



Science Teachers Association NSW  
Submission on the  
NSW Curriculum Review Report  
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## 1. Introduction

The Science Teachers Association NSW welcomes the opportunity to comment on the proposed reform directions from the NSW Curriculum Review.

A reform of this scale is an ambitious plan that seeks to reorganise both the structure and content of the curriculum so that students are placed at the centre of decisions and at an individual level be supported to realise an entitlement of educational attainment. The Science Teachers Association NSW believes this is commendable. We recognise the NSW Government's leadership in undertaking this review in order to enhance the effectiveness of school education in NSW.

We recognise that the Interim Report proposes a conceptual reform to the curriculum that seeks to address community concerns and aspirations raised in the previous consultation and current theories in pedagogy and policy reform.

We respond to the Review of the NSW Curriculum on behalf of our all NSW Science Teachers Association NSW individual and school members from across the state of NSW. This submission is informed by feedback from the Association's eight Councilors, a survey of our membership and a consultation workshop with a group of our members.

The Science Teachers Association NSW notes the high-level system-wide reform directions proposed and recognise that further work is to be undertaken to develop detail. We would welcome the opportunity to be an active partner in ongoing discussions during this reform process to develop that detail and to work with the NSW government in being a leader of this change as relevant to the science curriculum.

## 2. The Science Teachers Association

The Science Teachers Association Inc (STANSW) is an Incorporated Association representing Science Educators from across Government, Independent and Catholic School sectors throughout the state of NSW.

Our purpose is to achieve excellence in science learning and teaching, support professional standards and provide effective leadership for the profession of science educators.

We are governed by a council of professional educators drawn from across NSW and all three education sectors and support 245 member schools and 266 individual members across the State.

## 3. Response to Interim Report

### Overview

Science Teachers Association NSW broadly supports the proposed reforms in 'Nurturing Wonder and Igniting Passion' and are pleased to note the proposed long-term nature of this reform. The scope of this reform will require significant cultural and organisational change to be managed within schools across NSW, the school systems, tertiary institutions and at NESA in order to effect the intent of student-centred learning. Feedback from teachers included many questions about the practicalities of implementation and modelling of the reforms.

### Content

The Science Teachers Association NSW agrees with the rationale for reforming curriculum content and a focus on core disciplinary knowledge, skills and capabilities to deepen understanding and enable the transfer and application of skills. We believe that it is the ability to apply scientific thinking that will benefit students throughout life, whether they progress within the science professions or not.

### Reform Direction 1 - Less Crowded Curriculum

The Science Teachers Association NSW supports this recommendation to create a less crowded curriculum. We recognise the widespread concern regarding the current curriculum being complex and overcrowded and concur with the need to review syllabuses.

Feedback collected from our members, indicate support for a less crowded curriculum including a reduction in content. This would need to be balanced against providing a strong foundational knowledge in Science to support students who wish to pursue tertiary studies in the sciences. The overcrowding of the K-6 Science and Technology is regularly raised as an area of concern to educators and a reduction of content of that syllabus would be regarded as an immediate priority.

In considering what content ought to be required for science, our members agreed that syllabus content needs to be meaningful and linked to everyday life with a focus on core scientific concepts. Some teachers felt that the mandatory content in the new Stage 6 syllabuses was not currently clear. In science, perhaps the removal of Stage 6 'including but not limited to' would assist with this as teachers are teaching more than is required. While the HSC exams still exist, greater clarity about mandatory content is essential for teachers. However, if this external exam were to be removed or replaced, it would give teachers more flexibility to provide rich learning environments through a flexible curriculum.

### Reform Direction 2 - Promote Deep Understanding

We support the integration of the curriculum through the teaching of core science knowledge, skills and capabilities. In discussions with members, there was consensus that core knowledge in science included creative and critical thinking skills specifically, 'how to think, measure and conclude'.

STANSW is also well-positioned to be able to offer professional learning for science teachers to support reforms that promote deep learning and collaborate with NESAs during the implementation of the reforms.

#### Reform Direction 3 - Building Skills in Applying Knowledge

The Science Teachers Association NSW agrees that Science is best taught through a context that is relevant to students and builds efficacy in scientific literacy.

In our discussions with members about the barriers to change, our members raised as a challenge, that school systems and universities are still valuing science courses that focus more heavily on conceptual knowledge over courses that focus more heavily on scientific skills. An example provided was a school that cancelled Investigating Science which was perceived to have less rigor than the other Stage 6 Science courses.

This comment highlights the need for strong modelling and support by NESAs when new syllabuses are introduced. Recent syllabus support materials developed by NESAs have not been exemplar and do not model innovation or best practice. With any new reforms, strong examples, models and extensive professional learning for all education sectors must be provided. STANSW could support NESAs by collaborating and developing effective teaching and learning resources that model effective practice. STANSW is also well placed to collaborate with NESAs to support professional learning and syllabus familiarisation.

#### Reform Direction 4 - Common Entitlement

The Science Teachers Association NSW strongly supports the Reform Direction to provide every student with a 'common entitlement.' The notion of a common entitlement is consistent with our obligations as signatories to the International Convention on Economic, Social and Cultural Rights and the Convention on the Rights of the Child. In the planning of this reform it is imperative we consider the requirements to support all students to successfully reach their level of attainment and specifically, the necessary resources for students who require additional support.

The Science Teachers Association NSW strongly recommends that science be considered as a Common Entitlement particularly up to Year 10. As citizens we are increasingly faced with the imperative of developing opinions and making choices that require scientific thinking. This consideration supports comments received by our members who suggested that the Common Entitlement up to year 10 ought to be based on how the world works and a focus on the application of science within specific content areas.

In practical terms, we heard from our members that to introduce a common entitlement in science curriculum it would need to be accompanied by a greater level of differentiation. In doing so, this raises the question of what resources are needed to support teachers in creating and implementing individualised plans for students, working in a classroom that is highly differentiated and how resources are allocated to enable access for all students. Support for teachers is required in the form of professional learning and a reduction of face to face teaching in order to implement this reform.

Science Teachers Association NSW recognises the current cross-curriculum commitment to ensure the unique place and diversity of Aboriginal and Torres Strait Islander people, their connection to Country – land and waters. We believe that this must be included as a Common Entitlement in order to support deep learning of First Nations histories, science and cultures and support true ongoing reconciliation. Within Science there are many opportunities to embed both historical and current scientific knowledge of First Australians.

## Structure

### Reform Direction 5 - Creating a more flexible curriculum

Science Teachers Association agrees with the concept of the reform direction for a more flexible curriculum as this allows teachers and students to make decisions about learning that are appropriate to each context. However, there is some doubt about the practicalities of implementing this reform without the negative effect of adding an additional administrative and class management load onto the teachers.

Discussion with STANSW members about attainment levels and moving away from Stage learning resulted in discussion about the practicalities of how that would look in a school or in a classroom.

Possible implications of a flexible curriculum identified by our members included:

- A heavy administrative load. The burden of timetabling, reporting and daily class management were all reported as challenges
- A culture of teacher resistance. There exists a feeling of “too much change” taking place and the need for both students and teachers to settle.
- The need for there to be a relationship between flexible curriculum options within schools and the consideration of foundational knowledge and skills for specific science courses at tertiary level.

It is recommended that some possible modelling be developed by NESA to supplement this reform proposal. Many of our teachers are not convinced that the proposed attainment level approach is a workable model and are concerned about the well-being of teachers who have an increased administration load.

### Reform Direction 6 - Restructuring the curriculum

The Science Teachers Association NSW agrees conceptually with the idea of a re-structured curriculum with curriculum re-organised into a sequence of syllabuses that corresponds with levels of attainment up to Year 10. However, as in Reform Direction 5, teachers are not convinced that there will not be an increased burden onto the teacher in the classroom.

We note that the interim report suggests this reform direction is not intended to require the

- re-organisation of classes or schools
- development of individual learning plans

- the abolition of whole group teaching.

Consistent with this, a number of members commented that replacing year levels was not practical and would be further complicated by students moving schools. It is however, unclear how this reform direction is intended to be delivered. How many levels would a teacher expect to have in one class, how might a teacher address an individual's learning needs in this context, what would a teacher's planning requirements be and how could we approach standardised assessment of the attainment levels.

The implications attached to these questions are significant. STANSW members have raised issues of implications to teacher training, resourcing for the planning of lessons and support in the classroom if teachers are to be delivering to a variety of attainment levels. The implications for managing student safety undertaking laboratory work if, within one class students are working on different activities could be a significant problem.

Further concerns raised by members included the need to consider the social impact on students and possible discrimination if they were not progressing at the same pace as peers of the same age.

We believe this reform direction requires strong modelling in order to provide in practical terms the intent of this reform. STANSW would be happy to be actively involved in working with the Review Team to explore what this reform might look like in practical terms relevant to the teaching of science.

#### Reform Direction 7 - Setting high expectations

The Science Teachers Association NSW agrees with the establishment of levels of attainment and see this as being consistent with the introduction of a common entitlement. For this reform to succeed in supporting student learning through levels of entitled attainment, Governments must commit to the adequate resourcing of teachers who will be at the frontline of delivering this reform along with either cohort or individual funding directed to students who require additional support to reach a level of attainment.

Consistent with our recommendation that science be considered as a Common Entitlement, an identified level of attainment in science should be reached by every student, recognising their individual capacity to achieve that minimum.

Our members expressed concerns that will need to be addressed in the consideration of attainment levels and how they are practically applied in the school setting, these include:

- The impact of levels in motivating or demotivating students
- The possible repeating of content if students do not achieve the conditional prerequisite to progress
- The training and resourcing of teachers to work with students to set their own goals and support progress towards those goals with a specific need for additional resourcing of students experiencing disadvantages and accessibility challenges.

### Reform Direction 8 - Monitoring whether learning is on track

We agree that the concept of being 'on track' could be useful for some students and could enable teachers to respond appropriately with teaching interventions at an individual level should a student's trajectory be considered to be off-track. Whilst this assumption would be consistent with the concept of entitlement of attainment it would require the teacher to be sufficiently resourced to work at an individual level with the student. Therefore, in the planning of this reform, commensurate budgets would need to be developed to enable teachers to operate in this way and less face to face teaching will provide more time for planning for possible interventions.

A number of members commented that this concept assumes that students are motivated to learn and there is a motivational match between progress and the 'on track' goals.

Whilst the general concept of students learning trajectories appears to be useful, it fails to consider the whole child and the impacts and variances in each child's life over time. Not all students progress through a linear pathway and this model could have a detrimental effect on a large proportion of students.

This reform direction seems to indicate that students are not currently being monitored. Current monitoring could be improved by providing increased teacher release time using the existing model.

If this reform is implemented there are significant concerns regarding the consequences on the schools when students do not meet the expectation due to factors outside the classroom.

### Reform Direction 9 - Ensuring Continuity of Learning

We support the idea that consecutive levels of attainment exist along a continuum and that a student's progress when considered at a specific point in time would reflect their position of attainment along that continuum. However, there was great concern about the practicality of being able to realistically monitor each student, concern about a potential increase in reporting and an increased administration load for teachers. There is also concern that student's progress at different rates due to a range of factors so this continuum could be demotivating for some students when they are at a time where they need support, not judgement. This model would certainly be useful for the transition period between Stage 3 and 4. It is a more valuable tool for students to know how they are tracking against expectations than A-E grades.

### Reform Direction 10 - Effective assessing and communicating of student learning

The Science Teachers Association recognises the limitations with summative reporting such as A to E grading based on assessments of a standards-based curriculum. Although the concept of attainment levels is supported, the practical implications and administration demands on teachers could be considerable

Our members commented that assessment against levels of attainment prepares students for real world competency assessment; yet, concerns were raised with respect to ensuring that students experiencing disadvantage were not discriminated against using this model and the additional workload that this type of assessment might mean for teachers. Adequate resourcing would alleviate this concern.



Consistent with our comments on Reform Direction 2 and 6, we recognise the application of this assessment model requires the identification of core concepts, knowledge and skills and how these are developed across the school years.

## Senior School Curriculum

### Reform Direction 11 - Creating a more integrated curriculum

STANSW welcomes a curriculum that fully integrates knowledge, skills and capabilities. Currently the layering of the capabilities into the NSW syllabus documents is not offering full integration. Science teachers are already working towards an effective integration of knowledge and skills.

The proposal to integrate Vocational applications is generally supported, although STANSW would not support any move away from providing appropriate foundational knowledge and skills that prepare more able students for tertiary study.

We believe this proposed reform, requires the synthesizing and alignment of the outcomes of the Commonwealth Senior Secondary Pathways Review 2019.

### Reform Direction 12 - Recognising Progress and Attainment

The Science Teachers Association NSW supports the recognition of progress and attainment during the senior years, replacing the current achievement bands with modularised attainment levels. We acknowledge that in the current context, students are being taught how to prepare for the final exams, and in some cases this risks both the learning of deep knowledge and the ability to apply core knowledge and skills across different contexts.

We note the concept of recognising progress and attainment in the senior years is consistent with the proposals in this report to reform the structure of the curriculum, notably creating a more Flexible Curriculum, Setting High Expectations, Monitoring whether Learning is on Track, and Effective Assessing of Learning.

Our members considered the disadvantage of this modularisation being a lack of continuity, both from the perspective of the teacher should there be significant changes with course cohorts and the risk of courses being discontinued due to lack of uptake by students. Practical implications of teaching students completing different modules in one class was also noted as a possible disadvantage.

### Reform Direction 13- Introducing a Major Project

The Science Teachers Association NSW notes that in the current curriculum there already exists Depth Studies for students studying Science in their senior years which has generally been well-received. The requirement of students to complete a Depth Study supports the students in the consolidation of their learning through the application of their knowledge and skills to investigations across contexts. A larger interest project may also support student learning.

During our consultation with members, many shared their positive experiences with Depth Studies. One recommendation offered was that major project works should remain at an individual level to enable

individual assessment. In general, there are still many teachers requiring support through professional learning to strengthen their capacity to facilitate project work. STANSW is well-positioned to work with NESAs to support teachers in the area of Professional Learning.

#### Reform Direction 14- Redefining Learning Areas

The Science Teachers Association NSW agrees with the rationale that every subject should be a mix of theory and application. The suggested learning areas provides greater context for reducing the polarisation of academic and vocational courses in an integrated curriculum. We also acknowledge that a redefining of the learning areas and a flexible curriculum would enable greater collaboration between schools, universities, vocational education providers and industry.

Teachers questioned the reasoning behind placing Science with Mathematics together as one learning area since the numeracy component of Mathematics is applicable across a much wider range of subject areas apart from science and the size of a Science and Mathematics faculty would be too large in many schools.

It is recommended that these proposed learning areas be further explored prior to the finalisation of the reforms.

#### Reform Direction 15- Reviewing ATAR

The Science Teachers Association NSW agrees with the interim report regarding the ATAR having a distorting influence on student's senior years, and support UAC's call for schools and universities to work together to consider ways of reducing the pressures around ATAR.

There was a mixed response to the suggestion to abolish the ATAR since there is no proposed alternative and possible alternatives would need to be suggested to support this strong proposal.

Over the last number of years STANSW have been communicating with NESAs regarding the perceived unfair allocation of band 6 to science students with the resultant lack of science students in the distinguished achievers list. No progress has been made to date. This review is the best opportunity to remove this inequity so students do not cherry-pick subjects that will 'pay' band 6.

### Leading Reform

The Science Teachers Association NSW strongly supports the need for reform of the NSW Curriculum and agrees that strong leadership is required for this reform to be achieved.

We recognise that these proposed reform directions make significant headway in addressing the concerns raised about the curriculum in the 2018 consultation and welcome the progressive and ambitious approach to the reform. We also welcome the pragmatic recognition that this reform will take significant time and believe this is consistent with the change management process that will be required within schools, the systems and at NESAs.

For this reform process to be successful it will require multi party political leadership and a commitment of adequate resources for its implementation. To that end, we recommend that this Review includes a review of the Education Act 1990 to provide a legislative framework for the reform and to address any inconsistencies between the Act and these reforms.

We also recommend a process for economic modelling in order to quantify the financial commitment required for implementation and the ongoing support of teachers within the new context. A genuine political commitment would require the current Government considering budget allocations in forward estimates for the implementation of this reform.

STANSW welcomes the opportunity to work in partnership with the Review Committee and NESA to promote and implement the reforms and support the development of models that might demonstrate the application of these reforms. STANSW is a cross-sectoral organisation and is well-placed to support the professional learning of all science teachers across NSW through face to face delivered training, mentoring and on-line teacher training. This would also require the support and commitment of the NSW Government and specifically NESA, as it seeks to invest in the capacity of our young people.

We look forward to continuing to engage with this reform as the process progresses and we welcome opportunities to actively contribute to the work of the Review Team.