic biosphere: models of change and resilience, does not add to the unit. It seems out of place and there is significant overlap with Unit 1.
- The term homeostasis is not in the ecosystem part of the unit.

Achievement standards

- Social, ethical and economic implications take too much emphasis and may lead to assessment that does not properly concentrate on the biology.

Way forward

- Revise the units and content descriptions to be more interconnected.
- Decrease the emphasis on ecology.
- Reduce the content.
- Write content descriptions about concepts.
- Minimise the prescription of Science as a Human Endeavour.
- To “future-proof” the curriculum, add flexibility in content, tools and language to account for rapid changes in technology. Being specific about the “latest technology”, for example, will not be current for 2015 and beyond.
- Revise the achievement standards.

6.8.2 Chemistry

Comments specific to *Chemistry* are summarised below:

- The rationale attempts to indicate how chemistry fits in the modern world. Primarily it should state that chemistry is the study of matter and energy and then relate it to broader applications. Currently it sounds like an interdisciplinary science rather than an enabling science.
- Generally the structure was considered to have covered important aspects of chemistry. It is difficult to determine if the unit names are to be considered as true contexts or simply a gathering of subject matter under a common area.
- There is only vague connection of some topics within units.
- There is an extensive list of topics to be studied, with only basic relationships in each content description (with the exception of Unit 4, where descriptions are more conceptual).
- There is too much content. Including an extended scientific investigation type assessment will be problematic.

Unit 1

- Generally, the concepts in Unit 1 are an appropriate start to a study of chemistry.
- There is too much in Unit 1 for one semester.
- There are some inconsistencies in the size of the content descriptions.
- Rates of reaction and activation energy are too complex for the beginning of Year 11. This should be a brief introduction and move to a full theoretical explanation later in the subject — possibly Unit 4.
- Moles should be earlier in the sequence.
- Concentration is referred to in rates but not dealt with until Unit 2.

Unit 2

- The concepts in Unit 2 are appropriate for this stage in the subject.
- Acids and bases and solutions can be developed further in Unit 3 with more challenging concepts.
- Bonding introduced in Unit 1 is extended in this unit.

- Some things in the unit description are not in the content descriptions.
- More detail is needed as to what is meant to be covered in terms of analytical techniques and nanotechnology. The emphasis on analytical techniques will be inequitable between schools with different resources.
- There is an overlap of acids and bases with this unit and Unit 3. There needs to be a clear distinction between the content of each unit.
- In Unit 2 the effect of materials on the environment is not connected to the content descriptions.
- Overall, students leaving at the end of Year 11 would have a solid grounding in fundamental chemistry from Units 1 & 2.

Unit 3

- There could be additional complexity added in the electrolytic aspect.
- There is a concern with schools being able to access equipment and resources to complete this unit.
- The unit is far too big with too much content expected to be covered.

Unit 4

- This is a good final unit. It links well as a lead-in to university.
- Organic chemistry and analytical chemistry fit well together in this unit. However there will be issues with equipment for some schools — particularly spectroscopy.
- This unit is written more conceptually which allows scope for treatment not seen in other units.
- Reduce emphasis on organic synthesis to allow for a more contextual and research-based approach.
- The study of analytical chemistry needs to be in context not in a separate unit. It really ought to be embedded in relevant parts of Units 1, 2 & 3.

Achievement standards

- The achievement standards in Units 3 & 4 attempt to differentiate themselves from Units 1 & 2 with the addition of “applies laws”. This seems artificial. Year 11 students could apply the Law of Conservation of Mass, Avogadro’s Law and the Gas Laws, for example.

Way forward

- Revise the rationale to be more chemistry specific.
- Reduce content (such as hydrocarbons from Unit 1) to enable time to undertake extended scientific investigations.
- Refine the content descriptions to be of a similar order and to be written consistently.
- Simplify the treatment of rates of reaction and activation energy in Unit 1 and revisit these to a deeper level in a later unit.
- Ensure there is alignment and consistency between the unit description and content descriptions.
- Revise the achievement standards.

6.8.3 Earth and Environmental Science

Comments specific to *Earth and Environmental Science* are summarised below:

- *Earth and Environmental Science* received the most positive comments of the four science subjects. This draft is a big improvement on the previous one.
- The topics within *Earth and Environmental Science* are sequenced well.
- Units 3 & 4 seem to be more challenging than Units 1 & 2. Many of the Unit 3 & 4 content descriptions build upon concepts from Units 1 & 2.
- The link with the F–10 curriculum is evident.

Unit 1

- The unit description and outcomes appropriately describe the focus, scope and purpose.
- The content included is consistent with the unit description and outcomes.
- The learning outcome: “identify and classify rocks and minerals and use stratigraphy and radiometric dating data to interpret the age of rocks and fossils” seems to belong in the content descriptions rather than learning outcomes. It is of a much smaller grain size than the other learning outcomes.
- There is too much content in Unit 1.
- Content descriptions are generally clear; although the depth of the treatment of the concepts is unclear given how important the theories/models are for subsequent units.
- The Science Inquiry Skills component will be challenging as most aspects relate to significantly complex concepts/theories/models that, in a practical context, would take considerable time to investigate. For example, field mapping and drawing cross-sections. Mapping is an essential part of the subject, so it cannot be excluded. It will be difficult to teach and learn all the content descriptions to any depth.

Unit 2

- The unit description and outcomes appropriately describe the focus, scope and purpose.
- The content included is consistent with the unit description and outcomes.
- Unit 2 is more balanced, considered and achievable than Unit 1. The amount of content in Unit 2 seems appropriate.
- Content descriptions are sufficiently specific.
- There are good opportunities for practical work.
- The required depth of treatment of thermodynamics could be made clearer.

Unit 3

- The unit description and outcomes appropriately describe the focus, scope and purpose.
- The content included is consistent with the unit description and outcomes; it is balanced in its coverage and integration of earth science and environmental science aspects.
- The amount of content in Unit 3 seems appropriate.
- The content descriptions are well expressed; inclusion of examples is useful.
- The connection to content from Units 1 & 2 is clear.
- This is the most clearly written of all units. It is reasonably succinct, with a high level of internal consistency. It is a good model for the other units.

Unit 4

- Unit description and outcomes appropriately describe the focus, scope and purpose.
- The content included is consistent with the unit description and outcomes; it is balanced in its coverage and integration of earth science and environmental science aspects.
- The amount of content in Unit 4 seems appropriate.
- The content descriptions are well expressed.
- The connection to content from Units 1 & 2 is clear.
- Further revision needs to ensure the science does not get lost in the “geography-ness” of the unit. The systems approach could be more explicit.
- The balance and treatment of environmental issues is now right. The focus is on the science and provides a good opportunity to teach about pre-conceptions, critical reflection, and evidence-based decision making. A great unit to be taught in context.

Achievement Standards

- For the most part, the standards are organised in a manner that is consistent with the content. However, they would work better and make more sense if there was a direct alignment to the unit outcomes.
- The first two points in Concepts, Models and Applications potentially contradict the stem statement: “For the Earth and environmental systems studied.” For example, in Units 1 & 2 the first point “...how the components of the Earth system have changed over time...” — relates to Unit 1 with some relationship to Unit 2. The second point “...analyses how matter flows and energy transfers and transformations ...” relates specifically to Unit 2 only.
- The difference in standards A to C is inconsistent.

Way forward

- Reduce the content in Unit 1.
- Refine the content descriptions to be of a similar order and to be written consistently.
- Revise the achievement standards.

6.8.4 Physics

Comments specific to *Physics* are summarised below:

- The use of models as a conceptual framework is not sufficiently explained.
- The importance of models in physics is not in dispute. However, as an overarching framework the “force fit” of some of the topics and content descriptions seems artificial. Models are only one of the constructs that scientists use to explain the world.
- Models should arise from student engagement with concepts rather than the other way around. Models have a role, but are not viewed as the priority.
- There are issues in the sequencing of content.
- There is too much content per unit to properly engage in an inquiry approach.
- There is concern with respect to “forcing” contexts, e.g. car safety.
- The Science as a Human Endeavour examples could have some more contemporary examples.

- Prescribing equipment and investigations is problematic (“...including thermometers, for example). Not all schools have access to specific equipment.
- The mathematical representations are strongly supported.

Unit 1

- There is too much content.
- The content descriptions are too prescriptive. Professional teachers should have the flexibility to choose content and context that are of interest to them and their students.
- Some of the electricity content descriptions are too general. Overall the inclusion of this topic is strongly supported, especially given the lack of electricity in the F–10 science curriculum.
- Most Science as a Human Endeavour examples are historical. This strand should provide more current examples, with teachers being able to pick which they would prefer to use.
- The Science as a Human Endeavour content description related to the life cycles of stars provides another example of the issue of prescription of specific contexts as raised in section 6.4.1. It is *required* that the nuclear physics topic deals with the history of science, astrophysics and radiopharmaceuticals/nuclear power. Trying to teach all three will result in superficial coverage and is a missed opportunity to delve into a particular nuclear physics context deeply.
- Some examples in the Science as a Human Endeavour strand will not be interesting to all, for example: “caloric theory and the kinetic particle model” and “steam technologies were pivotal to the Industrial Revolution”. It may be more applicable to look at more contemporary examples, such as heat sinks or radiators in commuting devices, or the use of geothermal “hot rocks” and radiation in electrical power generation and convection currents in thermosiphon hot water systems. Either way, the teacher is in the position to make a professional judgment on which would be of most interest to their students.

Unit 2

- The content descriptions in this unit (forces, motion and waves) epitomise the physics understandings that could be taught in any number of contexts. Unfortunately the curriculum removes most of the opportunity for teachers to tailor contexts to meet the needs and interests of their students.
- The following statement from Science Inquiry Skills mandates particular equipment and investigations: “Conduct investigations, **including using data loggers, timers, distance and displacement measuring devices, wave modelling devices, optics kits, polaroid materials and diffraction gratings**, safely, competently and methodically for accurate and reliable collection of data”.
- There is too much content and the content descriptors are overly prescriptive. It will not be possible to deal with each of the three subtopics (sound, motion and light) to the level implied by the detail in Science Inquiry Skills, the achievement standards and the Mathematical representations and relationships.

Unit 3

- Schools would not realistically be able to implement an extended scientific investigation in this unit. There is too much content.

- Multiple examples are prescribed in this Science as a Human Endeavour description:
 - Electromagnetic induction is utilised in a range of technologies including transformers, generators, large scale alternating current power distribution systems, induction motors, induction hot plates and microwave ovens; investment in development of these technologies is informed by health, environmental and commercial agendas.

Unit 4

- The content of this unit was viewed favourably.
- Gathering primary data for students to investigate could be problematic. The content descriptions might need to suggest practical work in Unit 4 may involve simulations.

Achievement standards

- The *Physics* achievement standards appear to be from an earlier draft. They are inconsistent with *Biology*, *Chemistry* and *Earth and Environmental Science*. For example, they still have:
 - “the student competently and independently” as the stem for Physics Inquiry Skills
 - “analyses data to identify cause and effect relationships” as a D descriptor in Physics Inquiry Skills.

The achievement standards for *Biology*, *Chemistry* and *Earth and Environmental Science* are preferred (although these still have significant issues, as outlined in sections 3.3 and 6.4.2).

- One of the concepts/skills used to differentiate between a C and B is the drop off of “quantitative”. This is not appropriate. *Physics* is fundamentally a quantitative science and it would be expected that a C standard would include quantitative work.

Way forward

- Explain the use of models as the overarching conceptual framework.
- Reduce the content in each unit to provide time for an inquiry approach.
- Revise the content descriptions so context is separated out and not mandated.
- Do not prescribe equipment or investigations.
- Avoid the use of “including” in the content descriptions and replace with “for example” and “such as”.
- The *Physics* C standard should include “quantitative”.
- Revise the achievement standards.

7. History

This section summarises feedback and recommendations for the two History subjects.

7.1 Strengths

The following strengths were identified in consultations about the two History subjects.

- Some of Queensland’s previous feedback is represented in this draft of the two subjects.
- The content described in both subjects has some similarities to the content currently described in the Queensland courses.
- The focus of the two subjects provided in the organisation section is clear, although it is debatable that a school subject in Ancient History needs to be so heavily focused on the issues related to archaeology.
- The statement that the strand organisation “provides an opportunity to integrate in flexible and meaningful ways” is supported. However it could be strengthened with a statement that both strands are essential in history learning.
- The generic Historical skills framework works well and shows the commonalities between the two subjects. The use of this framework also reinforces the links to the F–10 History curriculum and is core to history education.
- Achievement standards are organised in distinct bullet points across five levels for Units 1 & 2 and for Units 3 & 4. This broad model is generally supported.
- The rationale and aims describe some valid purposes for studying History subjects.
- The overall design is consistent across both subjects to include unit descriptions, learning outcomes and content descriptions.
- The mostly consistent way that the Historical skills are written across subjects is supported. Although some further checking is required in the redrafting process.
- Some flexibility is apparent through the inclusion of content choice within and between units.
- The links to F–10 is generally appropriate in the Historical skills section, despite some further work needed in other parts of the documents, and the emphasis on historiography has become clearer.

7.2 Rationale and aims of the subjects

Comments specific to the rationales and aims of the two History subjects are summarised below:

7.2.1 Rationales

- The rationales have significantly improved on previous versions. Both rationales go some way to communicating the purpose, intent and scope of each subject.

Ancient History

- The time period defined in the rationale appears to be arbitrary as the end date of ancient history is often disputed. The end point of 650 AD in the rationale is not explained. This does limit some potential topics of study.

- Links to *Modern History* need to be identified in the rationale or in the organisation section.
- The rationale is Eurocentric in nature with only a passing reference to Near East and Asia. It would be worthwhile to define “ancient” in ways other than time.
- The rationale does not make reference to careers and relevance of the subject to students as a course of study. An emphasis on the importance of the skills in the subject being transferrable would be valuable in this context.
- The third paragraph states that the subject “offers an opportunity to investigate the past with a discrete body of evidence”. In fact, there is a wide variety/range of evidence and further evidence is always being revealed — this should be acknowledged.

Modern History

- Some of the language in the rationale needs to be attended to so it is more consistent and clearer, for example, “forces” and “larger themes” are not seen again in the document.
- The idea of “curiosity and imagination” as used in the Ancient History rationale needs to be restored to this rationale.
- The rationale should aim for more than “deeper comprehension of the world”. As a rationale for 21st century learning, it is not strong enough — it needs to foreground the centrality of inquiry and the development of understandings that allow learners to participate in the world as citizens.
- On the whole the rationale is not aligned to the rest of the document. The rationale links broadly to the aims but this is not reflected well in the topic specifications and accompanying dot points.

7.2.2 Aims

- The aims of both subjects need significant redrafting to describe the intended learning as a result of studying the subject. The aims are quite broad and as a result they do not give a full indication of the learning intended within the subject.
- The aims are generally aligned to each unit’s learning outcomes.
- The aims of both subjects should be based on the same framework, for example the third aim about skills should be expressed in the same way and the fourth aim of each subject should have similar learning even if the content is different.

Ancient History

- The use of the term “appreciation” is more suited to the rationale.
- The aspects described in the fourth aim would be better placed in the first aim focused on knowledge and understanding.
- The fourth aim would be better as the “application of historical concepts including references to evidence of origins, impact and legacy of ideas, and beliefs and values of the ancient world”.
- The aims need to correlate to the aims of the *Modern History* course.

Modern History

- The term “capacity” used in the second aim is awkward. This curriculum should aim for students to develop the historical skills.

- “Active” should be added to informed citizenship in the fourth aim.
- The aims do not align with the curriculum. The concepts are largely missing from the knowledge and understanding content descriptions.
- The aims need to correlate to the aims of the *Ancient History* course.

Way forward

- Clarify the definitions of “Ancient” and “Modern” History in the rationales.
- Review the rationales to ensure consistency between the two subjects. Previous feedback has suggested the development of an overarching rationale for both history courses.
- Align the rationale, aims and the learning outcomes — organise the aims as a framework on which to develop the learning outcomes.
- Base the aims of both subjects on the same framework, using common and consistent wording as appropriate.
- Revise the rationales and aims to provide teachers with an understanding of the content and topic selection (knowledge), the concepts that will be developed through this content (understandings) and how students will engage with the knowledge and understanding through inquiry (skills).

7.3 Structure

The following summarises feedback about the structure of the two History subjects.

- The structure and constructs of both subjects describes more than the curriculum content — there is a level of prescription usually found in state-based syllabus documents that link to an assessment program. For example; the “requirements” to study one or two topics and select from list A and B should be removed. The directed nature of the subject is very limiting and essentially a syllabus type prescription. The structure and directions in the documents make it difficult not to read them as a courses — this contradicts the statement of state responsibilities at the front of the document.
- It will be extremely difficult, if not impossible for courses to be developed for composite classes under this unit structure.
- The descriptions of Historical skills in a generic format are supported. However some skills are not “point-at-able” for example, practicing ethical scholarship would be more appropriately described as “use” ethical scholarship.
- The understandings and skills of historiography described in the rationales do not feature in the learning outcomes and unit descriptions.

Ancient History

- There is no overarching set of educational goals or an historical philosophy contributing to the structure and design of the subject.
- Archaeology is overemphasised throughout the course and this moves the subject away from a study of ancient history.
- There is not a clear link between this senior secondary curriculum and the relevant F–10 Australian Curriculum. It would be worthwhile to adopt the structure used in F–10 that uses inquiry questions to frame the curriculum. Additionally, the Years 7–10 curriculum is structured into overviews and depth studies which not present in the Years 11–12 curriculum. Indicating which parts of the curriculum are overviews or background studies and which parts should be studied in depth would sharpen the focus for the reader and assist with planning and assessment.

- The four unit structure does not provide internal logic or coherence. The design specification, that states that Units 3 & 4 are more cognitively demanding than Units 1 & 2, is not evident in this subject as the only difference between the two sets of units is the content covered. Furthermore, Units 1 and 4 are framed in a manner that could result in the same topics being studied at the beginning of Year 11 and the end of Year 12.
- The units do not lend themselves to creating a coherent course. Queensland courses usually establish coherence through chronology and the investigation of selected historical themes — a typical course would involve an inquiry into the ancient world sequenced in a chronological order from pre-dynastic Egypt through to Europe in transition. The units described in the draft Australian curriculum would mean that studies of *Ancient History* would jump from one epoch in history to another without any discernible link. Furthermore, it is difficult to understand why Units 1 and 4 both focus on a detailed study of the preservation, ownership and display of materials.
- The emphasis on Indigenous Australians is a strength of the document. Australian students come to senior *Ancient History* with vague and romanticised notions of Inca, Mayan, Egyptian, Roman, Greek and Viking times from media representations. Yet they usually know little about Australian archaeological sites such as Lake Mungo, issues to do with repatriation of Aboriginal and Torres Strait Islander bones, or Australian archaeologists and their contributions.
- The depth in which the topics are described across the course are not equivalent or of the same order.
- There is very little differentiation across the achievement standards and there are inconsistencies between how the standards are expressed across Units 1 & 2 and Units 3 & 4.

Modern History

- The four units present a compartmentalised subject that provides limited opportunities to develop a program that is coherent and suits unique school contexts. The use of chronology in some instances makes it difficult to conceptualise the subject, as does the use of artificial start and end dates for topics. If a strict chronology is followed then Units 2 and 3 should be reversed. On the whole, the document contains too much content.
- Units 3 & 4 are not cognitively more difficult than Units 1 & 2. The idea that the concepts in Units 3 & 4 are more difficult is not valid. If this design is to be applied the Historical skills should be redrafted to develop the cognitive demand.
- The descriptions of Unit 3 & 4 do not provide a clear conceptual framework for the units.
- The links between the F–10 and senior topics are arbitrary and consist of repeated topics rather than conceptual development.
- The learning outcomes for Year 11 do not require research questions but the Year 10 curriculum does — this breaks the link and disrupts the idea of developmental learning.
- A clear link between aims and four sets of learning outcomes is needed, and this has to be seen in the learning content. To create an alignment of teaching, learning and assessment this link should be made to the organisation of the achievement standards. Additionally, there is a lack of alignment between the unit descriptions and aims and the dot points that appear in the topic descriptions.

- There is too much prescription in the topics and this should be replaced with broader parameters to ensure schools address the big ideas, major themes, and historical narratives identified. The historical topics which meet these parameters should be determined by schools and accredited by assessment and certification authorities.
- There is a narrow focus on the post 1960s and 1970s period. It is acknowledged that Unit 4 does address this period to some extent but this lack of emphasis causes problems with the cross-curriculum priority “Asia and Australia’s engagement with Asia”.
- There is too much weight on geo-politics and the political economy at the expense of social history.
- The structure of two achievement standards at the end of Year 11 and Year 12 will have a significant impact on Queensland’s moderation processes.
- The prescribed and mandated content is a major issue. Broader directions such as “Content may include ...” would be better suit the Queensland context.
- As it stands the listing of mandatory dot points for each topic is limiting to inquiry pedagogies. Focus will be more on coverage of dot points at the expense of inquiry skills. The result will be “informational teaching” (just the imparting of information) not “transformational” teaching for creative thinking. This is an out dated pedagogical approach and not consistent with the Melbourne Declaration.
- Mandating all dot points in a topic is excessive. It would be more effective to highlight one dot point for study in depth and other dot points could be bridging and linking studies. This would help to facilitate inquiry and deep learning, rather than superficial coverage of the dot points.

Way forward

- Ideally the documents should be revised by removing the four unit structure and provide a list of topics organised by themes that are able to be offered in any combination in Years 11 and 12.

If the unit structure is retained:

- Include key questions to guide each unit and provide a clear purpose and focus.
- Revise the descriptions of Historical skills to ensure they are “point-at-able” and able to be evidenced in student work.
- Provide an overarching set of educational goals and an historical philosophy that contributes to the structure and design of the subject.
- Revise the links between the senior secondary History curriculum and the F–10 Australian Curriculum: History to ensure connections and to describe appropriate development in learning.
- Establish a clear link between the aims and the learning outcomes, the learning content and the organisation of the achievement standards. Additionally align the unit descriptions, the aims and the dot points that appear in the topic descriptions.
- Provide information about the status of the dot points highlighting what should be studied in depth and what could be seen as introductory, bridging and linking studies. This would provide flexibility and make the subject much more manageable to deliver.

7.4 Content and achievement standards

Ancient History

Comments specific to *Ancient History* are summarised below:

Unit 1

- The unit description does not clearly describe the focus and scope for the unit and the unit outcomes do not describe clearly the expected learning for the unit.
- The unit is overly prescriptive and the title does not accurately describe the content of the unit — there is a lack of coherence as the key components of investigating the ancient past are not covered. It is very similar to Unit 4.
- The inclusion of the option to select “an alternative study of an ancient site, event, individual or group...” effectively makes the content of the unit — an ancient site, event, individual or group pre-AD 625 that has been interpreted and represented in different ways and has been the subject of some controversy. Plus the issues related to the authentication, preservation, ownership and display of material. This has the potential to be the starting point for writing more open and flexible content descriptions and using the topic electives as examples for developing depth studies.
- Units that focus on issues associated with the preservation, ownership and display of materials can lack interest, engagement or stimulation for students. There is a risk of turning students away from the study of *Ancient History*. The most problematic feature of this unit is that it does not allow for any process of inquiry, for example, examining why some solutions/methods succeed and others fail.
- This unit reflects the skills of a museum curator rather than an historian with a focus on relevant and valuable historical skills.
- Fundamentally this unit is focused on archaeological exploration at the expense of historical investigation and the development of a broader understanding of how the ancient past is studied. There is a lack of focus on student investigation or inquiry. The four issues listed do not contain an historical inquiry — there needs to be a link to the Historical skills.
- There is no overarching principle or logic for the electives and it is unclear how these electives will be linked to the two issues that have to be studied. There is no unifying context and coherence.
- Source materials available for some possible electives would be difficult to access and this will make it difficult to plan relevant, engaging learning experiences.
- If the chronological design of the History subjects is referenced, it seems illogical to commence a course with a topic such as the Late Roman Empire in the West.

Way forward

- Establish an overall theme for the unit that frames the inquiry.
- Include key questions to guide the unit and provide a clear purpose and focus.
- Redevelop this unit as an introduction to the ancient past and how the ancient past is investigated. Rethink the site, event, individual or group plus two issues framework and consider a structure similar to Unit 1 of *Modern History* and its “alternative significant development” topic elective.
- Remove the “requirements” from the unit, e.g. ONE site and TWO issues.

Unit 2

- The title and conceptual basis for this unit is appropriate but needs a clearer focus — the inclusion of inquiry questions would assist with this. The overarching ideas can be gathered from the statements within the unit but need to be clearer.
- The topic electives are very Eurocentric and there is no opportunity to study Aboriginal and Torres Strait Islander cultures. The limitations provided by the specific time frames do not allow for a detailed analysis of “change and continuity”. The removal of the dates from the topic electives would provide scope to explore more relevant issues related to an ancient society.
- This unit would be a better starting point for this subject as it at least, introduces the substance of the course and has some focus on historical skills.
- The study of *Ancient History* requires some sequence and chronology in order for the students to be able comprehend and make sense of the subject matter. This unit paired with the previous unit could result in students studying Alexander before Mycenae and the breakdown of the Roman Republic prior to the Peloponnesian War. Alternatively students could potentially study topics related to ancient Egypt over the 4 Units.
- The comparative analysis in this unit is a high level skill that would be better suited to Unit 4 than Unit 2.

Way forward

- Include key questions to guide the unit and provide a clear purpose and focus.
- Remove the dates from the topic electives to widen the scope of the study and opportunities to explore more relevant issues related to each ancient society.
- Remove the comparative analysis from this unit.
- Remove the “requirements” from the unit, e.g. TWO electives and ONE significant feature.
- Reconceptualise as an introduction to ancient societies and build on the key features of ancient societies and allow greater flexibility in the selection of societies that exemplify these features.
- Audit Unit 1 & 2 together to ensure coherence and the potential to create a logical inquiry based study of history across both.

Unit 3

- The unit description clearly describes the focus and scope for this unit and the learning outcomes are generally clear and describe the expected learning. The conceptual basis of the unit is evident.
- The inclusion of dates for topics is prescriptive and should be removed to open up possibilities for developing a focus for depth studies.
- The inclusion of the background study in the topic electives (societies) is a strength and reflects more of an inquiry based approach. The restating of the focus — “Power and authority: change and development” in each topic provides a link back to the learning outcomes and the unit description.
- The two topic electives are an awkward mix and could result in a disjointed unit. The topic electives listed are too short to be considered as broad historical periods of time. For example, by allowing just one individual to be analysed in Rome 133–63 BC requires that only the reforms of Tiberius Gracchus can be examined when analysing the breakdown of the Republic, ignoring the significant part played by Gaius Gracchus. Similarly the option to study one other individual allows for an inquiry into the actions of Marius and not Sulla when surely both are integral to the period of time. This could also be said of the choice of Pompey and not Caesar, which is only one third of a triumvirate.

This unit is an example of how the “requirements” are limiting despite the length of topic electives listed.

Way forward

- Include key questions to guide the unit and to clarify the purpose and focus of the unit.
- Remove the “requirements” from the unit, e.g. ONE society and ONE individual.
- Remove the dates from the topic electives and list the individuals as examples.
- Use the model of background studies and depth studies for all units.

Unit 4

- The unit description does not clearly describe the focus and scope for the unit and the unit outcomes do not describe clearly the expected learning for the unit. It is conceptually unclear.
- The unit is overly prescriptive and teachers will find this lack of flexibility restrictive. There is a lack of coherence as the key components of investigating the ancient past are not covered. It is very similar to Unit 1 and could even be considered less challenging than Unit 1. The repetition of an evaluation of the methods of excavation, management, conservation and ownership (covered in Unit 1) shapes this unit (and the subject) as a study of archaeology in an historical context rather than a study of *Ancient History*.
- This unit is inappropriate conceptually and cognitively to complete a two year study of *Ancient History*. The options provided do not allow for a study of the “Fall/transformation of Rome” or “Europe in transition” — these are important topics to the study of *Ancient History*, and engaging and enjoyable subject matter which proves a fundamental link from the ancient world to modernity. Additionally, the opportunity to complete a comparative study of different societies or civilisations is lost.
- The topic electives do not allow for the study of important figures such as Constantine, Trajan, Hadrian, or Justinian or significant sites in the ancient world. The topic electives for societies are Egypt, Greece and Rome and ignore significant Asian and Central and South American civilisations.
- The inclusion of dates for topics is prescriptive and should be removed to open up possibilities for developing a focus for depth studies.
- At the conclusion of Unit 4 it is possible for some students to have studied the same society over the four units.
- The provision of a structure for each elective based on the key elements of the inquiry provides some focus and indication of the relative depth of each study or element of the inquiry.

Way forward

- Include key questions to guide the unit and to clarify the purpose and focus of the unit.
- Remove the “requirements” from the unit, e.g. ONE site or development.
- Remove the dates from the topic electives.
- Build on the topic elective structure and develop a model of background studies and depth studies for all units. This is essential to highlight the relative depth of study required and to clarify the focus of the inquiry.
- Revise this unit as a comparative study that culminates with some big questions and ideas associated with studying *Ancient History* and builds on the previous learning in the subject.

Achievement standards: Units 1 & 2 and Units 3 & 4

- There is not a clear alignment between the understanding and skills dimensions of the achievement standards; and the unit learning outcomes and content descriptions, for example, “assesses the significance of issues” in the standard does not align with “understand issues” in the learning outcome.
- The design of the achievement standards hinders the clarity and comprehensiveness of the descriptions and they do not effectively illustrate increasing complexity in understanding or sophistication of skills. The overuse of “explain” makes it difficult to distinguish between A, B and C in Knowledge and understanding. The Skills descriptions focus on “low level” skills, for example, there is no evaluation and analysis in the Unit 3 & 4 achievement standards.
- The achievement standards are not pitched appropriately and the lack of qualifiers/quality words, especially in the understanding dimension make it difficult to determine the levels within the standards and across the two sets of standards. The reliance on using the concepts/skills and verbs that indicate cognitive demand provide an uneven and at times the nature of the descriptor changes, for example: A “assesses the significance of issues associated with the evidence...” is different from B “explain the significant issues associated with the evidence”. The need to “assess” changes the nature of what the student will have to demonstrate. Additionally, the Historical skills curriculum content requires students to deal with evidence by analysing, interpreting, synthesising and evaluating — a significant step up from the B and C standards.
- The first description in the Knowledge and understanding dimension should read individuals, events “or” developments rather than “and”.
- Some terminology needs attention such as the use of “sound” in the A descriptors and the use of “limited” in the C descriptors.
- The Skills descriptors in the Year 12 standards add material that is not included in the Year 11 standards — this indicates that these skills are not assessed in Year 11 despite being part of the Year 11 Historical skills content.
- Standards are very prescriptive in terms of what students have to do in order to achieve a standard and in some cases it is difficult to match the standards to qualities in student work. Additionally, some important aspects are missing such as “research”.
- The use of two dimensions may be problematic when applying these standards to make assessment decisions. It could also be argued that the structure of Knowledge and Understanding together as a single dimension is problematic, especially when considering that understanding is usually demonstrated by applying and processing key concepts. The framing of the learning outcomes provides a case for structuring the achievement standards with at least three dimensions.

Way forward

- Reconceptualise the learning outcomes and achievement standards under three dimensions, e.g. Knowledge, Understanding and Skills. Three dimensions give a better balance to the learning outcomes and achievement standards.
- Revise standards descriptors to include quality words — each standards descriptor should contain the “what” (concept, skill, cognitive process) and the “how well” (degree or quality word).
- Revise content descriptions, learning outcomes and dimensions to provide obvious alignment between the curriculum content and the achievement standards.

Modern History

Comments specific to *Modern History* are summarised below:

Unit 1

- The unit title is not accurate — it would be more appropriately titled “Understanding the ideas of the Modern World” or “Introducing the Modern World”. The unit description implies that the unit is about the ideas, phenomena and turning points that define the modern era.
- The unit description does not clearly describe the focus and scope for the unit and the unit outcomes do not describe clearly the expected learning for the unit. There is a lack of context and a coherent approach to the study.
- The key concepts in the unit description (last sentence) do not align with the key concepts in the Learning outcomes (third dot point) or the descriptions of the topic electives that will develop an understanding of these topics.
- The Topic electives listed do not have any internal logic — there is no rationale for this selection of topics. Additionally, the elective topics are of a different order and would require different treatment in programming and study.
- The inclusion of the Topic elective to select “an alternative significant development or turning point...” is a more worthwhile approach to the content of this unit. The listed criteria could be developed to describe how the beginning of modernity is defined. This has the potential to be the starting point for writing more open and flexible content descriptions and using the topic electives as examples for developing depth studies. This section should be at the start of the Topic section and followed by a list of suggested or possible developments /turning points that reveal the “big ideas of the beginning of the modern age”.
- The inclusion of the “requirement” — “TWO topics with at least ONE...” is very prescriptive and is what would be included in course specifications which are the responsibility of states and territories.
- Content descriptions about the ideas influencing the modern world would be useful but not presented as a list of content to be “covered”.
- This unit could not be covered in the indicative time as there is no indication of the depth of study required for each dot point.
- The last dot point of each topic content description — “representations and interpretations” could help to inform a purpose statement for each topic and for the unit as a whole. This is one of the few places in the document that integrates the Historical knowledge and understandings and the historical skills.
- This unit has the potential to be very dry and turn students off *Modern History*.
- The inclusion of the topic elective on the American Revolution sets up the opportunity for the course to be very American History focused (and there is the possibility for a student to study two years of *Modern History* and not study any Australian history).
- If the unit structure with elective topics is retained there needs to be some opportunity to study Australian History in Unit 1.
- The inclusion of “at least TWO significant individuals...” in Revolutions in Health and Medicine (1790s–1918) adds further requirement and direction to the unit.

Way forward

- Establish a clear overall theme including key questions to guide the unit and provide a clear purpose and focus for the unit.
- Redevelop this unit as “Understanding the ideas of the Modern World” or “Introducing the Modern World” and use the topic elective — an alternative significant development or turning point as the basis of the unit.
- Remove the “requirements” from the unit, e.g. TWO topics.
- Replace the topic electives with a list of possible depth studies based on key developments and important ideas, and include some depth studies with an Australian focus.
- Revise the generic descriptions of Historical skills to ensure they are able to be demonstrated and integrated effectively with the content descriptions — the emphasis on historical inquiry as core learning is essential.

Unit 2

- The unit description contains appropriate ideas and provides the basis for worthwhile and engaging historical inquiries. It describes the focus and scope for the unit and the unit outcomes generally describe the expected learning for the unit. However the key concepts in the learning outcomes could be more closely linked to the content.
- Clearer alignment between the unit description, the learning outcomes and topic elective dot points is needed.
- The requirement to study “TWO major 20th century movements” is limiting and unnecessary. The focus should be on coverage of the key features of movements for rights and recognition. Additionally, in some elective topics there are additional requirements within the topic descriptions, for example, Australia and ONE other society, TWO countries, Australia and ONE other Western society — this is an excessive amount of prescription.
- This unit contains very popular topic electives but in terms of their relationship to Unit 1, it will be difficult to program a coherent course and the view that the subject presents a chronological approach is not possible. As the topic electives are situated in the second half of the 20th century, studying the topics in this unit will require coverage of the content of Unit 3.
- The topic electives could be more manageable with some indication of the depth of study required in each dot point. The use of the organisers — bridging, background, depth and comparative studies — would be useful.
- The “Civil Rights in the USA” topic focuses on the developments in the South while ignoring the significant movements in the northern states and the Mid-West. Alternative and parallel movements like the Black Power Movement are not included.
- The “Recognition and rights of indigenous peoples” topic should not have to be comparative — programs that focus solely on Aboriginal and Torres Strait Islander peoples should be an option.
- The rights of Indigenous Australians and some aspects of the Civil Rights movement in the USA are studied as a compulsory depth study in Year 10 and now a significant amount of this content is repeated in Year 11. This content would be better positioned in Year 12.
- There are many other movements that could be studied and the list of elective topics limits this. The option to study something outside of this list so long as it falls within a set of parameters as per Unit 1 should be included.

- The issue of a chronological approach and developing concepts logically could be addressed by uncoupling the units from Year levels.

Way forward

- Remove all of the “requirements” in the unit including those in topic electives, e.g. TWO major 20th century movements, Australia and ONE other society, TWO countries, Australia and ONE other Western society.
- Replace the topic electives with a list of possible depth studies based on key features of movements for rights and recognition developments and important ideas.
- Revise the generic descriptions of Historical skills to ensure they are able to be demonstrated and integrated effectively with the content descriptions — the emphasis on historical inquiry as core learning is essential.
- Uncouple the units from Year levels to allow flexibility of programming for a range of school contexts.

Unit 3

- The unit description clearly describes the focus and scope for the unit and the unit outcomes generally describe the expected learning for the unit. However the key concepts in the learning outcomes could be more closely linked to the content.
- The unit description does need broadening from investigating a crisis point in a nation’s history. A study of nation states requires broader themes and big questions — the inclusion of inquiry questions would assist with this.
- Clearer alignment between the unit description, the learning outcomes and topic elective dot points is needed.
- The “nation state” and “national identity” are worthy areas of study in a *Modern History* program. However, the cut-off dates in the topic electives are problematic and ignore a whole period of modern history up to the end of the 20th century. It also limits the conceptual approach to such a study by not focusing on changes and developments since 1945.
- This unit would be better positioned in Year 11 as a logical progression from the introductory unit and prior study before investigating the movements for rights and recognition.
- The lists of topic electives are problematic for the following reasons:
 - the lack of equivalency of the conscription debate in Australia and the Russian Revolution
 - the arbitrary choice of Asian nations and date parameters provided
 - the questionable start date for Japan
 - the content descriptions that privilege specific interpretations (such as Hitler was a “weak dictator” and Stalin was both a tyrant and capable leader).
- The content descriptions do not need to specify the actual nations or time frames and the last dot point about “changing interpretations” could be in the unit description as the key focus of the unit.
- The requirement to study two nations from the provided lists is limiting and unnecessary. The focus should be on coverage of the key features of the rise of modern nations and how this is linked to the big ideas and understandings of the modern world.

Way forward

- Remove all of the “requirements” in the unit including “Students study TWO of the following topic electives, one from List 1 and one from List 2”.
- Replace the topic electives lists with a range of possible nations on which to base depth studies. Advice about the coverage of a range of regions to develop understandings of particular concepts should be added, along with content that positions the development of Western and Asian nations as having particular features.
- Revise the generic descriptions of Historical skills to ensure they are able to be demonstrated and integrated effectively with the content descriptions — the emphasis on historical inquiry as core learning is essential.
- Uncouple the units from Year levels to allow flexibility of programming for a range of school contexts.

Unit 4

- The unit description clearly states what students will learn in the unit and provides the focus and scope for the unit.
- The unit outcomes generally describe the expected learning for the unit and link to the key concepts that will be developed.
- Clearer alignment between the unit description, the learning outcomes and topic elective dot points is needed.
- The topic electives are sufficiently broad but there is significant cross-over between the topics. While the unit offers the opportunity to study something modern and contemporary, the focus remains very geo-political — this is implied not just in the titles of the elective topics but also in the “Historical Knowledge and Understanding” content descriptions for each of the elective.
- The topic electives are all of a different order and present issues for effective programming the links to the prior units.
- The topic elective content descriptions do not offer the opportunity for students to investigate the big questions about the nature of the contemporary world.
- The Struggle for Peace in the Middle East topic is inadequate — it is not coherent, it has limited links to the contemporary world and is too detailed to determine what the focus of a depth study would be.
- The Towards a Globalised Economy topic is narrow and very economic in its focus — there is much more to globalisation.
- The Engagement with Asia topic should be replaced with a stand-alone study of an Asian topic rather than Australia’s relation with Asian countries.
- The Changing World Order topic is essentially a Cold War study with a large amount of content. This topic needs to provide an opportunity to investigate the relationships between Islam and the West as a key part of the changing world order.
- The final two dot points in the Changing World Order topic, with some modification, could provide an appropriate conceptual basis for this unit.
- The opportunity to study non-violence and people-power movements in the post-1945 period is still missing from this unit.

Way forward

- Remove the “requirement” in the unit to study ONE of the topics.
- Replace the topic electives with a range of possible contexts that illustrate the distinctive features of the post-1945 world on which to base depth studies. Concepts should be added.
- Revise the generic descriptions of Historical skills to ensure they are able to be demonstrated and integrated effectively with the content descriptions — the emphasis on historical inquiry as core learning is essential.
- Uncouple the units from Year levels to allow flexibility of programming for a range of school contexts.
- If the unit and topic elective structure is retained, reframe the topic electives to be of the same order, that is, a relevant and manageable amount of content to be covered and provide opportunities to study particular aspects in depth. The topics should be based on the list of listed changes to the nature of the world order.

Achievement standards: Units 1 & 2 and Units 3 & 4

- There is no clear alignment between the understanding and skills dimensions of the achievement standards; and the unit learning outcomes and content descriptions, for example, “evaluate factors contributing to a change” (Unit 4) in the standard does not align with “understand the changes that took place over time” (Year 12) in the learning outcome.
- The design of the achievement standards hinders the clarity and comprehensiveness of the descriptions and they do not effectively illustrate increasing complexity in understanding or sophistication of skills. The overuse of “explain” makes it difficult to distinguish between A, B and C in Knowledge and understanding.
- The achievement standards are not pitched appropriately and the lack of qualifiers/quality words, especially in the understanding dimension, make it difficult to determine the levels within the standards and across the two sets of standards. The reliance on using the concepts/skills and verbs that indicate cognitive demand is uneven across the descriptors and, at times it changes the nature of the descriptor, for example, A “assesses the significance of issues associated with the evidence...” which is different to B “explain the significant issues associated with the evidence” — the need to “assess” changes the nature of what the student will have to demonstrate.
- It is difficult to determine the difference between the standards without quality words, for example, A is “select and apply relevant sources of evidence” and B is “select and use relevant sources of evidence” and C is “use relevant sources”.
- The Historical skills curriculum content requires students to deal with evidence by analysing, interpreting, synthesising and evaluating — a significant step up from the B and C standards descriptors.
- Some terminology needs attention such as the use of “sound” in the A descriptors and the use of “limited” in the C descriptors.
- The Skills descriptors in the Year 12 standards add material that is not included in the Year 11 standards — this indicates that these skills are not assessed in Year 11 despite being part of the Year 11 Historical skills content.
- Standards are very prescriptive in terms of what students have to do in order to achieve a standard and in some cases it is difficult to match the standards to qualities in student work. Additionally, some important aspects are missing such as “research”.

- The use of two dimensions may be problematic when applying these standards to make assessment decisions. It could also be argued that the structure of Knowledge and Understanding together as a single dimension is problematic, especially when considering that understanding is using knowledge demonstrated by applying and processing key concepts. The framing of the learning outcomes provides a case for structuring the achievement standards with at least three outcomes.

Way forward

- Reconceptualise the learning outcomes and achievement standards under three dimensions, e.g. Knowledge, Understanding and Skills. Three dimensions give a better balance to the learning outcomes and achievement standards.
- Revise standards descriptors to include quality words — each standards descriptor should contain the “what” (concept, skill, cognitive process) and the “how well” (degree or quality word).
- Revise content descriptions, learning outcomes and dimensions to provide obvious alignment between the curriculum content and the achievement standards.

7.5 General capabilities and cross-curriculum priorities

Comments specific to the general capabilities and the cross-curriculum priorities in the history subjects are summarised below:

7.5.1 Representation of the general capabilities

- The general capabilities that naturally fit with the subjects are generally appropriately represented in the organisation section.

7.5.2 Representation of the cross-curriculum priorities

- The cross-curriculum priorities that naturally fit with the subject are not appropriately represented.
- Both histories are very Western focused.
- Both subjects contain several missed opportunities to address Aboriginal and Torres Strait Islander histories and cultures, especially *Modern History*.
- Australia’s engagement with Asia is restricted to China in the ancient period but several units in *Modern History* address this priority.
- Both histories can establish links to the Sustainability priority — this is a core component of societies and civilisations through time.

Way forward

- Both histories need to be audited for opportunities to better represent general capabilities and the cross-curriculum priorities.

7.6 Glossary

- A more comprehensive glossary needs to be developed to include the words in the achievement standards. Teachers would value a more comprehensive glossary.

Way forward

- The glossaries for both subjects needs to revised and expanded.

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