



Leading education
and social research
Institute of Education
University of London

Aligned Instructional Systems:

Australia

Written by

Tina Isaacs and Brian Creese, with Alvaro Gonzalez

With contributions from:

Arthur Chapman, Justin Dillon, Esme Glauert, Paul Grainger, Martin Hollins, Jenny Houssart, David Lambert, David Mitchell, Candia Morgan, Gemma Moss, David Pepper, Richard Shewry and Cathy Smith

This report was funded by the National Center on Education and the Economy. The authors are grateful for the help provided by Suzanne North, Martin Mills, Chris Davidson, Ben Jensen and Doug McCurry who have read and commented on the report

Contents

Australia	6
History and background	6
Structure of school system	7
Pre-compulsory education	7
Post-compulsory education	8
Special needs education	8
Policy, aims and vision	8
21 st Century Skills	9
Innovation in Education Australia	10
Accountability	10
Setting Standards	12
Public/Private	13
Teacher training	14
The National Professional Standards for Teachers	15
Australia's Curriculum	17
Language of instruction	18
Assessment overview	18
Certification	19
International testing (Australia, New South Wales and Queensland)	20
New South Wales	24
History and Background	24
Structure of educational system	24
School year	24
Types of schooling/ages of transition	24
Twenty First Century skills	25
Governance	26
Accountability	26
Setting Standards	27
Teacher training	28
Initial Teacher Training	28
Early Career Teaching	28

Continuous Professional Development	29
Curriculum Overview	29
Years K-6	29
Years 7-10.....	30
Years 11-12.....	30
New South Wales and the Australian National Curriculum	31
Assessment Overview	31
K - 6 assessment	31
7 - 12 assessment.....	32
Assessment for Learning	32
National Testing: NAPLAN.....	33
Detailed analysis of curriculum	34
Primary: English language	35
Primary: Mathematics	37
Primary: Science	40
Primary: Social Studies/History.....	44
Secondary: English language	48
Secondary: Mathematics.....	55
Secondary: Science	63
Secondary: Earth Science.....	66
Secondary: Biology	68
Secondary: Chemistry.....	74
Secondary: Physics.....	77
Secondary: History.....	80
Secondary: Geography	91
Vocational education.....	94
Reflections/Observations.....	Error! Bookmark not defined.
Focus on teachers.....	Error! Bookmark not defined.
Structural changes	Error! Bookmark not defined.
Governance.....	Error! Bookmark not defined.
Closing the student performance gap in rural and remote schools....	Error! Bookmark not defined.
Principals' pay reforms.....	Error! Bookmark not defined.

Queensland	99
History and Background	99
Structure of the school system	100
Pre-compulsory education	100
Post-compulsory education	100
Vocational education and training	101
Special needs education	101
School year	101
Policy Aims and Vision	102
21 st century skills and the New Basics trial	102
Governance	103
Textbooks	103
Accountability	104
Teacher training	104
Initial Teacher Training	104
Continuous Professional Development	105
Curriculum	105
Queensland Curriculum and Assessment Reporting (QCAR) Framework	106
Queensland and the Australian National Curriculum	107
Assessment Overview	108
National Testing: NAPLAN	112
Detailed analysis of curriculum	113
Primary: English language	113
Primary: Mathematics	115
Primary: Science	120
Secondary: English language	123
Secondary: Mathematics	131
Secondary: Science	138
Secondary: Earth Science	139
Secondary: Biology	141
Secondary: Chemistry	146
Secondary: Physics	150
Secondary: Social Studies	153

Secondary: History	154
Secondary: Geography	167
Vocational education	169
Observations/Conclusions	Error! Bookmark not defined.
References	174

Australia

History and background

Australia's European roots lie in its original status as an 18th century British penal colony and for many years its closest ties were with Great Britain, and it is currently a member of the British Commonwealth. Australia comprises six states (New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia) and two Territories (the Australian Capital Territory – ACT, and the Northern Territory) and has a federal system of government. New South Wales and Queensland are the focus of this report. While Australia is physically very large – 7.7 million square kilometers – much of that area is sparsely populated. Most people live along the coasts and about two-thirds of the population lives in large cities, with almost 50% living in Sydney (NSW), Melbourne (Victoria) and Brisbane (Queensland). Australia's 2014 population is about 23.5 million, of whom about one-third is either first or second-generation immigrants; about 3% of Australians are of Indigenous origin. The population is ageing because of low fertility rates and increased life expectancy (Australian Bureau of Statistics 2014).

According to the World Bank, per capita income in 2013 was over \$67,000 US. Australia has extensive natural resources, a thriving commodities market, high productivity and an economy that welcomes investment and competition (ACER 2008). However, the domestic market for Australia's goods and services is small and local manufacturers find themselves competing with lower-cost countries. Distances and low population density cause high production and distribution costs. As in other developed nations, unemployment is more highly concentrated among the less educated and in some sectors there are concerns that a shortage of highly skilled labor might impede economic growth (ACER 2008). Not surprisingly the occupations that demand high skills and higher-level qualifications are the fastest growing.

Australia, much like the US, has three levels of government – federal/Commonwealth, state/territory and local. Education is a state/territory responsibility, although over the last two decades the federal government has been playing a larger role in policy development, funding, accountability and reporting (ACER 2008). Education ministers in the six states and two territories determine the education policy and have constitutional responsibility for school education, enrollment policies, determination of curriculum content, course accreditation and certification procedures and assessment methods. Importantly, though, when Kevin Rudd was elected Australian Prime Minister in 2007, he promised an education revolution, much of which would be centrally driven. This revolution included a national curriculum, national testing, transparency and accountability through a *MySchool* website and the establishment of a national authority to oversee these developments, the Australian Curriculum, Assessment and Reporting Authority (ACARA). A complementary teaching and school leadership institution, Australian Institute for Teaching and School Leadership (AITSL), was created to establish national standards in the teaching profession, a national education agreement signed that outlined national education outcomes, targets and performance indicators. Literacy, numeracy, teacher quality and low socio-economic status school communities were agreed, between the

national and state/territorial governments, as the highest priorities (Lingard and Sellar 2013; COAG no date).

The national curriculum is currently being implemented – it was adopted in 2011 – and there is a national testing system (see below) called the National Assessment Program (NAP) that started in 2008, with the first tests in 2009. Development and implementation of the Australian national curriculum involves the commitment and consensus of all state and territory education ministers. ACARA develops the curriculum with input from leading educators from each state/territory.

The most important of the NAP tests are those in literacy and numeracy (NAPLAN); these are given to students throughout the country in Years 3, 5, 7 and 9 each year. Sample testing in science, civics and citizenship and information and communications technology (ICT) takes place on a three yearly basis. Outcomes are posted publicly on a national website, making what goes on in schools, regions and states/territories transparent to anyone interested in the information. Together, the national curriculum and its attendant assessments will create a common educational standard across Australia. Australia has done relatively well in international assessments (see PISA, TIMSS and PIRLS reports below), but it is important to note that the students who took these assessment were educated before the national curriculum was put into place.

Structure of school system

Formal schooling starts with a foundation year (named differently in every state – in New South Wales it is called Kindergarten, in Queensland it is called Prep), followed by 12 years of elementary and secondary school. Students in Year 12 can study for the Senior Secondary Certificate of Education (Year 12 certificate), which most universities and vocational and training institutions require for entry. The federal government provides leadership in setting national education policy priorities and funds those priorities in concert with the states and territories.

Pre-compulsory education

Part-time, publicly funded pre-school education is usually offered for up to two years before compulsory education begins (at around age six). The second year of this provision – the year before compulsory education begins – is often known as the preparatory year and is also often offered full-time (that is for five full days each week).

In some states and territories the curriculum framework for the compulsory years applies to children in the pre-compulsory preparatory year. In addition some states have specific curriculum guidelines for the pre-school phase. Queensland's *Pre-school Curriculum Guidelines*, for example, are based on five foundation learning areas, which are: sense of self and others; health and physical understanding; social living and learning; cultural understanding; and understanding environments.

Post-compulsory education

At age 15-16, students may usually choose whether to continue in secondary school or to enter a range of technical or vocational courses at colleges of technical and further education, senior colleges or rural training schools.

At the post-compulsory upper secondary level, the curriculum is more likely to be specified in detail by an authority responsible for examining and certifying students. At these levels, students generally have more scope to specialize and a range of elective studies is usually provided. Although there are no compulsory subjects as such, the vast majority of senior level students do study English and mathematics throughout their senior secondary course.

Post compulsory education also takes place at Technical and Further Education (TAFE) institutions. These provide a wide range of predominantly vocational tertiary education courses, mostly qualifying courses under the National Training System/Australian Qualifications Framework/Australian Quality Training Framework. Fields covered include business, finance, hospitality, tourism, construction, engineering, visual arts, information technology and community work.

Special needs education

Types of special provision available in Australia can vary widely, both between states and between individual schools. Most school systems do, however, encourage, wherever possible, the mainstream education of students with special educational needs.

Policy, aims and vision

New South Wales and Queensland share the *Educational Goals for Young Australians*, as enshrined in the Melbourne Declaration of 2008 (MCEETYA 2008) and signed by all of the states/territories' education ministers. The goals were set in the context of a 21st century Australia being able to compete in the global economy on knowledge and innovation. Schools are to promote "intellectual, physical, social, emotional, moral, spiritual and aesthetic development and wellbeing ... [to ensure] the nation's ongoing economic prosperity and social cohesion" (preamble p1). Placing Australia at the heart of Asia, the Declaration recognized that India, China and other Asian countries are growing in international influence, encouraging Australia to become "Asia literate" and that globalization and technological change demand that Australians develop skills that will equip them for the jobs of the future. Young people will need to be encouraged to complete education and training beyond secondary school and engage with scientific concepts and principles, be problem solvers, creative thinkers and confident ICT users. While lauding some of Australia's successes, especially in international assessments, the Declaration recognized that the education system was failing many Indigenous Australians and students from low socio-economic backgrounds. Stating that literacy and numeracy, as well as other subject disciplines were the cornerstone of a good education, the Declaration also stressed the development of skills in social interaction, cross-disciplinary thinking, the use of digital media as well as the national values of "democracy, equity and justice, and personal values and attributes such as honesty, resilience and respect for others" (p 2).

The Declaration set out two main goals:

- 1) Australian schooling promotes equity and excellence
- 2) all young Australians become:
 - a. successful learners
 - b. confident and creative individuals
 - c. active and informed citizens.

All of the Australian state/territorial governments committed themselves to carrying out these goals through working both with the schools and the broader community by:

- developing stronger partnerships
- supporting quality teaching and school leadership
- strengthening early childhood education
- enhancing middle years development
- supporting senior years of schooling and youth transitions
- promoting world-class curriculum and assessment
- improving educational outcomes for Indigenous youth and disadvantaged young Australians, especially those from low socioeconomic backgrounds
- strengthening accountability and transparency (MCEETYA 2008).

21st Century Skills

Australia has been at the forefront in incorporating 21st century skills into its national curriculum. Three major international technology companies, Cisco, Intel and Microsoft funded the *Assessment and Teaching of 21st Century Skills Project*, with the aim of defining and clarifying the competencies that business needs educators to pay attention to and study how they may be assessed. The project was led by the University of Melbourne, with Barry McGaw as the Executive Director in 2009-2010. One of the essential parts of the new Australian curriculum is “general capabilities” which, according to Adamson and Darling-Hammond (2012), corresponds to 21st century skills, although as McGaw (2013a; 2013b), points out, it was believed that most of these skills pertained to previous centuries not just 21st. These general capabilities are: literacy; numeracy; ICT capability; critical and creative thinking and personal and social capability; intercultural understanding; and ethical understanding. Curriculum materials are being developed to integrate these general capabilities into the key learning areas so that teachers can incorporate them into their teaching. Naturally, teachers need training for this. The national government has invested in the development of technology-based support that offers formative tools within an online system for assessment and curriculum materials. As well as assessing the core subject areas Australia also has national assessments for ICT literacy and civics and citizenship – two key 21st literacy skills.

Innovation in Education Australia

The OECD *Measuring Innovation in Education* (2014) offers a way of measuring educational innovation. The ability to measure innovation is seen by OECD as an important element in any improvement strategy in education. Knowing whether, and how much, practices are changing within classrooms and educational organizations, how teachers develop and use their pedagogical resources, and to what extent change can be linked to improvements would provide, it argues, a substantial increase in the international education knowledge base. Of the 29 systems analyzed, Australia ranked 22nd for innovation (the US ranked 23rd) (OECD, 2014b).

The OECD used data from three comparative datasets, TIMSS, PIRLS and PISA, to identify the areas in which each education system has demonstrated emerging or changing organizational and pedagogic practices over a specific period. It should be noted that using these data means that any innovations identified will tend to be only in the subjects or age sectors testing in these studies.

The OECD report suggests that the following are Australia's five most significant organizational innovations:

- increased peer evaluation of teachers in primary and secondary schools
- more external evaluation of primary school classrooms
- more parental involvement in school projects, programs and trips
- more parental service on school committees
- more comparative information on school and student performance provided to parents.

The five most significant pedagogic innovations were:

- more observation and description in secondary science lessons (8th grade observation and description of natural phenomena)
- more use of answer explanation in primary and secondary mathematics, that is, student explaining their answers
- more use of textbooks as supplementary rather than the main resources in primary science
- more self-direction in complex decision-making in secondary mathematics, that is, more 8th grade mathematics students deciding their own procedures for solving problems
- more active learning in secondary science lessons, that is, students explaining what they are studying.

Accountability

Schooling has been the constitutional responsibility of the states and territories in the Australian federal system. Starting in the 1970s, however, the federal government became increasingly involved, particularly through supplemental funding, based on arguments about human capital

and the “centrality of education and skills to the competitiveness and productivity of the Australian economy” (Lingard & Sellar 2013, 635-636).

Both the Melbourne Declaration and the National Education Agreement put forward a case for increased accountability for the use of public education funding. Included in this accountability regime are improved reporting about student achievement and school performance both on an individual school and a comparative basis as well as reporting on the performance of overall Australian schooling (ACARA 2009a).

Through the Declaration the state governments committed themselves to report publicly in a manner that focused on improving performance and student outcomes, was locally and nationally relevant, timely, consistent and comparable. All schools, including non-government schools, have to report student progress to parents, including an assessment against national standards and for each subject studied, an assessment against a five point grading scale and relative to the student’s peer group. Schools also have to make publicly available an annual report.

National accountability measures include a nationally comparable data collection for all schools to support evaluation, accountability and resourcing decisions. In 2009 the Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEECDYA) ceded the responsibility for national accountability reporting to ACARA. It collects, manages, analyzes and publishes student assessment data and other school related data and publishes them in a National Report on Schooling in Australia.

One of the main accountability measures is the outcomes of the National Assessment Program – Literacy and Numeracy (NAPLAN) (see discussion below) tests of literacy and numeracy for students in Years 3, 5, 7 and 9. The reports are broken down by state and territory, gender, language background, ethnicity, parental education and income. They are also published for each school on the *MySchool* website that was launched in 2010. Website information is wide-ranging, including a description of the school, student numbers, staffing numbers, attendance rates, NAPLAN performance data, senior secondary outcomes and a report out on student socio-economic status so that comparisons of school performance can be made between schools with students from statistically similar backgrounds (ACARA 2009a).

In 2013 a *National Plan for School Improvement* was published in which transparency and accountability forms one of five main pillars (the others are quality teaching, quality learning, empowered school leadership and meeting student need). This plan shifts some of the accountability for performance to the states, each of which has to report out how it is progressing against the national priorities listed above through an augmented *MySchool* reporting system (Commonwealth of Australia 2013).

Australia’s education system is built on the principles of school choice and competition. According to the Australian National Audit Office (2004, cited in Perry & Southwell 2014, 471):

General recurrent grants assist government and non government schools with the recurrent costs of school education so that they can offer programs directed towards the achievement of the Australian Government's priorities for schooling. Those priorities include support for the principles of access, choice, equity and excellence in schooling by encouraging the provision of a strong, viable and diverse selection of government and non government schools from which parents can choose.

Thompson and Harbargh (2013) have catalogued a number of challenges that the Australian education faces:

- average scores in reading literacy and mathematical literacy have declined over the past few years
- gender gaps persist, with females achieving higher levels in reading literacy than males, and males achieving higher scores in mathematics
- students from remote locations perform less well than students from metropolitan schools.

Despite the better than average scores, significant levels of educational disadvantage related to socioeconomic background and Indigeneity (which are related) exist in Australia, and the performance gap between students of the same age from different backgrounds can be equivalent to up to three years of schooling. This gap places an unacceptable proportion of 15-year-old students at serious risk of not achieving levels sufficient for them to effectively participate in the 21st century workforce and to contribute to Australia as productive citizens (Thompson and Harbargh 2013).

Setting Standards

Shared responsibility is the hallmark of standard setting in Australia. Although the states and territories are ultimately responsible for education, they work together, usually through federally sponsored groups, to make decisions about curriculum, assessment and qualifications. This is a fairly recent development, though, and much of what is described below would not have been fully running when students in Australia received their elementary and secondary education in advance of PISA 2009 and 2012 and TIMSS and PIRLS 2011.

ACARA develops the national curriculum – itself a recent development, still undergoing changes, and currently undergoing a review by professors Ken Wiltshire and Kevin Donnelly – student assessment policies and national data collection and reports out on school outcomes. The Australian Qualification Framework Council holds responsibility for the Australian Qualifications Framework (AQF), which is a comprehensive framework of regulated qualifications both general and vocational, starting with (on the academic side) the Senior Secondary Certificate of Education (SSCE) and going up to PhD level. Qualifications are ascribed a level from 1 to 10 (the SSCE is unleveled) and the AQF clearly describes complexity and depth of achievement for those who “graduate”, spelling out what they know, understand and are able to do. The AQF has been in place since 1995; it was revised extensively in 2011.

AITSL is responsible for overseeing school reform for teachers and school leaders. They are the main actors, but unions, industry groups, non-governmental groups and Indigenous and parent groups are also routinely asked to enter conversations/consultations about standards.

The Council of Australian Governments (COAG) together with the Standing Council on School Education and Early Childhood (SCSEEC) help to ensure that the state and territory governments cooperate on education policy as well as the national evaluation and assessment framework. There is a national agreement on standard frameworks for reporting out key performance measures, the annual *National Education Agreement Performance Report*, published by the COAG Reform Council. COAG prioritizes reporting out socio-economic data and data regarding Indigenous status because it recognizes that these are the areas that seem to hold back educational progress. States and territories make most education decisions, with intergovernmental cooperation defined through national agreements¹. States make the majority of planning, structure and resource decisions, including authority over staff.

The OECD (2013) estimates that governance decisions (for lower secondary public education) are made in similar proportion by the government and by schools. This means that schools are almost as responsible for maintaining standards as the federal and state governments. They carry out self-evaluations complemented by external reviews, with literacy and numeracy results (NAPLAN) widely used in support. NAPLAN data are used in conjunction with teacher-based assessment, so teacher quality is of paramount importance in maintaining standards.

Schools are, however, answerable to state rather than federal governments in terms of meeting targets for academic and engagement outcomes. It is the state governments that plan programs and initiatives to help meet states' own targets (each is slightly different) set by the federal government on education. For example, the 2011 target for the "National Partnership for Literacy and Numeracy" for Year 5 in New South Wales was 92.1% of students at or above national minimum standard, whereas for Queensland it was 85% (see New South Wales and Queensland reports, below).

In order to implement standards properly funding has to be equitable. The Gonski Review, published in 2011 recommended a change the schools' funding model, directing more resources at socio-economically disadvantaged schools (Prasser and Tracey 2013; Australian Government 2011). Former Prime Minister Julia Gillard attempted to get all states/territories to sign up to a *National Schools Reform*, with Commonwealth funding to the states based on a needs-based funding model. States could not agree and this reform was unresolved by the time of the 2013 federal election. Agreement of a revised needs based funding formula remains unresolved at the time of this writing.

Public/Private

Education in publicly funded government schools is free. Private funding of education is mostly in the form of tuition fees paid to private schools. Commonly known as non-government schools, in addition to their privately raised income, private schools also receive some direct

¹ With the advent of the new government in September 2013, the role of National Agreements is under review.

Commonwealth government and state funding. For Catholic schools, the proportion of income that comes from the federal government is 72%; for independent schools it is a far smaller 38% (Ryan & Scibieta 2010). For decades, the Australian Commonwealth has promoted choice and competition through provision of private schools (Perry & Southwell 2014), but critics such as Watson and Ryan (2010, cited in Perry & Southwell 2014) state that the funding system has created further inequalities among schools, with high-status Catholic and independent schools having more per-student funding than government schools.

Private schools are an important feature of the education system and are free to determine their own curriculum and assessment procedures up to Year 10, when students must choose an accredited program/suite of syllabuses such as their state program or the International Baccalaureate (IB). However, all school sectors, including government, Catholic and private, follow ACARA's national curriculum to varying degrees. In 2012, 35% of all students (primary and secondary) were enrolled in private schools. The percentage was slightly higher for private secondary schools, which enrolled 40% of all secondary school students. The majority of private school students attend schools with some religious affiliation, most commonly with the Catholic Church.

Teacher training

According to the OECD (2013) Australian teachers' salaries are above the 2011 OECD average. They have a heavy workload, however, with 873 hours of teaching per academic year in elementary school compared to the OECD average of 790 hours. In the TALIS survey that complemented the PISA 2012 assessments, teachers reported that their average professional development time per year was nine days, which is about half of that reported by all teachers who participated in TALIS. Interestingly, fewer Australian teachers (44%) reported having a high need for professional development as compared to 53% of respondents overall (OECD 2014a).

Initial teacher training in Australia is generally provided in universities and other institutions of higher education. There are three common paths leading into either primary or secondary teaching:

- A four-year undergraduate teacher education degree such as a Bachelor of Education
- A double-degree program in which undergraduates study for two degrees concurrently, one of these being teacher education. Most universities offer this option over four years
- An initial three- (or four-) year academic degree, such as a Bachelor of Science or Bachelor of Arts, to which is added a one- or two-year postgraduate teacher training course. Most postgraduates opt for the shorter one-year Diploma of Education.

There are national moves to establish clearer, more consistent professional eligibility requirements for teaching, and a national framework for professional teaching standards for which universities have been lobbying for some time (ACDE 2013). This is likely to have a significant impact on the preparatory courses in universities. In this respect, the Australian

Institute for Teaching and School Leadership (AITSL) recently developed a *National Framework for Professional Standards for Teaching*. There is also a Teacher Education Ministerial Advisory Group, established in February 2014 that is to provide the government with advice on how teacher training could be improved. International best practice will be investigated, focusing on pedagogical approaches, subject content (particularly in foreign languages and STEM subjects) and professional experience (improved university, in-school placements and mentoring).

Through AITSL, the government is hoping to improve admission standards for teaching programs, developing selection guidelines and working with key stakeholders to develop processes for adoption from 2015. Literacy and numeracy skills among new teachers are to be improved, set to be the equivalent of the top 30% of the population. AITSL is developing a literacy and numeracy assessment tool through which it is hoped that higher education providers will be able to target those who need support to reach the required standard before graduating. The tool is expected to be ready for use from 2015 (Australian Department of Education 2014b).

The Australian Council of Deans (ACDE) welcomed the government's review of teacher training (ACDE 2013) but warned that teachers were paid lower salaries than comparable professionals and that the teaching workforce was increasingly made up of non-permanent staff, with the casual workforce being unable to access meaningful (and successful) mentoring activities. It recommended that the review of teacher training be on-going rather than a series of stop-start initiatives.

The National Professional Standards for Teachers

Pointing to a high level of teachers autonomy, the OECD (2013) warned that there are fewer opportunities for teachers to get professional feedback and that their appraisals vary widely. It recommended aligning teaching standards with a competency-based career structure, complemented by external inspections, in which teachers were held accountable for their practices, career pathways would define career progression and identify professional development needs. One of the steps that Australia has taken in this direction is the new National Professional Standards for teachers.

AITSL was created to establish national teaching standards and promote excellence in teaching profession (Lingard and Sellar 2013). Its seven standards:

identify what is expected of teachers within three domains of teaching (including Professional Knowledge, Professional Practice and Professional Engagement). Teachers' demonstration of the Standards will occur within their specific teaching context at their stage of expertise and reflect the learning requirements of the students they teach (AITSL 2011, 1).

The seven standards set down what teachers are expected to know and be able to do and four key career stages: graduate; proficient; highly accomplished; and lead. Almost 6000 teachers

participated in validating the standards, which are meant to inform the development of professional learning goals and provide a framework for self-assessment and reflection. Graduate standards are to be used to judge the efficacy of initial teacher education programs and guide the registration of new teachers. The Proficient Standards are to be used for full, nationally consistent, teacher registration. Highly Accomplished and Lead teacher status are to be used by the states and territories as additional voluntary registration. Grouped in three domains – professional knowledge, professional practice and professional engagement – the standards break down the overlapping components of excellent teaching. Professional knowledge involves knowing students and how they learn and knowing the content and how to teach it. Professional practice incorporates planning for and implementing effective teaching and learning and creating, maintaining supportive and safe learning environments and assessing, providing feedback and reporting on student learning. Professional engagement involves engaging in professional learning and engaging professionally with colleagues, parents/caregivers and the community.

Analyzing the TALIS survey published by the OECD in 2009, Ben Jenson (2010) was critical of the teacher evaluation and professional development system. He found that 63% of Australian teachers who participated reported that the evaluation of their performance was done merely to satisfy administrative requirement; 61% stated that the evaluations had little impact on their pedagogy and/or classroom management. Ninety-one percent reported that the most effective teachers were not the ones who received the most recognition and over 90% said that if they did improve the quality of their teaching they would not receive recognition in their schools (Jensen 2010). He does point out, though, that both New South Wales and Queensland have good teacher appraisal systems (see below) in which NSW teachers have to adhere to professional standards, demonstrating continuous efficiency, satisfactory performance and profession growth, while Queensland teachers were appraised by teams with professional standards used as reference points but not explicitly linked to appraisals (Jensen 2011).

The 2013 TALIS survey's results for Australia were not much different from the 2009 results (OECD 2014a). Only 39% of Australian teachers believed that society values teaching as a profession – but interestingly, this figure was higher than the average in TALIS countries of 31%. Teachers who worked in schools where they reported themselves to be active participants in school decision were almost three times more likely to say that teaching was valued. Teachers reported almost universal access to professional development (PD) opportunities, induction programs and mentoring opportunities. Lower than average numbers of teachers reported that their PD experiences had an impact on cross-curricular skills such as problem solving, however, more than three quarters stated that PD helped develop subject knowledge and understanding, curriculum knowledge and pedagogical competencies. Their view of formal appraisal was negative – with nearly half (43%) reporting that their appraisal had no impact on their teaching and 62% believing that appraisal and feedback were merely administrative exercises.

Australia's Curriculum

Although individual states and territories have responsibility for education, there have been two concerted efforts to introduce a national curriculum to Australia, with the second succeeding (despite recent changes to the party in power, both federally and in the states). Between 1983 and 1996 the Hawke and Keating Labor governments tried to introduce a national curriculum; in 2007 the Rudd and Gillard governments succeeded. Both had common rationales – globalization and creating and maintaining a competitive economy meant that Australia had to act as a whole to educate its children. “The federal government is responsible for the ‘national’ economy and thus with the economic reframing of education policy” has taken a stronger role in schooling, including in curriculum. This rationale is explicitly stated in national curriculum documentation (Lingard & McGregor 2014, 93). Lingard and McGregor see this as a manifestation of what Pasi Sahlberg calls GERM (Global Education Reform Movement), an approach to education reform that contains the following: prescribed curriculum, an emphasis on literacy and numeracy, test-based accountability, standardized teaching and learning and market-based reforms such as private sector management models and an emphasis on school and parental choice (Sahlberg 2011 as cited in Lingard & McGregor 2014). In Australia’s case, the assessments were NAP and especially NAPLAN, introduced in 2008.

Development of the national curriculum was based on a number of principles: clarity, high standards, build on the early years framework, extend from basic to specialized knowledge and skills, provide an understanding of the past, be manageable in terms of time and resources, be concise, allow for the study of areas outside the national curriculum, permit adaptation to local contexts and student diversity, and apply evidence-based research on learning and pedagogy. Each subject incorporated foundational and deep knowledge, understanding, skills and values but would also reflect cross-curricular 21st century skills such as critical thinking and working with others. Depth was privileged over breadth and the whole of the curriculum covered literacy, numeracy, information and communication technologies, thinking skills, creativity, self-management, teamwork, intercultural understanding, ethical behavior and social competence. Mindful of Australia’s geographical setting, the curriculum incorporated Indigenous people’s perspectives, emphasized sustainable living and engagement with Asia. Each subject’s achievement standards were set out on a year-by-year basis, and A to E grades were to be used to report student performance to parents. Teachers were heavily involved in the development, which was subject to wide consultation (Watt 2009).

The ensuing national curriculum is subject oriented; subject writing teams went to work in 2008 and in 2012 English, mathematics and science curricula began to be implemented for Years Kindergarten through 10, with history implemented in 2013. Geography was endorsed by all of the state ministers in 2013. Available for use, but awaiting final endorsement are arts, civics and citizenship, economics and business, health and physical education and technologies. ACARA is developing curricula for languages and work studies. For senior secondary (Years 10 to 12) curricula for English, mathematics, science, history and geography have been endorsed by all education ministers as a common base for states and territories to create courses.

Jurisdictions were able to time implementation of the national curriculum differently, so New South Wales embedded the curriculum into its own existing curriculum, while Queensland took up the full national curriculum. They also were responsible for assessment practices and support materials. There is a federal framework in each subject that outlines what to teach, alongside achievement standards for each grade. Integrated within the subject areas are “general capabilities” – those skills essential for “students to live and work successfully in the twenty-first century”, that is, literacy, numeracy, information and communication technology, critical and creative thinking, personal and social capability and ethical understanding and intercultural understanding (Australian Curriculum 2013).

Perry and Southwell (2014) noted a disturbing trend regarding access to the curriculum, particularly at the secondary level. For schools whose students were in the lowest socio-economic (SES) groups access to a full range of academic subjects was severely limited, whereas students who attended schools that primarily catered to those of middle-high or high socio-economic status had ample opportunities to study a broad range of subjects, many at the advanced level. Access to a good curriculum offer for students in middle and middle-low SES school was hit or miss. Interestingly the contrast between state and private schools was not as large as might have been assumed; although government schools on average offered fewer academic curriculum subjects and fewer advanced level subjects than independent school, differences were ironed out once SES was factored in. In fact, Catholic schools, many of which cater to children of middle and low SES tended to offer the full range of academic curricula.

With the coming of a new, more conservative, Liberal-National coalition government, ACARA was charged in 2014 with evaluating the national curriculum in order to identify ways that the curriculum could be improved over time.

Language of instruction

The official language by custom and practice is English, which is the language of instruction. However, at least 15% of the population speak a language other than English at home, so schools emphasize the development of English proficiency among non-English speaking students (ACER 2008).

Assessment overview

Teacher based, school level assessment is used as the basic tool for reporting to parents, and may influence decisions regarding a child’s promotion to the next grade. However, promotion usually depends predominantly on social considerations. Each state and territory has its own system for parental reports.

Assessment for Learning (AfL) is featured in the Australian curriculum and the Education Services of Australia have developed an AfL website on behalf of the states, territories and commonwealth that includes 32 assessment tasks in English, science, mathematics and other subjects with direct links to state and territorial curricula. On the site there is a section for professional learning and one on research background, all of which are meant to support

teachers to develop effective classroom assessment. The professional learning modules focus on explaining what AfL is, learning intentions, success criteria and rubrics, effective teacher feedback, strategic questioning, peer feedback, student self-assessment and the formative use of summative assessment. For the AfL approach in New South Wales and Queensland, see below.

National assessment, ostensibly low stakes for children but intended to be high stakes for schools and teachers through accountability regimes, is centered on NAPLAN. Children in Years 3, 5, 7 and 9 of compulsory education in Australia are tested against agreed national literacy and numeracy benchmarks. This mandatory testing program reports student outcomes against the benchmarks and collects data for reporting to parents/caregivers and schools, and for systemic reporting through the *MySchool* websites. Almost all children in both government and non-government schools participate in this testing. NAPLAN has been conducted annually since 2008 and tests the sorts of skills essential for children to progress through school and life including reading, writing, language conventions (spelling, grammar and punctuation) and numeracy. ACARA develops and marks the tests; many of the answers are multiple choice so can be machine read.

Nonetheless, in international terms, it is not clear that NAPLAN is high stakes for schools. As Ben Jensen points out, the *MySchool* website is the only accountability introduced for schools and there are no repercussions at all for teachers on their careers or promotion or any link to pay. Recent evidence from Western Australia, where NAPLAN was made explicitly more important for schools, saw students raise their achievement level.

Across the grade range, the reading tests are almost exclusively multiple choice, with one question asking the test takers to write items in order, introduced in Year 5 and one open-ended question, such as stating the main idea of a paragraph, introduced in Year 7. Language convention tests are a combination of multiple choice items and one word write-in items giving the correct spelling of given words. Until this year, the writing tests interestingly use the same prompt or stimulus across all of the grades, for example, “it is cruel to keep animals in cages”, and are scored using the same rubric. Students in the higher grades are expected to answer with increasing sophistication. Numeracy tests are a combination of multiple choice questions and write-in one word/number questions; in Years 7 and 9 there are both calculator and non-calculator tests (ACARA 2014).

Certification

All states and territories have some form of external certification system in Year 12) for students completing their final year of school education. This has the double purpose of certifying compulsory and post-compulsory school completion, and through the Australian Tertiary Admission Rank (ATAR) ranks students for entry to tertiary institutions.

The ATAR is a rank ordering of students that uses a combination of subjects and grades to determine how individual students compare with others. Numbered between 0.00 and 99.95, with increments of .05 ATAR scores put students in percent-based rank order, so a student with

a 90.00 is in the top 10% of his or her cohort nationally (or almost nationally – Queensland does not use the ATAR). The ATAR is based on tertiary entrance ranks that are calculated differently in each state and territory dependent upon participation rates at school, subject weightings, scaling and eligibility rules.

Students must satisfactorily complete subjects approved by the relevant state education authority (for more on the requirements for New South Wales, see below). Students who either fail to achieve an ATAR or get a low score must find an alternative pathway to enter university (Universities Admission Centre 2014).

Tertiary institutions determine what cut-off point is acceptable for each course of study and cut-off scores for the same course can vary from institution to institution and year to year depending on demand. So, for example, in 2013 a Bachelor of Education (Primary) at the Australian Catholic University’s Strathfield campus asked for an ATAR of 86, while the same degree at the same university’s Canberra campus only required a 59.3 (Tovey & McNeilage 2013). Cut-off scores are published and every applicant to that course who ranked above that year’s course cut-off receives an offer of a place; students below the cut-off are sometimes offered places through special schemes or alternative pathways (Blyth 2014).

The ATAR is perhaps one of the most distinctive characteristics of Australian education; a single national tertiary entrance rank. The process puts scores from different systems on a common scale to produce a single rank order for tertiary entrance for the whole country.

International testing (Australia, New South Wales and Queensland)²

New South Wales

PISA 2012

PISA 2012	Score	Rank: Australia	Point difference highest (95%)/ lowest (5%) achievers	Below level 2 (basic skills for life and work)	Levels 5 & 6 (top performers)
Mathematical Literacy	509	19th of 65	336 points OECD = 302	20% OECD = 23%	17% OECD = 13%
Reading	513	13th of 65	312 OECD = 310	13% OECD = 18%	13% OECD = 8%
Scientific Literacy	526	16th of 65	348 OECD = 304	14% OECD = 18%	13% OECD = 8%
Problem Solving	525	9th of 44		16%	18%

² Although PIRLS, TIMSS and PISA all have a mean score of 500 and a standard deviation of 100, because different countries participate in the assessments, the scores cannot be compared across instruments, i.e. a 570 in TIMSS does not equal a 570 in PISA. The same, obviously, is true for rank order – coming in 4th in PIRLS does not equal coming in 4th in PISA.

New South Wales' 2012 PISA results were not statistically significantly different from Australia's overall in all three subject areas. The points differences between its highest and lowest achievers, which the OECD uses as a measure of educational equity, i.e. the lower the point difference, the closer educational opportunities are for all students, was higher than the OECD average. Between 2003 and 2012, New South Wales' performance in mathematics declined by 17 points, reading scores declined by 26 points between 2006 and 2012 and science scores declined by 9³ points between 2006 and 2012, a fact that troubles the Australian government (OECD 2013c; OECD 2014c; Ryan 2013; Thomson, De Bortoli & Buckley 2013).

PIRLS and TIMSS 2011

	Score	Rank: Australia	Advanced International Benchmark (625)	Low International Benchmark (400)
PIRLS 4th grade	535	27th of 45 (Australia)	12% International Median = 8%	94% International Median = 95%
TIMSS math 4th grade	525	23rd of 57	13% International Median = 4%	91% International Median = 90%
TIMSS math 8th grade	512	22nd of 56	3% International Median = 3%	90% International Median = 75%
TIMSS science 4th grade	528	28th of 57	9% International Median = 5%	92% International Median = 92%
TIMSS science 8th grade	521	22nd of 56	16% International Median = 4%	93% International Median = 79%

Australia participated in PIRLS in 2011 for the first time. New South Wales' performance in PIRLS was not statistically significantly different from Australia's overall. Its scores are second lowest of all of the jurisdictions under study here. Its scores in all TIMSS tests were not statistically different from Australia's, except for 4th grade science, where they were slightly higher. Since the last round of TIMSS testing (2007) New South Wales' scores in 4th grade mathematics have decreased by 9 points, 8th grade mathematics have increased by 12 points, 4th grade science have decreased by 10 points and 8th grade science have stayed the same, for an overall quite flat performance (Martin et al 2012; Mullis et al 2012 [PIRLS]; Mullis et al 2012 [TIMSS]).

Australia (Queensland)

PISA

PISA 2012	Score	Rank: Australia	Point difference highest (95%)/	Below level 2 (basic skills)	Levels 5 & 6 (top

³ As a rule of thumb, the OECD equates 40 points with one year of schooling.

			lowest (5%) achievers	for life and work)	performers)
Mathematical Literacy	503	19th of 65	305 points OECD = 302	20% OECD = 23%	15% OECD = 13%
Reading	508	13th of 65	317 OECD = 310	15% OECD = 18%	11% OECD = 8%
Scientific Literacy	519	16th of 65	318 OECD = 304	13% OECD = 18%	12% OECD = 8%
Problem Solving	525	9th of 44		16%	18%

Queensland's 2012 PISA results were not statistically significantly different from Australia's overall in all three subject areas. The points differences between its highest and lowest achievers, which the OECD uses as a measure of educational equity, i.e. the lower the point difference, the closer educational opportunities are for all students, was about the OECD average. Between 2003 and 2012, Queensland's performance in mathematics declined by 16 points, reading scores declined by 13 points between 2000 and 2012 and science scores declined by 3 points between 2006 and 2012 (OECD 2013c; OECD 2014c; Ryan 2013; Thomson, De Bortoli & Buckley 2013).

PIRLS and TIMSS 2011

	Score	Rank: Australia	Advanced International Benchmark (625)	Low International Benchmark (400)
PIRLS 4th grade	511	27th of 45 (Australia)	6% International Median = 8%	90% International Median = 95%
TIMSS math 4th grade	499	23rd of 57	5% International Median = 4%	89% International Median = 90%
TIMSS math 8th grade	497	22nd of 56	6% International Median = 3%	88% International Median = 75%
TIMSS science 4th grade	501	28th of 57	4% International Median = 5%	90% International Median = 92%
TIMSS science 8th grade	516	22nd of 56	16% International Median = 4%	93% International Median = 79%

Queensland's average score was significantly lower in PIRLS than Australia's overall. Both at the advanced international benchmark and the low international benchmark Queensland scored below the international median. Queensland's scores on all of the TIMSS tests were not significantly different from Australia's. Since the 2007 round, Queensland's scores have

remained relatively flat – an increase of 14 points in 4th grade mathematics; an increase of 6 points in 8th grade mathematics; the same average score in 4th grade science; and an increase of 3 points in 8th grade science (Martin et al 2012; Mullis et al 2012 [PIRLS]; Mullis et al 2012 [TIMSS]).

New South Wales

History and Background

New South Wales contains just over 10% of Australia's total area (802,000 square kilometers) and is its most highly populated and heavily industrialized state. The capital is Sydney, which is the site of Australia's oldest European settlement and Australia's largest city. At the last census of 2011 it had over seven million people of whom 2.5% were of Indigenous origin and 31.4% were born overseas. Twenty-three percent speak a language other than English at home. Over 57% have some form of post high-school qualification and managers/professionals make up 36% of its workforce.

There are 3136 schools in New South Wales, the majority of which are government schools (67%), with Catholic schools comprising the next largest group (18%) followed by independent schools (15%). Most are co-educational and all government schools are non-denominational. There are 2200 public schools that serve 748,000 students and 900 non-governmental private schools that serve 390,500 students (Piccoli 2014). The state operates and is the main funder of public schools while most of private schools' public funding comes from the federal government. There are 17 fully and 12 partially selective high schools for high achievers, the entry into which is determined by students' results in the Selective High School Placement test in English, mathematics and general ability alongside their primary school's judgment. In 2014 13,104 students vied for 4191 places.

Children have 13 years of schooling: one year of Kindergarten followed by six years of primary and six years of secondary. Students must complete Year 10, after which, and until they turn 17, they must be in school or in approved education or training or in full-time, paid work or in a combination of work, education and/or training (Australian School Directory 2014). In 2011 85% of 20-24 year olds had a Year 12 leaving certificate or its equivalent, although numbers were much lower for Indigenous students – 56%. Seventy-three percent of 17 to 24 year olds were fully engaged in work or study (COAG 2013a).

Structure of educational system

School year

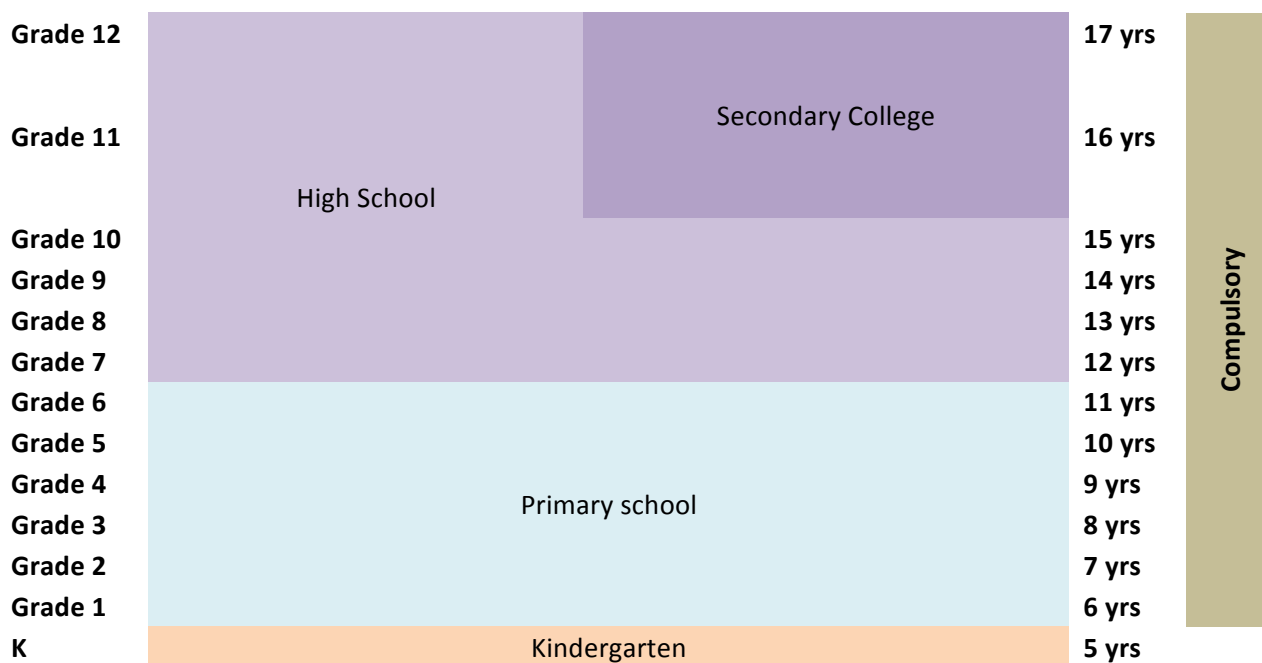
The school day normally consists of around five hours of tuition over five days each week (Monday to Friday). These hours of tuition are usually organized in a school day starting at around 9:00 am and finishing around 3:00 pm. The school year comprises 200 days, organized around four terms and beginning in late January. The annual five- to six-week summer break takes place in December and January.

Types of schooling/ages of transition

Typically, a primary school provides education from Kindergarten to Year 6. A secondary school, usually called a high school, provides education from Years 7 to 12. Secondary

colleges are secondary schools that only cater for Years 11 and 12. Primarily, the state government's 10 TAFE institutes provide vocational training up to the level of advanced diplomas. These institutes run courses in over 130 campuses throughout the state.

New South Wales school structure



Twenty First Century skills

The government of NSW has declared that 21st century knowledge and skills are essential for success in education. Those skills include collaboration, problem solving, thinking creatively, and connecting through technology. Alongside core content knowledge and a deep understanding of subject matter, including how to use, critique and apply it appropriately, schools are supposed to develop in students:

- confidence to know they can learn as part of a group and on their own
- the ability to solve problems both as individuals and collaboratively as part of a team
- the capacity to analyze what they see and hear, and know the difference between fact and myth
- confidence to use technology in all parts of their lives and to understand that technology should be a tool to enhance communication, learning and the quality of life
- the ability to communicate and express ideas in a clear and rational way
- interpersonal skills to enable them to relate effectively and appropriately to others

- creativity to help them look at the world and be innovative in dealing with challenges and making the most of opportunities
- ethical values, social responsibility, wellbeing and engaged citizenship (NSW Government 2013).

New South Wales has invested in technology through its *Connected Classrooms Program* and has joined the International Center for Curriculum Redesign to investigate how the state can create a 21st century curriculum (Bruniges 2012). According to McGaw (2013a) the NSW curriculum is more traditional than the Queensland curriculum, with civics and citizenship absent from its key learning areas, fewer cross-curricular themes and less embedding of 21st century critical skills.

Governance

Until quite recently the New South Wales education system was characterized by a great deal of central control. A relatively large state office – the Department of Education and Communities (DEC) made most staffing and budgeting decisions about schools. All staff positions were allocated centrally using a funding formula that strictly associated staff numbers with student numbers; some staff were placed in schools by central authorities; salary was based on number of years in the profession; school leaders had limited authority to deal with less than adequate staff; and principals' salaries were directly linked to student numbers. Schools controlled less than 10% of their budgets, with funding determined, again, by student numbers (Piccoli 2014).

A *Local Schools, Local Decisions* (LSLD) education reform program began in 2012 that reduced the size of the state office and changed its way of doing business to providing fewer and simpler policy guidelines for schools. Local schools have more authority to make decisions across a range of areas such as teacher placement, performance management and budgeting. Schools will soon manage more than 70% of their budget and funding will reflect a school's complexity as well as its student numbers; professional development will be linked to the school's plan, progression will follow attainment of professional standards (NSW DEC 2014b). LSLD was piloted in 2013 in 229 schools; the rest of the remaining 2000 schools will have decentralized school decision making in place by the start of the 2015 school year (Chakraborty & Blackburn 2013).

Accountability

The accountability system in New South Wales parallels that of Australia as a whole (see above). In addition, school principals are directly accountable for what happens within their schools under the *Leading and Managing the School* (LMS) policy of 2000 (NSW DEC 2004). Under LMS principals have seven main accountabilities, of which two are directly relevant to curriculum policy – educational programs and learning outcomes. Through the former, the principal must ensure that the curriculum meets student needs, that syllabuses are consistent with the current state and national syllabuses, that learning and teaching programs are relevant

and varied and that student outcomes form part of any evaluation of those programs. Regarding learning outcomes, the principal is accountable for the school's teachers maximizing student learning outcomes and ensuring that those outcomes are analyzed based on school-based and system-wide assessment data. These accountabilities complement the recent moves towards greater school autonomy, which sees the role of the principal as key (NSW DEC 2004).

Setting Standards

The Board of Studies NSW (BOSTES) develops state-wide curriculum standards for all schools in the state, both governmental and non-governmental, which spell out what students are required to learn. It was established in 1990 and develops, communicates and implements education policies and practices; sets the core curriculum through developing Kindergarten to Year 12 syllabuses; provides support materials for teachers and parents, manages the NSW Higher School Certificate Examinations that students take in Year 12; provides advice on grading and assessment policy and procedures; awards secondary school credentials – the Record of School Achievement (RoSA), put in place in early 2012, and the Higher School Certificate (HSC).

Primary school standards are based on learning stages that set out the skills, knowledge and level of understanding that each student should develop, with each approximately the equivalent to two school years. Kindergarten to Year 6 standards focus on seven key learning areas: English; mathematics; science and technology; human society and its environment; personal development, health and physical education (PDHPE); creative arts; and languages. The Board develops syllabuses for each of the learning areas that set out aims, objectives and outcomes expressed in terms of knowledge, understandings, skills, values and attitudes.

Students in Years 7 to 10 concentrate on the same seven key learning areas as Kindergarten to Year 6 students plus technological and applied studies. Within these key learning areas are a number of mandatory courses and electives. The Board sets the syllabuses for the mandatory courses; there is some local flexibility for the electives. Before 2012 in order to qualify for the School Certificate in Year 10, students had to meet the mandatory 7 – 10 subject requirements. The School Certificate has been superseded by the Record of School Achievement (RoSA). RoSA is cumulative, centered on school-based assessment, allows comparison between students across New South Wales, and gives students the option of taking on-line literacy and numeracy tests and records extra-curricular achievements. Those students choosing to leave school without pursuing the HSC will have RoSA as a formal credential for applying for jobs, further education or training.

In Years 11 and 12 most students take courses that lead to a Higher School Certificate (HSC). There are two types of HSC courses – Board developed and Board endorsed. The former are externally examined and contribute to the calculation of the Australian Tertiary Admission Rank (ATAR) and include courses in the eight key learning areas as well as vocational courses; the latter are developed by schools, TAFE institutes or universities and count toward the HSC but

not the ATAR. Board endorsed courses are mainly vocational and lead to qualifications on the Australian Qualifications Framework (AQF), with Registered Training Organizations (RTOs) delivering the courses, some of which include a work placement.

The TAFE system has been around since the end of the Second World War and grew in the 1970s, responding to climbing unemployment and economic insecurity. During the economic recovery of the 1980s, TAFE expanded and further strengthened in the 1990s. A National Training Board was set up to oversee industry and competency-based components and new apprenticeship and training packages evolved. Starting in 1992 dedicated TAFE Institutes were developed alongside the AQF. There are more than 500,000 students in the system, but only about 8% are full-time. Training is industry specific.

Teacher training

Initial Teacher Training

Teacher training has recently been subject to national agreements (see above), with the NSW Institute of Teachers assessing the quality of initial teacher education programs. There is no mandatory government minimum ATAR for entry to ITE and cut-offs for the same program differs based on program demand and places available. In 2013 the ATAR cut-off scores ranged from 58.80 to 94.30. Pre-service teachers who complete a four-year undergraduate program are required to complete 80 days of supervised teaching practice; those with graduate entry two-year programs are required to complete 60 days. They need to have literacy and numeracy skills equivalent to the top 30% of the population and an HSC Band 4 in English and general mathematics for primary teaching and an HSC Band 4 in English for secondary teaching. Graduate entrants must have an undergraduate degree in a discipline relevant to the curriculum areas they will be teaching. All teaching programs include methods courses (NSW Government 2013).

In 2013 the government recommended changes to the induction of teachers. They include:

- entrants into teacher education will be high academic performers, have well-developed literacy and numeracy skills and show an aptitude for teaching
- teaching will attract more of the brightest and motivated school leavers and career changers
- NSW teacher education programs will produce high quality graduates with personal attributes suited to teaching
- all teacher education students will receive high quality professional experience as part of their teacher education programs
- the quality of the teaching workforce in NSW will be informed by a strong evidence base.

Early Career Teaching

Newly hired full-time teachers must obtain accreditation at Proficient Teacher status within one to three years. Teachers go through an induction program, which is each school's responsibility.

They are assigned mentors who provide advice and feedback. Mentoring programs, however, do not reach all beginning teachers and not everyone in a mentor role is provided with training. In the future, the government has said it will ensure that:

- all beginning teachers will receive a high quality induction program to support their entry into the teaching profession
- all beginning teachers will receive high quality support to enhance their teaching skills during their first year of teaching
- teachers returning to the profession will be required to refresh and update their knowledge of curriculum, pedagogy and educational expectations
- accreditation and probation processes in NSW government schools will be aligned to create one system for beginning teachers.

Continuous Professional Development

Currently New South Wales is the only jurisdiction that does not require accreditation of all teachers – those appointed before 2004 are exempt. Those accredited since 2004 must undertake 100 hours of professional learning over each five year period. A recent consultation highlighted that more recognition should be given to school-based professional learning linked to Australia's *Professional Teaching Standards*. Teachers say that collaborative teaching, lesson observation and feedback are significant sources of their professional learning but that they do not always have the opportunities to carry out such activities in their schools. Teachers believe that current performance management systems do not provide sufficient feedback and therefore do not have a strong impact on classroom activities (OECD 2014a).

In the future, the government has promised that:

- the *Australian Professional Standards for Teachers* will apply to all NSW teachers
- all teachers will be supported by high quality performance and development processes
- the processes of the Institute and school authorities will be streamlined to reduce duplication and give greater recognition to school-based, classroom-focused professional learning

underperforming teachers and school leaders will be treated in an efficient and fair way (NSW Government 2013).

Curriculum Overview

Years K-6

Primary learning includes whole-class, group and individual activities, concentrating on basic learning skills and attributes. Literacy and numeracy are emphasized in all of the primary years. Learning programs are based on Board syllabuses. Although schools have some flexibility in how they deliver the curriculum, 50% of the time must be spent on mathematics and English

and 40% on the other key learning areas and sport, including two hours per week physical activity and one hour of sport per week for children in Years 3 to 6.

Years 7-10

Again, the taught curriculum is based on Board syllabuses for each subject and course. Yearly requirements include:

- 500 hours per subject for English, mathematics and science for all year groups
- 400 hours of human society and its environment; with 100 hours of geography and 100 hours of history for Years 7-8; and 100 hours of Australian geography and 100 hours of Australian history for Years 9-10
- 100 hours of one language in a continuous one year period
- 200 hours of technology for Years 7 and 8
- 100 hours of music and 100 hours of art
- 300 hours of PDHPE (personal development, health and physical education) for all year groups
- 400 hours of additional studies (elective) which may include Board Developed courses or school developed Board Endorsed courses
- 80-120 minutes per week of sports for all year groups.

Subjects for this age group are quite diverse and include quite a few vocational offerings – agriculture, commerce, food technology, industrial technology, information & software technology, textiles & design as well as work education – alongside more traditional studies such as aboriginal studies, dance, drama, English, geography, history, languages, mathematics, music, PDHPE, science, and visual arts.

Years 11-12

Courses that will contribute to the HSC are developed by the Board. In addition, schools must provide students with:

- a 25 hour personal development and health education course, *Crossroads*
- 80-120 minutes of sports in each week. However, students in Year 12 can choose to participate or not participate.

Subjects are even more diverse than for younger students and include vocational (accounting, agriculture, business services, business studies, ceramics, community & family studies, computing applications, construction, entertainment, electronic technology, engineering studies, exploring early childhood, food technology, furnishing, hospitality, industrial technology, information technology, legal studies, life skills courses, marine studies, metal & engineering, photography, video and digital imaging, primary industries, retail, software design & development; sport, lifestyle and recreation, textiles & design, tourism, visual design and work studies) alongside general (aboriginal studies, biology, chemistry, dance, design & technology, drama, earth and environmental science, economics, English, geography, history, languages,

mathematics, music, PDHPE, physics, senior science, society and culture, studies of religion and visual arts) courses.

Some of the subjects have differentiated programs, for example, in mathematics students can take general courses, the indicative hours for which is 240 or extension courses where indicative hours are 360 and 420 (see mathematics subject section for more information) (NSW BOS 2014c; NSW DEC 2013).

New South Wales and the Australian National Curriculum

New South Wales alongside all of the other Australian states and territories is introducing the new national curriculum that was adopted in 2011. The Board of Studies has, and is, developing syllabuses that include the national curriculum, retaining many of the features already found in NSW syllabuses. Implementation is the responsibility of the states and territories, as are credentialing and related assessment requirements and processes. This is done under the aegis of the Board of Studies. The NSW syllabuses have been online since October 2012; 2013 was a year of familiarization and planning; 2014 saw the first teaching of English and optional teaching of mathematics and science and technology for years Kindergarten to 6. Years 7 and 9 started teaching English, mathematics, science and history in 2014. In 2015 Years Kindergarten to 6 start teaching mathematics and science and technology, with the option of starting to teach history; Years 8 and 10 will start teaching English, mathematics, science and history. In 2016 years Kindergarten to 6 will start teaching history. Other subjects will roll out as the curriculum is signed off and New South Wales develops syllabuses (NSW BOS 2014d).

Assessment Overview

Aside from national testing, New South Wales has a number of assessment initiatives in place. Judgments about students' progress depend as much on teacher assessment as they do external assessment.

K - 6 assessment

For Kindergarten children *Best Start Kindergarten* assessment is a diagnostic assessment of children's literacy and numeracy skills at the start of the year. It is comprised of one-to-one tasks, marked by the teacher.

During their Kindergarten through Year 6 experience, children's achievements and progress are teacher assessed, using a variety of continuous assessment techniques including direct observation. Twice a year teachers make more formal judgments against each key learning area on a five point (A – E or Outstanding, High, Sound, Limited and Basic) achievement scale. These judgments are written up in a report that is sent home to parents/caregivers and that also includes written comments on the child's strengths and area in which s/he can improve.

7 - 12 assessment

School-based assessment for older children follows a similar pattern to the younger ones, with progress reports home to parents twice a year. Judgments of progress are made against key learning area expectations using a five point scale. Year 12 students aim to achieve a Higher School Certificate (HSC) prior to entering the workforce or going to university or a TAFE institute (although the HSC itself can be completed at TAFE). In order to get an Australian Tertiary Admission Rank (ATAR) an HSC must be completed.

The HSC is based on clearly defined standards of achievement. Students receive a course report for each course they complete that describes their level of achievement as well as the standards reached by other students in the course. The syllabuses set out clear expectations about what students should know and be able to do in each course by the end of Year 12. Sample papers and rubrics are provided by the Board of Studies. The course reports state a student's mark in relation to six performance bands, with a set minimum expected standard for each course. Students are awarded a mark of 50 or more out of 100 if they reach or exceed the minimum standard. The standards are criterion based and the school-based component forms 50% of the final mark.

Assessment for Learning

New South Wales emphasizes assessment for learning (AfL) throughout schooling. The syllabuses incorporate AfL on the theory that it has had world-wide success in enhancing teaching and improving student learning. Teachers decide how and when to assess student achievement, since they plan the work students will do, and use a range of appropriate assessment strategies including self-assessment and peer assessment. The Board of Studies argues that AfL:

- is an essential and integrated part of teaching and learning
- reflects a belief that all students can improve
- involves setting learning goals with students
- helps students know and recognize the standards for which they are aiming
- involves students in self-assessment and peer assessment
- provides feedback to help students understand the next steps in learning and plan how to achieve them
- involves teachers, students and parents in reflecting on assessment data.

It uses the following principles in each syllabus to provide the judgment criteria about the quality of assessment materials and practices. AfL:

- emphasizes the interactions between learning and manageable assessment strategies that promote learning
- clearly expresses for the student and teacher the goals of the learning activity
- reflects a view of learning in which assessment helps students learn better, rather than just achieve a better mark
- provides ways for students to use feedback from assessment

- helps students take responsibility for their own learning
- is inclusive of all learners.

Teachers are expected to incorporate AfL activities into their units of work through:

- identifying the unit's outcomes
- deciding on the subject matter or focus of the unit
- deciding on the required evidence of learning and how students will show their learning and how evidence will be gathered and recorded
- selecting relevant syllabus content for the outcomes
- planning the learning experiences and instruction and identifying the AfL strategies that will provide evidence
- ensuring a range of assessment strategies are used and that meaningful feedback is given
- providing opportunities to reflect on student progress and modify future learning experiences accordingly.

Sample programs of work and recording grids are available through the Board (NSW BOS 2014a, 2014b, 2014e).

National Testing: NAPLAN

Scores for students in Years 3, 5, 7 and 9 are reported out in bands of 1 to 10 separately for reading, persuasive writing, spelling, grammar and punctuation and numeracy. Scaled scores range from 0 to 1000. For each year group six of the 10 available bands are reported out, reflecting the increasing complexity of the tests. The latest test results were published in 2013 (ACARA 2013). Overall the scores across all four grades and all five tests were not statistically significantly different for New South Wales and Australia as a whole. Between 2008 when the tests were first given and 2013, literacy and numeracy scores have been relatively stable, although fewer Year 9 students have reached the national minimum standards in numeracy. There were troubling gaps between non-Indigenous and Indigenous test takers and between test takers from the highest and lowest socio-economic groups. Further details are below.

Year 3	Mean score NSW	Mean score AUS	% at or above minimum standard	% band 1	% band 6 and above	Point gap non-Indigenous/Indigenous	Point gap high/low SES
Reading	424.0	419.1	96.3	2.1	24.9	63.6	81.2
Writing	422.2	415.6	96.0	2.3	19.3	59.9	61.7
Spelling	423.4	410.8	95.5	2.9	24.6	63.0	64.5
Punctuation & Grammar	436.7	428.2	96.4	1.9	30.5	70.6	83.6
Numeracy	403.6	396.9	96.4	2.0	13.6	56.9	71.3
Year 5	Mean NSW	Mean AUS	% at or above	% band 3 and	% band 8 and	Point gap non-	Point gap

			minimum standard	below	above	Indigenous/Indigenous	high/low SES
Reading	506.4	502.3	96.8	1.6	12.6	53.1	71.3
Writing	483.7	477.9	93.1	5.3	6.3	62.1	63.3
Spelling	505.4	494.2	94.3	4.1	14.9	59.3	61.9
Punctuation & Grammar	508.0	500.6	95.8	2.6	14.7	67.1	79.9
Numeracy	493.1	485.8	93.9	4.6	12.5	64.8	79.4
Year 7	Mean NSW	Mean AUS	% at or above minimum standard	% band 4 and below	% band 9 and above	Point gap non-Indigenous/Indigenous	Point gap high/low SES
Reading	544.1	540.6	94.7	3.9	9.4	59.7	79.2
Writing	516.6	517.0	89.2	9.4	5.6	68.0	75.7
Spelling	559.7	549.3	94.8	3.8	14.1	57.8	60.7
Punctuation & Grammar	541.0	535.1	91.5	7.1	11.7	72.6	88.2
Numeracy	547.5	542.1	95.1	3.5	13.5	65.2	82
Year 9	Mean NSW	Mean AUS	% at or above minimum standard	% band 5 and below	% band 10 and above	Point gap non-Indigenous/Indigenous	Point gap high/low SES
Reading	584.0	580.2	94.1	4.6	5.6	56.0	72.3
Writing	553.7	554.1	81.8	16.9	6.3	82.2	91.0
Spelling	591.4	582.7	93.3	5.4	7.7	53.0	57.0
Punctuation & Grammar	577.3	573.1	88.3	10.4	8.9	75.0	92.2
Numeracy	591.9	583.6	90.4	8.2	14.8	80.9	95.2

Detailed analysis of curriculum

In this section, the following key areas of the New South Wales curriculum have been analyzed: primary English language, mathematics, general science and history, and secondary English language, mathematics, earth science, biology, chemistry, physics, social science and geography and vocational education. The areas of the analysis are:

- *Orientation* – the aims, goals and rationale for the subject/content area
- *Coherence and Clarity* – the extent to which the curricula contain clear and specific goals for each grade and whether the suggested learning activities and pedagogical materials support those goals
- *Scope* – the scope of material coverage, the number or amount of items or goals in the curriculum versus the depth of mastery proposed of each one
- *Levels of Difficulty* – to what extent the curricula items can be judged to be at the appropriate levels of difficulty. An appropriate level of difficulty should be defined as one

that builds sequentially on prior and existing knowledge and presents an achievable challenge to the average student

- *Integration* – how the different subjects within each grade of the curriculum is internally aligned
- *Progression* – how smoothly and coherently the learning goals and proposed content of a given curriculum in a given subject progress from one grade level to the next
- *Key competencies* – the level of development of a number of key competencies in the current curriculum and textbooks (such as problem solving, teamwork, self-learning, creativity, critical thinking competencies).

Primary: English language

The analysis presented in this section is based on the document *Board of Studies New South Wales English K-6 Syllabus* from 2007, which was the current syllabus at the time of writing this report. There is a new K-10 curriculum for primary English that is scheduled for implementation starting in 2014.

Orientation:

The aim of the English K–6 syllabus is to “encourage positive attitudes towards learning English, to develop students’ ability in using language effectively and to enable critical reflection on how language works.”

This will enable students to: interact with others; to create and interpret texts; to develop understandings about the world and ourselves.

Competence in English will enable students to learn about the role of language in their own lives, and in their own and other cultures. They will then be able to communicate their thoughts and feelings, to participate in society, to make informed decisions about personal and social issues, to analyze information and viewpoints, to use their imaginations and to think about the influence of culture on the meanings made with language.

Coherence and Clarity:

The curriculum is organized into three strands: talking and listening; reading; writing, with outcomes describing “the knowledge, skills, understandings and strategies that students demonstrate when learning to talk, listen, read and write” and when learning about talking, listening, reading and writing. Framework statements are set out for pairs of grades, called stages, summarizing the “knowledge, skills and understanding children at each stage are expected to develop.”

Beneath this each stage is sub-divided into outcomes: specific statements of the results intended by the syllabus and indicators: “a statement of the behavior that students might display as they work towards the achievement of syllabus outcomes.” There are four outcomes for listening and talking, eight for reading and 14 for writing. There are also eight “values and

attitude” outcomes that repeat across every stage; for example, enjoys creating a range of spoken and written texts. In addition, outcomes are linked to a content overview for each stage, which sets out what teachers should teach. The different trajectory ESL children might take through the curriculum is explicitly mentioned.

Scope:

The level of detail in the curriculum specification is high, with up to 29 indicators listed under a single outcome; for example, for RES1.6 Demonstrates developing reading skills and strategies for reading books, dealing with print and comprehending texts. This has the potential to make planning difficult as the number of indicators for each stage far exceeds the numbers of weeks in which they might be taught.

Levels of Demand:

The learning curve is quite steep between K – P6; for example, for *Learning about Writing* the outcomes by stage are as follows:

WES1.13	WS1.13	WS2.13	WS3.13
Recognizes some different purposes for writing and that own texts differ in various ways.	Identifies how own texts differ according to their purpose, audience and subject matter.	Discusses how own texts are adjusted to relate to different readers, how they develop the subject matter and how they serve a wide variety of purposes.	Critically analyzes own texts in terms of how well they have been written, how effectively they present the subject matter and how they influence the reader.

Progression:

Progression is not clear from the specification, which is complex. In addition to the outcomes and indicators, the further layer to the curriculum set out as content has the potential to hasten curriculum coverage without necessarily building from students’ prior knowledge. It is not clear how such high content specification translates into time spent on each objective and how much time there is for consolidation of learning in any particular area. Planning for student diversity is explicitly mentioned, but it is not clear how the curriculum leaves room for this to be addressed, or whether those facing difficulties in keeping up do not simply get left behind.

Assessment:

Planning, programing, assessing, reporting and evaluating are strongly linked in the curriculum document, with student achievement of the syllabus outcomes the goal. Formative, summative and diagnostic procedures are all mentioned within a strong planning framework. It is made clear that “programing should cater for the diversity of student learning needs at a particular stage”, but it is not obvious how the fast pace and breadth of curriculum content facilitate this. Unless teachers plan for holistic experience rather than from the itemized curriculum, they are likely to sacrifice individual progression for meaningful development. Explicit and transparent progress measures are assumed to help everyone keep account of how students are doing. It is

not clear whether this really aids children's learning, when learning may itself of necessity be differentiated.

Since 2008, Australia has set a national testing framework, NAPLAN for children in Year 3, 5, 7 and 9. Guidance to teachers says "NAPLAN is not a test of content. Instead, it tests skills in literacy and numeracy that are developed over time through the school curriculum. Excessive test preparation using previous tests is not useful." Sample tests are on reading comprehension, testing children have understood the text and can infer meaning as well as identify information; and on "language conventions", which mainly tests spelling and vocabulary, using multiple choice cloze passages. The tests, judging by examples for Years 3 – 7, test a relatively small skill set, compared to the breadth of the NSW curriculum. Curriculum responsibilities in Australia rest with the state, the tests are commissioned by federal authorities, which accounts for the disjuncture.

Key competencies:

These are part of the skill set, but it is not clear how far they will get space in a very crowded curriculum.

Primary: Mathematics

The information that follows is drawn from the 2012 document *NSW Syllabus for the Australian Curriculum*. This draws on the Australian mathematics curriculum, as does the Queensland documentation (see below), although there appear to be significant differences between the documentation for the two states.

Orientation:

Mathematics has three stated aims. The first is about students becoming confident and creative users of mathematics, including in their life and work and as active citizens. The second aim is about developing an increasingly sophisticated understanding of mathematical concepts and fluency with processes. The third aim is about recognizing connections between areas of mathematics and across subjects.

Coherence and Clarity:

The curriculum is clear and very detailed. The documentation starts with an overview and moves on to give detailed content for each stage. The suggested details match the objectives and outcomes.

Scope:

The curriculum for New South Wales differs from most others in that it sets out content per stage rather than grade, with the majority of stages representing two years of study. Early Stage 1 represents Kindergarten and the preliminary year. Stage 1 represents Year 1 and Year 2 of primary. Stage 2 represents Years 3 and 4 of primary. Stage 3 represents Years 5 and 6 of primary. It is explicitly stated that some students may access work from a different stage. The work is organized in four strands:

- working mathematically
- number and algebra
- measurement and geometry
- statistics and probability.

For each of these strands, objectives and outcomes are tabulated across the stages. This is then followed by much more detailed content for each stage. Although the outcomes are organized in the four strands, the detailed content is organized in three content strands with the assumption that working mathematically happens across the strands. The curriculum takes account of the Australian cross-curriculum priorities and a range of icons are used to show opportunities for addressing these priorities in relation to the detailed mathematical content. So, for example, ICT appears throughout, as do opportunities to make cross-cultural links.

In early Stage 1, work on number and algebra has five sub-strands:

- whole numbers
- addition and subtraction
- multiplication and division
- fractions and decimals
- patterns and algebra.

Whole number work includes counting, ordering and reading numbers. Addition, subtraction, multiplication and division are all introduced via sets of objects. Under fractions and decimals, students describe two equal parts as halves. The pattern and algebra content is about recognizing, describing and continuing repeating patterns.

The measurement and geometry content of early Stage 1 has eight sub-strands:

- length
- area
- volume and capacity
- mass
- time
- three-dimensional space
- two-dimensional space
- position.

Measurement content at this level is mainly about using the language of comparison in relation to practical activities. Shape content at this level is about manipulating and sorting shapes and using appropriate language and using the language of position. Statistics and probability at early Stage 1 has one sub-strand called data and involves representing data using objects.

The number and algebra content at Stage 1 contains the five sub-strands introduced at early Stage 1. Students develop their counting up to three-digit numbers and use a range of methods for adding and subtracting one and two-digit numbers. They use mental strategies and concrete materials to multiply and divide and they represent halves, quarters and eighths. Under patterns and algebra, they create, represent and continue patterns with numbers and objects.

The measurement and geometry strand at Stage 1 has the same eight sub-strands as early Stage 1. In measuring, students use non-standard units for length, area, volume, capacity and mass. They are introduced to some standard units for length and they read half and quarter hours from clocks. Work on shape is extended to include the names of 3D and 2D shapes and work on position includes describing the position of objects on maps.

The probability and statistics strand at Stage 1 contains two sub-strands. The sub-strand data is continued and there is a new sub-strand called chance. For data, students use a range of methods of representation, including lists, tables and picture graphs. In chance, they recognize and describe events.

For Stage 2 of number and algebra, the same five sub-strands apply as in previous years. Students now represent numbers up to five digits. They use mental and written strategies for adding and subtracting up to five digit numbers. They use mental and informal written strategies for multiplication and division. They compare and represent commonly used fractions and decimals. They generalize the properties of odd and even numbers, generate number patterns and calculate missing values in number sentences.

The measurement and geometry strand at stage 2 has nine sub-strands as previous stages. The new sub-strand is angles. Students estimate, measure and compare using standard units of length, area, volume and mass. They read time to the nearest minute and convert between hours, minutes and seconds. They sketch and name 2D and 3D objects, start to compare and classify angles and represent position on grids and maps.

The statistics and probability strand at Stage 2 has the same two sub-strands as Stage 1. Data is extended to include column graphs. For chance, students describe and compare chance events in social and experimental contents.

The number and algebra strand for Stage 3 contains the same five sub-strands as previous stages. Students are expected to use integers of any size and to add and subtract whole numbers of any size. They use a range of strategies for multiplication and division, and compare order and calculate with fractions, decimals and percentages. They analyze and create geometric and number patterns, construct and complete number sentences and locate points on the Cartesian plane.

The measurement and geometry strand of Stage 3 contains the same nine sub-strands as Stage 2. Work on length includes calculation of perimeters and conversion between units. Work on area includes calculation of the area of squares, rectangles and triangles. Students convert

between different units of capacity and of mass. They use the 24 hour clock. Students use an increasing range of 2D and 3D objects, including prisms, pyramids and particular types of triangle. They measure and construct angles and locate points using grid references.

For statistics and probability at Stage 3, students extend data representation to include dot plots. They are introduced to the probability scale.

Levels of Demand:

The level of demand is generally appropriate, though some of the non-number work might appear in the secondary curriculum in some countries. There are explicit statements about the fact that students should work at the appropriate level and may be at different stages in different levels of mathematics.

Progression:

Progression is clear from the table of objectives and outcomes. The detailed content makes this even clearer.

Assessment:

Sample tests for Year 3 and Year 5 contain items across the mathematics curriculum (despite being headed 'numeracy'). The syllabus documentation also includes information about formative and diagnostic assessment (although this is much less detailed than for Queensland).

Key competencies:

The working mathematically strand contains three sub-strands:

- communicating
- problem solving
- reasoning.

In the table of objectives and outcomes, these are developed across stages, giving some indication of how they might differ for age groups.

Primary: Science

The curriculum for New South Wales is in transition. The 1993 curriculum is currently in operation. A new curriculum was published in 2012 and implementation will take place over the next two years. Teachers in Kindergarten –Year 6 have the option to start the new science curriculum in 2014. Implementation for the primary phase will be compulsory in 2015. This brief overview makes reference to both the old and new curricula.

Orientation:

The curriculum sets out the syllabus for primary science and technology together within one common document. Relationships between science and technology are emphasized throughout in both curriculum content and learning and teaching approaches.

The 1993 curriculum for science highlights personal, social, environmental and economic reasons for the place of science and technology in the primary curriculum. It underlines the importance of science and technology education in meeting *the needs and interests of both students and the wider community* (p6) in supporting the development of skills and understandings to enable them to make informed judgments as individuals and citizens as well providing a basis for future careers in science and technology. The aims of the syllabus refer to the need to foster *students' competence, confidence and responsibility in their interactions with science and society* (p7). Objectives focus on the development of knowledge and understanding and skills in science and technology alongside the promotion of positive and informed values and attitudes.

In the new curriculum high priority is given to stimulating wonder and curiosity through active engagement in processes of *Working Scientifically and Working Technologically*. There is a continued emphasis on the importance of education in science and technology to inform decision making as an individual and a citizen. The role of the study of science and technology in enabling students to develop a *positive self concept as learners* as well as confidence and enjoyment from their learning, is underlined.

Coherence and clarity:

In the 1993 curriculum objectives and learning outcomes are provided for each overlapping stage in primary education: Stage 1 (K-2), Stage 2 (2-4) and Stage 3 (4-6). These are organized into:

- *Knowledge and Understanding*: encompassing both knowledge and understanding of content and of learning processes related to the nature of science and technology
- *Skills*: in investigating, designing and making and using technology
- *Values and Attitudes*: towards themselves, others and towards science and technology.

In the new curriculum stage statements and outcomes are again provided for each stage. In addition there is a separate stage statement and set of outcomes for Early Stage 1 (Kindergarten). There are some changes also in the organization of the content of the syllabus for Science and Technology. The new strands are as follows:

- *Values and Attitudes*: interest and positive attitudes, recognizing importance and relevance of science and technology
- *Skills*: working scientifically, working technologically
- *Knowledge and Understanding*: Natural Environment and Made Environment.

There is more limited inclusion of outcomes related to the nature of science than in the 1993 version.

The structures and outcomes associated with both the old and new curriculum are clear and reflect curricular aims and rationale. In both curricula working scientifically is emphasized and the link with technology reinforces an emphasis on applications of science and links to everyday life. Teaching and assessment approaches advocated and the glossary of terms for the new curriculum all reflect the strong focus on inquiry in the science curriculum.

Scope:

As indicated above, science is linked with technology in the primary age phase in both the 1993 and 2012 curriculum.

Content strands in the 1993 curriculum refer to *Knowledge and Understanding of: Built environments, Information and Communication, Living things, Physical phenomena, Products and services, Earth and its surroundings, Investigating, Designing and Making and Using Technology*. They encompass both knowledge and understanding of content and of learning processes related to the nature of science and technology. Outcomes are expressed in broad terms and reflect knowledge and understanding that could be gained through students' exploration and investigation of the world around them. The outcomes related to procedural understanding focus on understanding the processes of investigation and links between science and society.

In relation to the scope of *Skills* included, features of scientific inquiry are strongly represented from Stage 1 onwards, including interpretation, explanation and evaluation, not just description and communication, as is the case in some curricula. The outcomes related to *values and attitudes* include references to informed commitment to improving the environment, curiosity, gaining satisfaction in their efforts. Across the stages students are expected gain increasing appreciation of the scientific and technological contributions of 'Australians and members of other societies and cultures' (p17).

In the 2012 curriculum the outcomes for *Values and Attitudes* focus on interest and enthusiasm in the early primary stages with attention to global issues, sustainability and the use and influence of science and technology with older age groups. The *Skills* of working scientifically are set at the heart of the curriculum. Outcomes are presented as a descriptor for each stage incorporating a range of inquiry skills (as in the 1993 curriculum) but not divided into separate statements.

The objectives for *Knowledge and Understanding of the Natural Environment* are divided into the *Physical World, Earth and Space, Living World and Material World*, with broad outcomes set out for each area for each stage (including early Stage 1). Those for *Knowledge and Understanding of the Made Environment* are divided into *Built Environments, Information, Products and Material World* (the content here is shared with the natural environment). As in the 1993 curriculum much of the content could be addressed through exploration and investigation in students' immediate environment with increasing emphasis on the applications of science and technology (in line with the outcomes for values and attitudes).

The presentation of science alongside technology and the equal status given to the two subjects is a notable feature of the curriculum, as is the inclusion of specific outcomes to be assessed in relation to *Attitudes and Values*.

Level of demand:

In both old and new curricula there is a strong focus on the development of skills and attitudes. Skills associated with scientific inquiry are emphasized and outcomes more demanding than in some curricula but accessible to students of primary age. There is explicit emphasis on

developing understandings associated with the nature of science in the 1993 curriculum (at an appropriate level for children of this age group given research evidence of children's capabilities). This features less strongly in the new curriculum.

The level of demand in relation to Knowledge and Understanding builds across the primary years. In both curricula knowledge and understanding to be gained is generally expressed in broad terms (rather than through many detailed statements) and would be accessible to a wide range of students. Teachers would need to interpret these broad statements in their planning for teaching and assessment.

Progression:

Both 1993 and 2012 documents are set out to support understanding and identification of expectations of progression across the primary age phase. The 2012 curriculum provides a clear indication of how the curriculum builds on the early years' framework and includes tables that set out both progression in content and learning outcomes in relation to attitudes, skills and knowledge and understanding.

Assessment:

Guidance in relation to assessment in the 1993 curriculum emphasizes both student assessment and the use of assessment information to evaluate learning and teaching. Detailed guidance is provided in relation to assessment strategies – emphasizing a range of approaches, the need to ensure accessibility for all students and the importance of assessment in relation to ideas, skills and attitudes. Prompts are provided to support teachers' assessment and evaluation processes based on different sources of assessment information.

In the new curriculum there is an emphasis on use of the developmental sequence provided as a basis for assessment. The importance of Assessment for Learning (as well as Assessment of Learning) is underlined. There is also a focus on Assessment as Learning – with guidance on ways in which students might be encouraged to engage in peer and self evaluation and the use of collaborative and inquiry based activities as a basis for assessment. Sample Assessment for Learning Activities are provided to illustrate approaches advocated.

Teachers are required to make judgments twice a year of each student's achievement in relation to the objectives and outcomes set out in the syllabus for science and mathematics. In Years 1-6, their judgments are made on a five point achievement scale, using A-E or the word descriptors; Outstanding, High, Sound, Limited and Basic. Schools have the option to use either A-E or these words.

The written report to each child's parents provided by each school twice a year, needs also to include a written comment with strengths and areas for improvement. Kindergarten students' progress is reported through the descriptions provided by teachers in their comments.

There are no tests for science in the primary age phase.

Key competencies:

The 1993 curriculum indicates links between the science and technology and other learning areas including, mathematics, human society and its environment, personal development,

health and physical education, English and the creative arts. Opportunities are highlighted in particular within investigations or design and make activities, for the use and development of mathematical and communication skills and understandings, understandings of people, societies and environments and practical and creative skills.

In the 2012 curriculum requirements for learning across the curriculum set out explicitly cross-curriculum priorities and general capabilities as well as a range of other important areas. These are incorporated in the content of the science and technology curriculum and identified by icons in the syllabus.

Primary: Social Studies/History

The following is based on the 1998 and 2006 Board of Studies New South Wales syllabuses.

Orientation:

At the primary phase (K-6), history does not exist as a separate subject in the Human Society and Its Environment (HSIE) curriculum, which takes a social studies/civics approach to subject disciplines. At K-6, the aim of the HSIE curriculum is to develop in students the values and attitudes, skills, and knowledge and understandings that:

- enhance their sense of personal, community, national and global identity
- enable them to participate effectively in maintaining and improving the quality of their society and environment.

History is conceptualized as learning about “change and continuity”, as one of four strands of HSIE. These strands are modeled as enabling the development of specific knowledge and understanding and as contributing together to the development of information acquisition, inquiry and social and civic participation “skills” and to the development of “values and attitudes” enabling students “to contribute to intercultural understanding and the development of a democratic and socially just society in a sustainable environment.” By studying change and continuity the HSIE syllabus document argues, students will: “develop historical knowledge and understandings about their heritages and the past, and how these have influenced the present and may influence the future.”

Change and continuity is broken down in the syllabus documentation into two component elements – *Significant Events and People* and *Time and Change* – and these are further analyzed into “origins; significant people and achievements; significant places and events; changes; and current events and issues.”

Coherence and Clarity:

Clear and specific goals are provided for all aspects of the HSIE H-6 syllabus and these are specified in detail in terms of:

- *Outcomes* – for example, describes events and actions related to the British colonization of Australia and assesses changes and consequences and ‘*Indicators*’ of the achievement of these outcomes, for example, describes some of the environmental consequences of occupation in the Sydney region, for example, changes in land practices
- *Subject Matter* – that students... will learn about – for example, the establishment of a British colony – aspects of life, significant people including Arthur Phillip, achievements, events and places.

Suggested learning activities are detailed in *Implications for Learning and Teaching*, which identifies (a) what students ‘typically...will have opportunities to’ do/engage in at each grade across K-6 and (b) the opportunities that teachers will typically provide students with. For example, at Stage 2:

Typically, students in Stage 2 will have opportunities to:

Time and Change

- complete case studies of different people in the Sydney region following the arrival of the British in 1788, for example, a local Aboriginal person, soldier, convict, ex-convict, official

Typically, teachers of Stage 2 students will:

- provide opportunities for students to use primary and secondary source material such as letters, diaries and other texts that depict a variety of perspectives on early British occupation, encouraging students to discuss different interpretations and to distinguish between fact and opinion.

Pedagogical support materials are provided through exemplar ‘Units of Work’ containing ‘teaching notes, learning experiences and outcomes... indicators... for each unit’ and these ‘teaching notes’ include ‘information about the subject matter and learning opportunities that have been selected from the syllabus... key resources, links with other key learning areas and literacy notes’ and ‘student work samples based on the units’. ‘Units of Work’ are not mandatory and it ‘is expected that teachers and schools will adapt the units according to the needs of their students, the availability of or preference for particular resources and the nature of school policies and priorities’.

There is good alignment between the exemplar units of work and objectives and subject content in the syllabus – for example, in the unit on the ‘British Colonization of Australia’– and both appear well-designed to support the syllabus’ goals. The exemplification above shows that the curriculum is specified in detail. Clear guidance is given to teachers on how to translate syllabus objectives into pedagogic experiences and learning outcomes for students.

Scope:

The historical focus of the syllabus is intended to be local, national, regional and global as the following statements about the content associated with 'Change and Continuity' show; however, the accent is firmly on local and national content as the statements also demonstrate:

Through the learning experiences in this syllabus, students will develop knowledge and essential understandings about Australia's history and geography, the people who live within its territory and their social, cultural, economic and political lives. They will learn about Australians, European influences, the original occupation of Australia by Aboriginal people and Australia's shared history, Australia in the context of the Asian and Pacific regions and the world, and other cultures in the world.

Students learn that human societies and environments are affected by change and continuity. Emphasis is placed upon the importance of knowing about the past in order to understand the present and hypothesize about the future. They also learn about sites and places and the significance of these for their own and Australia's heritage. Students learn about their historical roots, their shared history and the people, forces and events that have created present societies and cultures. They recognize their connections with the past and develop understandings and values about themselves and others and their heritages, what it means to be human and, in particular, what it means to be Australian. They learn about the history of the Aboriginal peoples and their contribution to Australia's heritage.

The units of work addressing historical themes exemplified for the syllabus have a local or family history themes (for example, 'Families Past and Present: Stories and Histories'), or focus on Australian history (for example, 'British Colonization of Australia').

The curriculum is rather narrow in terms of the range of historical thinking that it addresses. There is a good focus on significance and on change, as earlier sections have shown, however, there is very little focus on other key historical concepts, such as evidence (Lee, 2005).

It seems like the focus of this course is for students to gain much knowledge of history in the Australian context, in comparison to other contexts. It is possible that this could lead to a rather narrow grasp of key historical concepts for students.

Levels of Demand and Progression:

Overall, levels of demand between grade levels tend to build sequentially on prior and existing knowledge and seem to represent an achievable challenge to the average student in a mixed ability classroom, as the example below shows.

Table 1 maps one strand of learning outcomes across grades. The activities and understandings that these outcomes sequence represent progression in cognitive challenge (from 'describes... or retells' to 'communicates importance' to 'describes... and assesses' to 'explains... significance... in developing'). In terms of content there is good evidence of

cumulative complexity in which each stage builds upon the stage before – a progressive movement away from the local and personal to the national and plural. There are perhaps some relatively abrupt jumps in level of demand, however, notably between Stage 1 and Stage 2.

Table 1: A sample of learning outcomes mapped across grades

Grade	Overview of Change and Continuity Outcomes for Significant Events and People
Early Stage 1, Kindergarten	CCES1 Describes events or retells stories that demonstrate their own heritage and the heritage of others
Stage 1, Years 1 and 2	CCS1.1 Communicates the importance of past and present people, days and events in their life, in the lives of family and community members and in other communities.
Stage 2, Years 3 and 4	CCS2.1 Describes events and actions related to the British colonisation of Australia and assesses changes and consequences.
Stage 3, Years 5 and 6	CCS3.1 Explains the significance of particular people, groups, places, actions and events in the past in developing Australian identities and heritage.

Based on BSNSW, 2006:20

Assessment:

Assessment objectives are stated very precisely for each grade and operationalized clearly in the identification of opportunities that students will experience. The syllabus documentation and exemplar teaching materials are well focused on enabling delivery.

Assessment is teacher-driven rather than externally assessed, and appears closely aligned with the breadth of curriculum aims and content, judging by the evidence of the exemplar units of work.

Key competencies:

As was noted above, the HSIE syllabus aims to enable the development of information acquisition, inquiry and social and civic participation skills and to the development of values and attitudes enabling students ‘to contribute to intercultural understanding and the development of a democratic and socially just society in a sustainable environment’.

Generic competencies are identified in the syllabus but also, to generalize from Year 2, conventional academic competencies related to researching and reasoning play a much more important role in the change and continuity component of the syllabus than competencies linked to modes of learning, to problem solving, to collaboration and to creativity.

Secondary: English language

The following text is based on the 2012 English K-10 and the 2009 English Stage 6 (Year 11 and 12) syllabus from the Board of Studies New South Wales.

Orientation:

A new English syllabus is being introduced in to NSW, starting in 2014 with Years 7 and 9, continuing with Years 8 and 10 from 2015. This will simplify the existing system, standardizing the number of outcomes to five, increasing in demand through the stages. Those outcomes are:

- A. communicate through speaking, listening, reading, writing, viewing and representing
- B. use language to shape and make meaning according to purpose, audience and context
- C. think in ways that are imaginative, creative, interpretive and critical
- D. express themselves and their relationships with others and their world
- E. learn and reflect on their learning through their study of English.

Much of the responsibility for teaching programs, and for assessment, remains with schools.

The new syllabus states:

For Kindergarten to Year 10, courses of study and educational programs are based on the outcomes of syllabuses. The content describes in more detail how the outcomes are to be interpreted and used, and the intended learning appropriate for the stage. In considering the intended learning, teachers will make decisions about the sequence, the emphasis to be given to particular areas of content, and any adjustments required based on the needs, interests and abilities of their students.

Progression is expected to be linear:

The knowledge, understanding and skills described in the outcomes and content provide a sound basis for students to successfully move to the next stage of learning.

The program of study states:

In accordance with the K–10 Curriculum Framework and the Statement of Equity Principles, the English syllabus takes into account the diverse needs of all students. It identifies essential knowledge, understanding, skills, values and attitudes. It outlines clear standards of what students are expected to know and be able to do in K–10. It provides structures and processes by which teachers can provide continuity of study for all students. The framework also provides a set of broad learning outcomes that summarize the knowledge, understanding, skills, values and attitudes essential for all students in all learning areas to succeed in and beyond their schooling.

The published programs of study, syllabus and support material are very detailed and clearly support teaching across a decentralized system.

The English K–10 Syllabus states:

Language shapes our understanding of ourselves and our world. It is the primary means by which we relate to others and is central to the intellectual, social and emotional development of all students. In the years of schooling from Kindergarten to Year 10, English is the study and use of the English language in its various textual forms. These encompass spoken, written and visual texts of varying complexity through which meaning is shaped, conveyed, interpreted and reflected. In acknowledgement of its role as the national language, English is the mandatory subject from Kindergarten to Year 12 in the NSW curriculum. Knowledge, understanding, skills, values and attitudes acquired in English are central to the learning and development of students in NSW. Developing proficiency in English enables students to take their place as confident communicators, critical and imaginative thinkers, lifelong learners and informed, active participants in Australian society. It supports the development and expression of a system of personal values, based on students understanding of moral and ethical matters, and gives expression to their hopes and ideals. The study of English from Kindergarten to Year 10 should develop a love of literature and learning and be challenging and enjoyable. It develops skills to enable students to experiment with ideas and expression, to become active, independent and lifelong learners, to work with each other and to reflect on their learning.

The stage 6 syllabus has a complementary rationale, sharpening the emphasis on students as independent learners:

The study of English enables students to make sense of, and to enrich, their lives in personal, social and professional situations and to deal effectively with change. Students develop a strong sense of themselves as autonomous, reflective and creative learners. The English Stage 6 syllabus is designed to develop in students the faculty to perceive and understand their world from a variety of perspectives, and it enables them to appreciate the richness of Australia's cultural diversity.

Stage 6 English students must take a preliminary course and a Higher School Certificate (HSC) course either at standard or advanced level. There are also extension courses available to students who are taking the advanced course, as well as preliminary Fundamentals of English, English Life Skills and English as a Second Language courses.

Coherence and Clarity:

The aims of the program of study are comprehensive and clearly laid out:

In their study of English, students continue to develop their critical and imaginative faculties and broaden their capacity for cultural understanding. They examine the

contexts of language usage to understand how meaning is shaped by a variety of social factors. As students' command of English grows, they are able to question, assess, challenge and reformulate information and use creative and analytical language to identify and clarify issues and solve problems. They become imaginative and confident users of a range of electronic and digital technologies and understand and reflect on the ongoing impact of these technologies on society. These skills and understandings allow them to develop their control of language in ways that will help them in lifelong learning, in their careers and in life.

The aim of English in Years K–10 is to enable students to understand and use language effectively, appreciate, reflect on and enjoy the English language and to make meaning in ways that are imaginative, creative, interpretive, critical and powerful.

The aim of the Stage 6 syllabus is almost identical, “to enable students to understand, use, enjoy and value the English language in its various textual forms and to become thoughtful, imaginative and effective communicators in a diverse and changing society.”

The programs of study are expressed in outcomes for each stage. The varying number of outcomes has become rather unwieldy, and will be reduced to five from 2015. They are, however, strongly supportive for teachers in a decentralized system. Outcomes are cross referenced to Related Life Skills outcomes. For example outcome 1 for year 7: *A student responds to and composes texts for understanding, interpretation, critical analysis, imaginative expression and pleasure* is cross referenced to five other outcomes, such as 2A: *communicates for a variety of purposes, audiences and contexts*.

Outcomes are supported by a specification of content, expressed in broad, general terms, leaving the specific selection of, for example, texts to local decision making. For example, Engage personally with texts:

- recognize, reflect on, interpret and explain the connections between their own experiences and the world in texts
- consider and analyze the ways their own experience affects their responses to texts
- explore and appreciate the aesthetic qualities in their own and other texts and the power of language to communicate information, ideas, feelings and viewpoints
- experiment with language forms and features to compose texts for pleasure and enjoyment.

The requirements at Year 7 are ambitious and sophisticated:

- Develop and apply contextual knowledge:
- interpret the stated and implied meanings in spoken texts, and use evidence to support or challenge different perspectives
- understand and apply knowledge of language forms and features

- apply increasing knowledge of vocabulary, text structures and language features to understand the content of texts
- recognize that vocabulary choices contribute to the specificity, abstraction and style of texts
- analyze how the text structures and language features of persuasive texts, including media texts, vary according to the medium and mode of communication
- understand and explain how the text structures and language features of texts become more complex in informative and persuasive texts and identify underlying structures such as taxonomies, cause and effect, and extended metaphors.

By Year 10 there is sufficient depth to support growth and differentiation:

understand, interpret and discuss how language is compressed to produce a dramatic effect in film or drama, and to create layers of meaning in poetry, for example haiku, tankas, couplets, free verse and verse novels. A student: effectively uses a widening range of processes, skills, strategies and knowledge for responding to and composing texts in different media and technologies.

However the outcomes presently specified have overlapping elements in common, requiring frequent cross-referencing, for example:

Outcome 3: A student uses and describes language forms, features and structures of texts appropriate to a range of purposes, audiences and contexts.

Outcome 4: A student makes effective language choices to creatively shape meaning with accuracy, clarity and coherence.

And some are purely from the realm of related life skills.

Outcome 9: A student uses, reflects on and assesses their individual and collaborative skills for learning.

There are 13 outcomes in the Stage 6 (Years 11 and 12) preliminary and standard syllabuses, and they show clear progression as well as highlighting the role that students play in taking responsibility for their own learning. For example, outcomes 10, 12 and 13:

Preliminary	Standard
10. A student analyses and synthesises information and ideas from a range of texts for a variety of purposes, audiences and contexts.	10. A student analyses and synthesises information and ideas into sustained and logical argument for a range of purposes and audiences.
12. A student reflects on own processes of responding and composing.	12. A student reflects on own processes of responding and composing.
13. A student reflects on own processes of	13. A student reflects on own processes of

learning.	learning.
-----------	-----------

Advanced students have a few, additional, outcomes.

Scope

The scope is wide, and related to broader areas of learning. For K to 10:

Students will develop knowledge, understanding and skills in order to:

- communicate through speaking, listening, reading, writing, viewing and representing
- use language to shape and make meaning according to purpose, audience and context
- think in ways that are imaginative, creative, interpretive and critical
- express themselves and their relationships with others and their world
- learn and reflect on their learning through their study of English.

Specific skills are defined through objectives. These embrace speaking and listening, writing and representing, handwriting and using digital technologies, reading and viewing, spelling, grammar, punctuation and vocabulary. However the program of study includes more generic skills such as values and attitudes:

Students will value and appreciate the importance of the English language as a key to:

- learning the personal enrichment to be gained from a love of English, literature and learning
- the power of language to explore and express views of themselves as well as the social, cultural, ethical, moral, spiritual and aesthetic dimensions of human experiences
- the power of effective communication using the language modes of speaking, listening, reading, writing, viewing and representing the role of language in developing positive interaction and cooperation with others
- the diversity and aesthetics of language through literary and other texts
- the independence gained from thinking imaginatively, creatively, interpretively and critically.

Or this example from Outcome 8: *A student questions, challenges and evaluates cultural assumptions in texts and their effects on meaning.*

Values and attitudes continue in Years 11 and 12. From the advanced level course, students learn to appreciate:

- the role of language in developing positive interaction and cooperation
- their developing skills as users of English
- the pleasure and diversity of language and literature
- the role of language and literature in their lives

- the study and use of English as a key to learning
- reflection on their own processes of responding, composing and learning
- English as a language of communication and culture
- appropriateness, subtlety and aesthetics in language use.

Levels of Demand and Progression:

There are three broad bands through Years K-10, SEN, standard and advanced standard. The terms in which students with learning difficulties are described sound rather out of date, and their curriculum is restricted:

For a small percentage of students with special education needs, particularly those with an intellectual disability, adjustments to teaching, learning and assessment may not be sufficient to access some or all of the Stage 4 and Stage 5 outcomes. These students may best fulfill the curriculum requirements for English Years 7–10 by undertaking Life Skills outcomes and content.

For Standard and Advanced Standard the outcomes are highly differentiated. For example the outcome ‘Engage personally with texts’ progresses from stage 4 to stage 5:

recognize photographs, pictures or symbols as representations of familiar people, objects, venues.

view and respond to a range of visual texts, media and multimedia for enjoyment.

At high school certificate level (advanced standard) the level of response required is very high. From a 2011 test paper:

- Demonstrate understanding of the way perceptions of belonging are shaped in and through texts
- Describe, explain and analyze the relationship between language, text and context.

Specific questions require a sophisticated response. This, from a 2013 test paper:

- Describe how a sense of disconnection is created in the image.
Or
- Why is the ‘creased photograph’ important to the speaker and his sense of identity?

Two written components of this examination also develop the wider intellectual social understanding inherent throughout the mother tongue curriculum. The first in a literary way: *Compose a piece of imaginative writing that explores a decision to embrace or reject a connection with others.* A further written piece is more about participation in society:

An individual's sense of belonging is determined not only by their own choices but also by the attitudes of others. How accurately does this statement reflect the ideas represented in your prescribed text and ONE other related text of your own choosing?

The literature canon is broad, with no great emphasis on Australian texts, but including Asian, English and American contemporary authors and the classics: Amy Tan, Jhumpa Lahiri, Charles Dickens, Ruth Praver, Tara Winch, Raymond Gaita, Arthur Miller, Jane Harrison, Baz Luhrmann etc.

The second paper in the HSC also develops the sense of abstract social themes, in this case a comparison between Shakespeare and a contemporary Al Pacino film: *In what ways is your appreciation of both texts enhanced by a comparative study authority in King Richard III and Looking for Richard?*

Students are also asked more familiar questions on contemporary and classic texts, but again looking for comparisons, for example between *Who's Afraid of Virginia Wolf* and *A Room of One's Own*.

The Standard HSC paper follows a similar format as the Advanced Standard, but the texts used, and the responses required, are not as sophisticated: *The Curious Incident of the Dog in the Nighttime presents the reader with a powerful exploration of the impact of personal choices on relationships. How does Haddon achieve this?* (2013 paper).

Assessment

For years K-10 external testing is through NAPLAN, for Upper Secondary, assessment is through the HSC certificate described above.

The majority of assessment is local and teacher centered, categorized by outcomes defined within the English syllabus. Assessment is seen as integral to teaching. The Board of Studies described assessment for, as, and of learning. These are described as essential components of good teaching. This is supported by detailed specification of content.

Assessment can be used to provide information to direct teaching, provide feedback to students about progress or contribute to reporting. Although all of these are valid uses of assessment, they require different emphases in assessment.

The Board of Studies specifies a curriculum framework that consists of three interrelated elements: outcomes and content in syllabuses showing what is to be learned; stage statements that summarize student achievement, samples of work on the Board Assessment Resource Centre (ARC) website that provide examples of levels of achievement within a stage.

There is, perhaps misplaced, an assumption that progression will be smooth:

The knowledge, understanding and skills described in the outcomes and content provide a sound basis for students to successfully move to the next stage of learning.

Teachers are supported by a *Consistent Teacher Judgment in Action* website. Its aim is to help establish the understandings necessary to ensure that consistent teacher judgments about student achievement can occur across all key learning areas.

Assessment covers reading, listening, viewing, writing, speaking, representing, communicating and context, analyzing language, interpretive, imaginative and critical thinking, and expressing views. Each is supported by a detailed, web based, description of activities.

Key competencies

The program of studies is intensively cross-referenced, and real life skills permeate the English curriculum. There is sensitivity to Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia. More general themes include: sustainability, critical and creative thinking, ethical understanding, information and communication technology capability, intercultural understanding, literacy, numeracy, and personal and social capability. Across all curriculum areas there is reference to civics and citizenship, difference and diversity, work and enterprise.

Key competencies are built directly into the Stage 6 syllabuses:

English Stage 6 provides a powerful context within which students develop general competencies that are essential for the acquisition of effective, higher-order thinking skills necessary for further education, work and everyday life.

- collecting, analyzing and organising information
- communicating ideas and information
- planning and organizing activities
- working with others in teams
- solving problems
- using technology.

These key competencies are developed by the core processes of composing and responding that are essential to each course. They are reflected through the objectives, outcomes and content of each of the Stage 6 English courses.

Secondary: Mathematics

Secondary is taken to include Stages 4 (Years 7/8), Stage 5 (Years 9/10) and Stage 6 (Years 11/12).

Orientation:

The rationale for studying mathematics up to Year 10 is related primarily to its value to individual students. There is a brief mention of the importance of mathematics to scientific and technological advances but arguments for the economic importance of mathematical knowledge are not evident. The value for individual students includes the application of mathematics for decision-making and problem solving in everyday life, including in further studies and in employment. Appreciation of mathematical qualities of elegance, power, creativity and efficiency is also related to the development of positive self-concept, enjoyment and motivation.

This rationale is reflected in the aims of the K-10 curriculum, which focus on: using mathematics in personal life, employment and citizenship; developing understanding, fluency and problem solving; and appreciating mathematics for itself and for its connections with other disciplines.

In Stage 6 (Years 11-12), students follow different pathways in mathematics depending on their prior achievement and intended trajectories:

- General Mathematics is designed to prepare students for vocational pathways or to undertake higher education courses in the areas of “the humanities, nursing and paramedical sciences.” (There are two “General” pathways, only one of which is eligible to be examined as part of the Higher School Certificate). The General Mathematics pathways are oriented towards the development of skills and techniques with direct application to “a broad range of human activity”, making an explicit contrast with the more abstract orientation of the other Stage 6 courses. This orientation is reflected in the inclusion of “focus studies” on themes such as “Mathematics and Driving”, “Mathematics and the Human Body”, etc.
- The other three options involve different amounts and depths of study, consisting of two, three or four units: a two unit course intended to support concurrent studies in science subjects and to prepare students for minor studies in mathematics and science at tertiary level; a three unit course is recommended for those intending to study physical sciences, engineering or computing at tertiary level; and a four unit is course recommended for those with a special interest and aptitude for mathematics as a preparation for further study of the subject at tertiary level.

The two, three and four unit syllabuses all define their mathematical content in a primarily abstract way but also claim to be oriented towards content that has applications in the “real world.” In the case of the two unit syllabus, all the content is claimed to be applicable.

Throughout the secondary curriculum it is expected that students should make appropriate use of digital technologies. The development of skills in using computational technologies and appreciation of their capabilities and limitations are included explicitly at relevant points in the syllabi.

Coherence and Clarity:

The curriculum for Stages 4 and 5 lists general outcomes and specific content for each sub-strand (see next section for list of sub-strands). The content items are cross-referenced to the

Australian national curriculum but these are elaborated to define their scope more precisely, for example:

Solve linear equations using graphical techniques (ACMNA194)

- recognise that each point on the graph of a linear relationship represents a solution to a particular linear equation
- use graphs of linear relationships to solve a corresponding linear equation, with and without the use of digital technologies, e.g. use the graph of $v = 2x + 3$ to find the solution of the equation $2x + 3 = 11$
- graph two intersecting lines on the same set of axes and read off the point of intersection
 - explain the significance of the point of intersection for two lines in relation to it representing the only solution that satisfies both equations (Communicating, Reasoning).

This is a very high level of specificity. Each sub-strand also includes a section giving background information related to such aspects as the history of the topic and connections to applications and other mathematical topics together with identification of significant language issues. It is not clear who is the intended audience of this section. While some parts of the information give appropriate guidance for teachers (for example, to ensure that students are aware that 'gradient' may be referred to as 'slope' or to suggest where students might use practical equipment or appropriate software), other parts offer information that one would expect secondary mathematics teachers to be very familiar with, for example:

Linear relationships are very common in mathematics and science. The graph of two quantities that have a linear relationship is a straight line. A linear relationship may be a direct relationship or an inverse relationship. In a direct relationship, as one quantity increases, the other quantity also increases, or as one quantity decreases, the other quantity also decreases. In an inverse relationship, as one quantity increases, the other quantity decreases.

The syllabus for the General Mathematics pathway lists outcomes and content in a rather less detailed way, for example: *calculate measurements from scale drawings*. However, the content is then glossed with more specific "considerations": *Scale diagrams should include house plans and maps. Online maps are readily available (with measurement tools) for extension activities and "suggested applications"*:

Students accurately construct a scaled floor plan of the classroom.
Find ceiling heights from building plans.
Use house plans to cost carpeting, tiling, painting rooms, etc.
Clearly communicating the curriculum expectations.

The syllabus for the two and three unit mathematics courses is presented as a list of topics with very little detail:

7. Series and Applications

7.1 Arithmetic series. Formulae for the n th term and sum of n terms.

7.2 Geometric series. Formulae for the n th term and sum of n terms.

7.3 Geometric series with a ratio between -1 and 1 . The limit of x^n , as $n \rightarrow \infty$, for $-1 < x < 1$, and the concept of limiting sum for a geometric series.

7.4 Mathematical induction. Applications.

7.5 Applications of arithmetic series.

Applications of geometric series: compound interest, simplified hire purchase and repayment problems.

Applications to recurring decimals.

However, a later section of the syllabus provides detailed guidance for teachers on each topic including suggestions of pedagogic strategies, indication of where rigorous proof is or is not expected, and examples of applications and problems. The four unit mathematics course presents a list of “skills objectives” for each topic, itemizing what students should be able to do. This is followed by “Applications, Implications and Considerations”, offering advice and examples that define the scope of the topic more clearly.

Scope:

The content for primary and lower secondary is organized into three content strands: Number and Algebra; Measurement and Geometry; Statistics and Probability. There are also process objectives “Working Mathematically” integrated into the content strands. At secondary level, sub-strands are identified as follows:

- Number and Algebra:
 - computation with integers (stage 4 only)
 - financial mathematics
 - ratios and rates
 - fractions, decimals and percentages (stage 4 only)
 - logarithms (Stage 5.3 only)
 - polynomials (Stage 5.3 only)
 - functions and other graphs (Stage 5.3 only)
 - non-linear relationships
 - equations
 - indices
 - algebraic techniques

- Measurement and Geometry:
 - length
 - area and surface area
 - volume
 - numbers of any magnitude
 - time

- properties of geometric figures
- angle relationships
- right-angled triangles
- trigonometry and Pythagoras' theorem
- circle geometry (Stage 5.3 only)
- Statistics and Probability
 - data collection and representation
 - single variable data analysis
 - bivariate data analysis
 - probability.

Working Mathematically includes Communication, Problem Solving and Reasoning. These aspects are associated with specific items of content in the lists of each sub-strand.

The content of the General Mathematics course at Stage 6 is divided into five strands:

- Financial Mathematics
- Data and Statistics
- Measurement
- Probability
- Algebra and Modelling.

In each year there are also two “Focus Studies” addressing specific areas of activity that are informed by mathematical thinking. In Y11 these are Mathematics and Communication, focusing on issues related to the everyday use of digital technologies, and Mathematics and Driving, focusing on the costs and safety issues. In Y12 the focus studies are Mathematics and Health (body measurements, medication, life expectancy) and Mathematics and Resources (water management, energy and sustainability).

The two/three unit course at Stage 6 is defined by a list of more traditional abstract topics:

- Basic Arithmetic and Algebra
- Plane Geometry
- Probability
- Real functions of a real variable and their geometrical representation
- Trigonometric ratios
- Linear functions and lines
- Series and applications
- The tangent to a curve and the derivative of a function
- The quadratic polynomial and the parabola
- Geometrical applications of differentiation
- Integration

- Logarithmic and exponential functions
- The trigonometric functions
- Applications of calculus to the physical world
- Inverse functions and the inverse trigonometric functions
- Polynomials
- Binomial theorem
- Permutations, combinations and further probability.

The focus of the mathematics courses at this level is primarily on the development of mathematical concepts and techniques. Applications are very limited, although the unit on Application of calculus to the real world aims to enable students to understand how calculus is used in simple situations, including rates of change, kinematics, projectile motion and simple harmonic motion. In most cases, students are provided with the necessary equations rather than needing to derive them for themselves.

The topics of the 4 unit course are:

- Graphs
- Complex Numbers
- Conics
- Integration
- Mechanics
- Polynomials
- Harder three unit topics (intended to take approximately 30% of the course, extending the difficulty of the problems and the rigor of proofs in the topics of the three unit course).

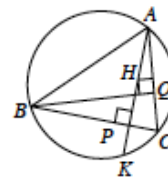
It is interesting to note that the study of non-analytic geometry continues through the Stage 6 courses. Students in Stage 5 meet concepts, properties and theorems involving triangles, quadrilaterals and circles, the complexity of the situations in which these may be applied and the extent to which formal proofs are required continues to be developed through Stage 6.

The following example from the four-unit syllabus illustrates the complexity and depth achieved at the highest level:

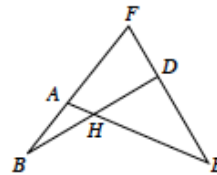
- The following examples on concyclic points illustrate the depth of treatment that 4 Unit students should encounter with all results in the course on deductive geometry.

- The altitudes AP and BQ in an acute-angled triangle ABC meet at H . AP produced cuts the circle through A , B and C at K . Prove that

$$HP = PK.$$



- BF , FE , AE and BD are 4 straight lines as in the diagram. AE meets BD at H . Circles are drawn through the vertices of the four triangles ABH , HDE , FBD and FAE . Prove that the four circles have a common point.



Levels of Demand:

The K-10 curriculum document identifies a number of adjustments and strategies to allow students with Special Educational Needs to access the curriculum content and outcomes. Where this is not considered appropriate there is a separate Life Skills curriculum in Years 7-10. The outcomes and content of this curriculum are related to those of the mainstream curriculum and are structured in a similar way.

The needs of students with English as an additional language or dialect are highlighted in the K-12 curriculum document and within each topic there are notes about language issues that would enable teachers to support all students in learning the academic language of mathematics.

The curriculum for Years 9 and 10 is divided into three nested strands at differing levels: 5.1, 5.2 and 5.3. It is anticipated that the majority of students will study the content of 5.1 and 5.2 while “many” will also study the content of 5.3.

Sample unit plans for Stages 4 and 5 demonstrate how differentiation may happen in the classroom, indicating work from the previous stage that may need to be reviewed and suggesting adjustments to make the work accessible to lower achievers. While the Stage 5 plan includes work related to 5.3 objectives for higher achievers, the degree of challenge for the strongest students at Stages 4 and 5 is not explicit.

The algebra strand in Years 7 and 8 focuses mainly on linear equations, patterns and relations. Only quadratic equations of the form $x^2=c$ are met at this level. This is apparently an end-point for those students who do not progress beyond stage 5.1. At Stage 5.2, students solve monic quadratics by factorization. At Stage 3 students are expected to be able to solve any quadratic equation, choosing an appropriate method (factorization, completing the square and using the formula are mentioned) and to predict the number of real roots (including using the discriminant). This form of progression is typical of other topics: a broadly accessible level of

demand in Stage 4, consolidated in Stage 5.1, built on for a majority of the cohort in Stage 5.2, with rapidly deepening demand, both in extent and rigor of the content for the highest attainers in Stage 5.3.

Progression:

Across Stages 4, 5.1, 5.2 and 5.3, the content sub-strands present a coherent progression. For example, within the sub-strand *Properties of Geometrical Figures*, the notion of congruence is defined in Stage 4 and used to solve problems numerically and to investigate properties of quadrilaterals. There is an equivalent development of the notion of similarity in Stage 5.1. Both congruence and similarity are used in simple deductive proofs in Stage 5.2, while the scope and formality of geometrical reasoning is further extended in Stage 5.3.

The General Mathematics pathways in Stage 6 build on the content of stage 5.1. The syllabus includes guidance for teachers on aspects of the earlier curriculum that are likely to need revision.

Assessment:

Guidance on assessment is included within the K-12 curriculum specification, including examples of assessment activities for many topics. The sample unit plans also include guidance on assessment. There is a strong focus on formative assessment and on a range of assessment approaches that involve students in communicating their understanding and engaging in problem solving. There is a high degree of alignment between these suggested assessment approaches and the curriculum, including the process strand.

Assessment in Stage 6 is by externally set end of course examination, contributing to the HSC. (The General Mathematics 1 course, which does not contribute to HSC, is teacher assessed.) The examination for General Mathematics 2 consists of a multiple-choice section and an open response short answer section. A high proportion of the questions involve some “real world” context, though this often seems a routine application. Several of the later questions ask students to make judgments (for example, whether a loan paid off at a given rate will be completely paid at the end of a certain period of time), and to justify these by showing numerical calculations. This is aligned with the curricular emphasis on use of mathematics in everyday activities and on communication, reasoning and problem solving. It is not evident that the “focus studies” form a significant part of the examination.

The examinations for Mathematics (two, three and four units) are structured similarly with multiple choice questions that generally require a routine computation or manipulation followed by open response questions. Most of the open response questions are short and appear routine. There is also a small number of more substantial questions, though these are all structured so that they do not demand substantial problem formulation. The coverage of topics in the mathematics examinations is consistent with the curriculum.

Key competencies:

The K-12 curriculum integrates process objectives and provides substantial guidance to teachers about the kinds of activities that will develop and demonstrate these. The sample unit

plans include group work but do not suggest what kinds of development students might need for this to be successful.

Secondary: Science

Orientation

The science Years 7-10 (Stages 4 and 5) syllabus developed in 2003 and last revised in 2009 sets out a rationale and aims. There is an emphasis on critical thinking, problem-solving, scientific inquiry and communication in meaningful and relevant contexts, while working individually or in groups. In particular, examining the contribution of Australian scientists is considered an important part of the syllabus.

The aim of the science Years 7–10 syllabus is to provide learning experiences through which students will:

- acquire scientific knowledge and skills and develop understanding about phenomena within and beyond their experience
- develop an appreciation of science as a human activity and apply their understanding to their everyday life
- develop positive values about and attitudes towards themselves, others, lifelong learning, science and the environment.

The objectives of the NSW Science Years 7–10 Syllabus describe the purpose of the syllabus and are:

Knowledge and Understanding

Students will develop knowledge and understanding of:

- the history of science
- the nature and practice of science
- applications and uses of science
- implications of science for society and the environment
- current issues, research and development
- models, theories and laws, and structures and systems related to the physical world, matter, the living world, and Earth and space
- interactions within the physical world, matter, the living world and Earth and space.

A small percentage of students with special education needs may best fulfil the mandatory curriculum requirements for science by undertaking Life Skills outcomes and content. Life Skills outcomes will be selected on the basis that they meet the particular needs, goals and priorities of each student. Students are not required to complete all outcomes. Outcomes may be demonstrated independently or with support.

Skills

Students will develop skills in working scientifically through:

- planning investigations
- conducting investigations
- communicating information and understanding
- developing scientific thinking and problem-solving techniques
- working individually and in teams.

Values and Attitudes

Students will develop positive values and attitudes towards themselves, others, learning as a lifelong process, science and the environment.

Each outcome is described in terms of its essential content and has been designed to be realistically addressed by typical students in an indicative time of 400 hours. Teachers are required to develop units of study to address all of the essential content of the Prescribed Focus Areas and the Domain. Teachers may use any remaining allocated time in each stage to:

- incorporate additional content into units of study throughout their teaching program or develop extension units in their teaching program. In this way, students' learning can be extended into areas of specific interest
- choose other contexts to reinforce the essential content of the syllabus. In this way, students can be given more time to acquire the essential knowledge, understanding and skills
- undertake remediation of knowledge, understanding and/or skills in addressing the outcomes and essential content of the syllabus.

Coherence and clarity:

The content of the science Years 7–10 syllabus comprises three major elements. Each unit of work developed by teachers must include content related to each of these three elements:

- Contexts
- Prescribed Focus Areas
- Domain.

Within this structure there are clear and specific goals for each Year. The science Years 7–10 Syllabus defines Stages 4–5 in the science K–12 Curriculum. Sets of outcomes are defined for both Stages 4 and 5. They include, with their respective objectives prescribed focus areas:

Students will develop knowledge and understanding of:

- the history of science
- the nature and practice of science
- applications and uses of science
- implications of science for society and the environment
- current issues, research and development.

Domain: Knowledge and Understanding

Students will develop knowledge and understanding of:

- models, theories and laws, and structures and systems related to the physical world, matter, the living world, and Earth and space
- interactions within the physical world, matter, the living world and Earth and space.

Domain: Skills

Students will develop skills in working scientifically through:

- planning investigations
- conducting investigations
- communicating information and understanding
- developing scientific thinking and problem-solving techniques
- working individually and in teams.

Domain: Values and Attitudes

Students will develop positive values and attitudes towards themselves, others, learning as a lifelong process, science and the environment.

Assessment:

Standards in science can be used as a reference point for planning teaching and learning programs, and for assessing and reporting student progress. Syllabus outcomes in Science contribute to a developmental sequence in which students are challenged to acquire new knowledge, understanding and skills. The assessment system used for Science K–10 is assessment for learning. Assessment for learning involves teachers in deciding how and when to assess student achievement, as they plan the work students will do, using a range of appropriate assessment strategies including self-assessment and peer assessment. Teachers provide students with opportunities in the context of everyday classroom activities to demonstrate their learning as well as planned assessment events. The Science Years 7–10 Syllabus lists Assessment for Learning Principles (see above) which provide the criteria for judging the quality of assessment materials and practices.

Descriptions of levels of achievement for Stage 4 and Stage 5 in science have been developed to provide schools with a useful tool to report consistent information about student achievement to students and parents.

Key Competencies:

Key competencies are embedded within the objectives and content of the skills. The content develops students' ability to:

- plan, organize and perform first-hand investigations to test a hypothesis or question that can be researched

- collect, analyze and organize information from first-hand investigations and secondary sources, organizing data using a variety of methods including diagrams, tables and spreadsheets, and checking reliability of gathered data and information by making comparisons with observations or information from other sources
- communicate ideas and information using a range of text types including explanation, procedure and report formats to present data and information from first-hand investigations
- identify the nature of issues and problems, framing possible problem-solving strategies and developing creative solutions in a logical, coherent way
- use technology including CD-ROMs and the internet to access information
- work individually and in teams where appropriate, safely, responsibly and effectively with realistic timelines and goals
- use appropriate mathematical processes including appropriate units, graphs, spreadsheets and mathematical procedures and relationships.

These are developed by teachers as part of the learning and teaching process, and assessed internally.

Secondary: Earth Science

Orientation:

Earth science is taught as 'earth and environmental science'. There is a clear and well developed vision, aim and rationale for teaching earth science. This is articulated explicitly and also comes through in the explanation of the content and processes of the earth science curriculum. Curriculum aims are given in three areas of knowledge, skills and attitudes. There is a balance between the three areas, but throughout the curriculum documents there is a notable emphasis on values and attitudes and a moral tone to the curriculum. There is a role of earth science education to foster a sense of 'stewardship' of the earth and a respect for diversity and working effectively with others as citizens. Decision-making and problem solving is prominent and there is attention to how people interact with the fragile and dynamic earth, especially in the context of Australia. There is a very strong emphasis on fieldwork and the skills of investigation. Encouraging future study and a learning ethos is emphasized. Learning for future employment is mentioned, but the tone of the curriculum leans more toward deep understanding and 'positive' values and individual growth through knowledge and skills to support a 'better' future society, than toward hard-edged economic performance management.

A notable feature of the curriculum is the very detailed, coherent and clear 'syllabus' document. Like the Queensland syllabus, this is much more than simply being a document to give lists of content and requirements or standards to be met. The NSW syllabus provides detailed background and explanation to why and how earth science should be studied.

Coherence and Clarity:

The syllabus document has strong coherence between the aims and rationale, and the content and processes as explained in detail. The development of the syllabus document ‘marries up’ with the initial aims and principles set down early on. This is true of all key emphases, including fieldwork, investigation skills, decision-making and problem-solving, knowledge and understanding of earth science processes, landforms and their local contexts. Although the curriculum puts strong emphasis on developing ‘positive’ values, there is a strong knowledge and understanding emphasis in the content and assessment of the curriculum. This is coherent, and consistent with the stated vision of developing the social and moral person through the pursuit and acquisition of knowledge. The curriculum is rigorous in this respect. The assessment arrangements are clear and also ‘marry up’ with the curriculum aims. There is strong attention to formative assessment uses as well as summative.

Scope:

The curriculum given for secondary earth science does not appear to include every aspect possible. There is a consistent emphasis on how each component of the earth system (water, ice, rock soil, atmosphere and so forth) functions and the significance to people. The earth systems approach is a strength and is likely to help students to make sense of the component parts of the earth science curriculum. There is an appropriate weighting toward Australian contexts. Some areas seem to receive less attention (such as glaciation, river processes and meteorology) than others (such as plate tectonics, geological timescales and ecosystems). But this is a reasonable selection, given the overall aims and the scope of curriculum allows for good breadth and depth. A very strong feature for both breadth and depth of curriculum is the amount and quality of fieldwork expected (a minimum of 80 hours spread across preliminary and higher secondary education).

Levels of Demand:

An impressive and helpful feature of the curriculum is a series of detailed tables for the all earth science curriculum areas, showing the expected outcomes in terms of both what students *learn* (content) and what they *do* (process of learning/ skills and capabilities). There is sufficient clarity in assessment support documentation to help teachers prepare students appropriately. A very strong feature of the curriculum is attention to the formative uses of assessment, which can encourage students to be suitably stretched and challenged.

Progression:

An excellent feature is a clear table in the syllabus showing each objective and its learning outcome at the preliminary and higher level. These outcomes show progression in both the nature and level of cognition (from description to analysis/ from basic analysis to more critical evaluation and so forth) and in the breadth of knowledge (for example, drawing on a wider range of factors affecting a process). The content and processes of the curriculum give much scope for the teacher to design opportunities for progression – for example the detailed tables, which help the teacher to assess how far the students have learned content and how far they are able to perform a certain skill or demonstrate an ability. Progression is supported by the overall clarity of what the teacher is aiming for.

Assessment:

The clarity of content and outcomes (both knowledge and skills/ abilities) supports strong summative and formative assessment. Assessment curriculum documents show curriculum coherence in 'marrying up' with statements of aims and curriculum content. There is emphasis on the formative use of assessment. The first point made in the rationale of the NSW education board guidance for assessment of is that the first purpose of assessment should be formative (to help students to learn).

- *assisting student learning*
- *evaluating and improving teaching and learning programs*
- *providing evidence of satisfactory achievement and completion in the Preliminary course*
- *providing the Higher School Certificate results.*

Key competencies:

Key competencies are summarized as:

- planning and conducting investigations
- communicating information and understanding
- developing scientific thinking and problem-solving techniques
- working individually and in teams
- develop positive attitudes about, and values towards:
 - themselves and others
 - learning as a lifelong process
 - Earth and the environment.

There is ample scope and support to develop these opportunities in meaningful ways through the curriculum.

Secondary: Biology

Implementation of new syllabuses, including science, is phased from 2014. The previous syllabus was developed in 2003, and amended in 2009, developed within the parameters set by the Board of Studies NSW in its K–10 Curriculum Framework. This report is based on these current standards, as outlined in *K–10 Curriculum Framework, the Science Years 7–10 Syllabus 2003* and the *NSW Biology Stage 6 Syllabus*. Biology is an integral part of the science syllabus, but a separate entity at Stage 6.

Orientation:

The Biology Stage 6 syllabus has a preliminary course and an HSC (Higher School Certificate) course. The preliminary and HSC courses are organized into a number of modules. The preliminary modules consist of core content that would be covered in 120 indicative hours. The HSC course consists of core and options organized into a number of modules. The core content covers 90 indicative hours with one option covering 30 indicative hours. Students are required to cover one of the options.

Biology in Stage 6 aims to provide learning experiences through which students will:

- acquire knowledge and understanding about fundamental concepts related to living things and their environments, the historical development of these concepts and their application to personal, social, economic, technological and environmental situations
- progress from the consideration of specific data and knowledge to the understanding of models and concepts and the explanation of generalized biology terms, from the collection and organization of information to problem-solving, and from the use of simple communication skills to those which are more sophisticated
- develop positive attitudes towards the study of living things, the environment and the opinions held by others, recognizing the importance of evidence and the use of critical evaluation of different scientific opinions related to various aspects of biology.

The stated objectives are:

Students will develop knowledge and understanding of:

1. the history of biology
2. the nature and practice of biology
3. applications and uses of biology
4. the implications of biology for society and the environment
5. current issues, research and developments in biology
6. cell ultrastructure and processes
7. biological diversity
8. environmental interactions
9. mechanisms of inheritance
10. biological evolution.

Students will develop further skills in:

11. planning investigations
12. conducting investigations
13. communicating information and understanding
14. developing scientific thinking and problem-solving techniques
15. working individually and in teams.

Students will develop positive values about and attitudes towards:

16. themselves, others, learning as a lifelong process, biology and the environment.

Coherence and Clarity:

Biological content is defined in the Domain: Knowledge and Understanding. For Stage 4, this includes:

- 4.8 describes features of living things
- 4.10 identifies factors affecting survival of organisms in an ecosystem.

For Stage 5, this includes:

- 5.8 relates the structure and function of living things to models, theories and laws
- 5.10 assesses human impacts on the interaction of biotic and abiotic features of the environment
- 5.11 analyzes the impact of human resource use on the biosphere to evaluate methods of conserving, protecting and maintaining Earth's resources.

Essential content is defined for each of these, for example, 4.8 describes features of living things:

- 4.8.1 cell theory
- 4.8.2 classification
- 4.8.3 unicellular organisms
- 4.8.4 multicellular organisms
- 4.8.5 humans.

Each item of essential content is exemplified. For example, 4.8.1 cell theory:

- identify that living things are made of cells
- identify and describe the functions of the nucleus, cytoplasm, cell membrane, cell wall, chloroplast
- identify that substances move into and out of cells
- distinguish between unicellular and multicellular organisms.

A similar pattern exists for skills, for example, for Stage 4, 4.13 clarifies the purpose of an investigation and, with guidance, produces a plan to investigate a problem. 4/5.13.1 includes identifying data sources:

- 4/5.13.2 planning first-hand investigations
- 4/5.13.3 choosing equipment or resources.

Each item of essential content is exemplified, for example, 4/5.13.1 identifying data sources:

- describe a problem and develop an hypothesis or question that can be tested or researched
- propose possible sources of data and/or information relevant to the investigation
- identify what type of information or data need to be collected
- justify why particular types of data or information are to be collected
- identify the appropriate units to be used in collecting data

- recommend the use of an appropriate technology or strategy for collecting data or gathering information
- formulate a means of recording the data to be gathered or the information to be collected.

Much detail is provided to help teachers to see how the different elements and outcomes work together, and how they can be used to create a teaching and learning program that is appropriate to that grade and will lead to the desired outcomes at the end of that Stage.

The NSW Biology Stage 6 Syllabus follows a very similar pattern of skills and knowledge. It is expected that students will further develop skills in planning and conducting investigations, communicating information and understanding, scientific thinking and problem-solving and working individually and in teams. Each module specifies content through which skill outcomes can be achieved. Teachers are advised to develop activities based on that content to provide students with opportunities to develop the full range of skills.

Scope:

The Science Years 7–10 Syllabus details the curriculum, assessment and reporting, in stages 4 and 5. Biological content is defined in the Domain: Knowledge and Understanding, together with aspects of physics, chemistry and earth science. The breadth and depth defined by the outcomes is appropriate for each year. For Stage 4, this includes:

- 4.8 describes features of living things
- 4.10 identifies factors affecting survival of organisms in an ecosystem.

For Stage 5, this includes:

- 5.8 relates the structure and function of living things to models, theories and laws
- 5.10 assesses human impacts on the interaction of biotic and abiotic features of the environment
- 5.11 analyzes the impact of human resource use on the biosphere to evaluate methods of conserving, protecting and maintaining Earth's resources.

The depth is illustrated by the essential content, for example, 5.8: A student relates the structure and function of living things to models, theories and laws:

- 5.8.2 the Watson-Crick model of DNA
 - explain the advantages of DNA replicating exactly
 - explain the advantages and disadvantages of DNA mutating
 - identify that information is transferred as DNA on chromosomes when cells reproduce themselves
 - identify that genes are part of DNA
 - Identify the role of genes and environmental factors in determining the features of an organism.

The same pattern is used for the skills, and values and attitudes, domains. Each outcome is prefaced by a command word. These appear to be based on Bloom's taxonomy. The command words give a clear indication of the depth to which each outcome should be taught.

The NSW Biology Stage 6 Syllabus follows a very similar pattern of skills and knowledge, with a wide range and depth of skills and content.

Levels of Demand:

The level of demand is appropriate for the biological content in this science course. This is illustrated by the way each topic builds on from previous years. Biological content at Stages 1-3 includes The Living Things. This strand is concerned with:

- the similarities and differences between living things
- the way that living things interact with one another
- the processes that occur within living things.

Stages 4 and 5 build on this, for example,

4.8.1 cell theory

- identify that living things are made of cells
- identify and describe the functions of the nucleus, cytoplasm, cell membrane, cell wall, chloroplast
- identify that substances move into and out of cells
- distinguish between unicellular and multicellular organisms.

5.8.1 cell theory

- explain that systems in multicellular organisms serve the needs of cells
- identify the role of cell division in growth, repair and reproduction in multicellular organisms.

And at Stage 6, the preliminary course:

1. Organisms are made of cells that have similar structural characteristics

- outline the historical development of the cell theory, in particular, the contributions of Robert Hooke and Robert Brown
- describe evidence to support the cell theory
- discuss the significance of technological advances to developments in the cell theory
- identify cell organelles seen with current light and electron microscopes
- describe the relationship between the structure of cell organelles and their function.

And the HSC course:

3. Plants and animals regulate the concentration of gases, water and waste products of metabolism in cells and in interstitial fluid

- explain why the concentration of water in cells should be maintained within a narrow range for optimal function.

A similar continuum can be built for the skills, and values and attitudes, domains. There is also a progression in demand as illustrated by the command words used for each outcome and its associated essential content.

Progression:

The Science Years 7–10 Syllabus details the progression through the stages, in the form of a continuum of learning. The continuum uses the course outcomes to map the transition from Early Stage 1 to Stage 6 in terms of the Prescribed Focus Areas, knowledge and understanding, skills and values and attitudes. The syllabuses from Kindergarten to Year 12 may use different ways to organize the content, but there are clear underpinnings of knowledge and understanding, skills, values and attitudes from one stage to another.

Assessment:

There are no external examinations in K-10, but NAPLAN tests are carried out. The pattern at Stage 6 is similar, but with an external examination element for HSC. The internally assessed component is based on assessment for learning, for both the preliminary and the HSC course. The internal assessment criteria for both courses are:

Knowledge and understanding of:

- the history, nature, and practice of biology, applications and uses of biology and their implications for society and the environment, and current issues, research and developments in biology
- cell ultrastructure and processes, biological diversity, environmental interactions, mechanisms of inheritance and biological evolution (40% weighting).

Skills in:

- planning and conducting first-hand investigations
- gathering and processing first-hand data
- gathering and processing relevant information from secondary sources (30% weighting).

Skills in:

- communicating information and understanding
- developing scientific thinking and problem-solving techniques
- working individually and in teams (30% weighting).

The HSC examination has the following structure:

The examination consists of a written paper worth 100 marks, with a time allowance of 3 hours plus 5 minutes reading time. The paper consists of two sections:

Section I is based on the Core and Section II will be based on the Options.

Section I – Core (75 marks). This section will consist of two parts.

Part A (20 marks)

There are objective response questions to the value of 20 marks.

Part B (55 marks)

- There are approximately 10 short-answer questions
- Questions may contain parts
- There will be approximately 18 items in total
- At least one item will be worth from 6 to 8 marks.
-

Section II – Options (25 marks)

- There are five questions, one for each of the options
- Candidates are required to answer the question on the option they have studied
- Each question consists of approximately seven short-answer parts
- At least one part will be worth from 6 to 8 marks.

Secondary: Chemistry

The Chemistry Stage 6 (Years 11-12) syllabus was developed in 2003 and last revised in 2009.

Orientation:

The rationale in the syllabus is for a ‘contemporary and coherent’ understanding of matter and its interactions. The history and philosophy of science is seen as necessary to understanding the applications of chemistry. As in Stages 4 and 5, there is an emphasis on scientific inquiry, problem-solving and communication. Both syllabi make it clear that students should develop an appreciation of scientific endeavor, its provisional nature and the relationship between evidence and ideas.

The Stage 6 course is intended for students who have ‘a substantial achievement level based on the Stages 4-5 Science course performance descriptors’. The Stage 6 course comprises a Preliminary Course (120 indicative hours), which is followed by a HSC course (the High School Certificate in which it results; 90 indicative hours for core content and 30 indicative hours for options).

Coherence and Clarity:

The Science Stage 4 and 5 syllabus and the Chemistry Stage 6 syllabus objectives, outcomes and contents are detailed, clear and consistent. There is, however, a lack of coherence in the treatment across these sections of *prescribed focus areas* (or PFAs; ‘curriculum emphases or purposes’); *knowledge and understanding*; *skills*; and, *values and attitudes*. At Stages 4 and 5, the content is organized sequentially under these headings with the exception of values and attitudes, which is omitted. At Stage 6, the content is organized sequentially with a section on *Chemistry Skills* and sections for each of the modules.

For each module and topic therein, the content of the Stage 6 syllabus is arranged in two columns with one column listing specific outcomes (*Students learn to...* classify elements as metals, non-metals and semi-metals...) and the other column listing types of activities (for example, *Students: plan and perform an investigation to examine some physical properties, including malleability, hardness and electrical conductivity...*) apparently intended to further these outcomes. The content of the Stage 4 and 5 syllabus is also arranged in two columns but while *Students learn about* lists modules, *Students learn to* lists outcomes, which are still one step removed from activities.

Scope:

The outcomes for Stage 4 and 5 for *knowledge and understanding* relating to the chemistry domain are concerned with the properties of substances. At Stage 4, the outcome is that a student: *describes observed properties of substances using scientific models and theories* (Outcome 4.7). At stage 5, the outcome progresses so that a student: *relates properties of elements, compounds and mixtures to scientific models, theories and laws* (Outcome 5.7). Particularly relevant outcomes for related *skills* are that the student *evaluates the relevance of data and information* at Stage 4 (Outcome 4.17), which progresses into 'explains trends, patterns and relationships in data and/or information from a variety of sources' (Outcome 5.17). There are few outcomes for *values and attitudes* and they cut across Stage 4 and 5 but some examples are: *respects differing viewpoints* (Outcome 4.24/5.24) and *recognizes the role of science* (Outcome 4.26/5.26).

In total, there are 27 outcomes for each of Stage 4 and Stage 5. Each outcome comprises content organized into several topics (*Students learn about*) with more specific outcomes (*Students learn to:*). Outcome 4.7 comprises six such topics (the particle model of matter, properties of solids, liquids and gases, change of state, elements, mixtures, and compounds and reactions), each with three or four such specific outcomes (for example, *relate properties of solids, liquids and gases to the particle model of matter*). Outcome 5.7 comprises three topics (atomic theory, elements and compounds and reactions) with two to six specific outcomes (for example, *describe features of and the location of protons, neutrons and electrons in the atom*).

The Stage 6 preliminary course incorporates four modules: The Chemical Earth; Metals; Water; and, Energy. The HSC course comprises three core modules: Production of Materials, The Acidic Environment, and Chemical Monitoring and Management. Students then choose one option from a diverse range of modules: Industrial Chemistry; Shipwrecks, Corrosion and Conservation; The Biochemistry of Movement; The Chemistry of Art; and, Forensic Chemistry. All modules are each allocated 30 indicative hours and modules generally comprise five topics with between three and 11 specific outcomes.

Demand and progression:

Each outcome provides 'Additional content [which] is not prerequisite knowledge for the following stages but may be used to broaden and deepen students' knowledge, understanding and skills in Stage 4 and/or Stage 5'. As in the outcome itself, the additional content is organized according to topics and more specific outcomes (for example, Outcome 4.7, Particle

theory of matter: *use simple examples of physical and chemical changes to demonstrate that mass is conserved*). The syllabus tabulates a continuum of the overall outcomes (that is, not the specific outcomes) for Stages 3, 4 and 5 but these seem too abstract to be useful. Furthermore, the outcomes for Stage 6 necessarily proliferate across various subjects and are therefore not incorporated in the table.

The content of the Stage 6 syllabus includes a section on assumed knowledge and understanding for each module. The general outcomes and content for the Stage 6 preliminary and HSE courses are clearly delineated. The Stage 6 syllabus anticipates that some outcomes may not be appropriate for a small proportion of students with special educational needs, such as those students who have an intellectual disability. 'Life skills outcomes and content' is intended for these students. Like the standard content, this is organized as four objectives (for example, knowledge and understanding of interactions within the physical world, matter, the living world and Earth and space) and 21 outcomes (for example, LS.13 *observes a range of chemical interactions*) with topics (for example, LS.13 combustion, rusting and corrosion, and chemical changes) and specific outcomes (for example, identify ways to remove corrosion from metals).

Assessment:

The Stage 4 and 5 syllabus refers to the *K-10 Curriculum Framework*, which describes outcomes and levels. The syllabus itself emphasizes the value of assessment for learning and provides some brief guidance on 'quality assessment practices', 'reporting' and 'choosing assessment strategies' appropriate to each of the outcomes detailed in the syllabus.

The Stage 6 syllabus includes only a short section on assessment and reporting, which refers to *Assessment and Reporting in Chemistry Stage 6*. This document details internal and external assessment arrangements. The HSC is both internally assessed (50%) and externally assessed (50%). The internal assessment must be weighted 40% knowledge and understanding of the content, 30% essentially practical skills (for example, planning and conducting investigation) and 30% essentially abstract skills (for example, problem-solving). The external assessment is a written examination with multiple-choice items (20%), short-response items on core content (55%) and on elective content (25%). In addition, to this summative assessment, the document provides very brief guidance on assessment for learning.

Key competencies:

The syllabi rationale emphasize key competencies and these are evident in the content, not only in the skills, values and attitudes sections but also in the PFI and knowledge and understanding sections.

In addition, there is a section on key competencies in the Stage 6 chemistry syllabus, which incorporates 'core' competencies in collecting, analyzing and organizing information, communication ideas and information, planning and organizing activities and other competencies in working with others and in team, solving problems and using mathematical ideas and techniques. The encouragement to use a range of assessment methods, though

found only in the Stage 4 and 5 syllabus, is consistent with the emphasis on these key competencies.

Secondary: Physics

Orientation:

Years 10-11 (band D post-compulsory upper secondary) leads to higher school certificate (HSC). Physics is an optional subject. The curriculum document is dated 2009. The rationale for stage 6 physics (Years 11-12) is an overview of the nature of physics at this level, involving practical experiences and theoretical concepts. The course builds on previous studies, is designed for those with 'a substantial achievement level' but 'recognizes that students entering stage 6 have a wide range of abilities, circumstances and expectations'.

The outcomes of the 7-10 syllabus cover three strands: skills, values and attitudes, working scientifically and knowledge and understanding. This review covers the physics, which is part of the Physical World strand. The Physics stage 6 syllabus sets out aims that cover knowledge and understanding; information handling and attitudes to aspects of physics. There is also a set of 16 objectives that provide a summary of content under the headings of knowledge and understanding, skills, values and attitudes.

Coherence and Clarity:

The K-10 BOS curriculum documents include stage statements which summarize student performance across the curriculum, for example at stage 4 the physics reads:

Students describe the action of unbalanced forces on the motion of objects in everyday situations, including the Earth's gravity. They discuss how developments in scientific knowledge and technology have contributed to finding solutions to problems involving the use of energy transfers and transformations in simple systems and how the solutions may impact on other areas of society.

At stage 5 the corresponding statement is: 'Students apply models, theories and laws to explain phenomena and situations involving energy, force and motion. They explain the concept of energy conservation, by describing energy transfers and transformations within systems.'

There is advice on continuity of the programs, including the recommendation of the allocation of 50% of time to hands-on practical experiences, research projects, and use of relevant contexts. The role of cross-curricular learning in addressing contemporary issues is detailed, for example sustainability.

There is a parallel Years 7-10 syllabus 'Life Skills' for 'a small percentage of students with special education needs, particularly those with an intellectual disability.'

The Stage 6 syllabus for physics consists of a preliminary course and an HSC course, each of four modules of 30 hours that is, a total of 120 hours. In HSC one module is optional from a choice of five. There is a clear overview of the course and a summary of each of the five focus areas, for example, 'applications and uses of physics' and three domains - skills; values and attitudes; knowledge and understanding. The outcomes are listed for each objective at the preliminary and HSC course level, which demonstrates coherence.

Apart from the general requirements and advice, there appears to be no specific pedagogical support in the documents.

Scope:

In the Years 7-10 curriculum learning outcomes are set out in detail for each of stages 4 and 5. There is a wide range of skills 'working scientifically' including predicting, planning, conducting investigations, processing information, problem solving and communicating. At each stage the physics knowledge and understanding outcomes are concerned with forces and energy, with four statements divided into about 20 sub-outcomes, for example:

Stage 4 'PW3 Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems

Students: e) investigate some everyday energy transformations that cause change within systems, including motion, electricity, heat, sound and light

Stage 5 'PW4 Energy conservation in a system can be explained by describing energy transfers and transformations.

Students: a) apply the law of conservation of energy to account for the total energy involved in energy transfers and transformations.'

There is also 'Additional content [which] is not prerequisite knowledge for following stages, but may be used to broaden and deepen students' skills, knowledge and understanding'. These include contexts for physics such as music, energy efficient building design etc.

The breadth of physics is wide and the detail provides a good indication of the depth of treatment.

There are cross references throughout to the reduced syllabus of the Life Skills course for students with special education needs.

The Stage 6 physics syllabus is similarly detailed for each of the preliminary and HSC courses. For example, under skills, each course has about 50 learning outcome statements. The four modules in the preliminary course are The World Communicates, Electrical Energy in the Home, Moving About and The Cosmic Engine. In HSC the three core modules are: Space, Motors and Generators, and From Ideas to Implementation. The choice of options is Geophysics, Medical Physics, Astrophysics, From Quanta to Quarks and The age of Silicon.

The content is laid out in two columns, one listing what students should learn and the second what they could do to bring about this learning. This is a very helpful and concise way of combining pedagogy and outcomes. For example, in the preliminary course:

Electrical Energy in the Home 1: Society has become increasingly dependent on electricity over the last 200 years

Students learn to: discuss how the main sources of domestic energy have changed over time

Students identify data sources, gather, process, and analyze secondary information about the differing views of Volta and Galvani about animal and chemical electricity and discuss whether their different views contributed to increased understanding of electricity.

The HSC content covers a high level of physics in contemporary contexts, for example the 'From Ideas to Implementation' module covers cathode rays and TV; the photoelectric effect; semiconductors; superconductors. The choice of options enables the breadth of physics to be appreciated and provides an opportunity for specialization.

Demand and Progression:

There are general statements at the start of each stage, describing how it builds on previous studies. The demand of the learning outcomes is very clear, in the level of the detail provided. In the stage 6 format the accompanying actions for students is of further help in determining the demand. Successive level statements can be compared in the presentation of the curriculum to check progression. The Life Skills course at 7-10 provides a less demanding route for those students with special needs. The K-10 document has a table to show a continuum of learning across stages 1-5, which actually show quite a number of discontinuities. For example, light appears at Stages 1 and 3 but these are not aligned, and the light content of Stages 4 and 5 are not listed. It is necessary to go to the detailed content specification to see the full opportunities for progression.

Assessment:

One sample assessment for learning activity for Stage 4 was analyzed. This related to a space exploration context, but was assessing measurement and the exploration of the relationship between mass and weight. There are therefore both practical and theoretical aspects to the learning being assessed.

Stage 6 physics has a detailed specification of assessment and reporting from the BOS, which describes the contribution of the school-based assessment and examination results in the HSC awarding. The internal assessment is covered by the requirements in the *Assessment Certification Examination (ACE) Manual*, which appears comprehensive and comprehensible. Assessment weightings of the internal assessment are stated (with 60% for scientific enquiry and communication skills). The examination is specified to consist of objective response and

short answer sections of the paper. The HSC sample paper reviewed is appropriately demanding. The objective questions give a good content spread, though perhaps depend heavily on very specific items of knowledge. The short answer questions are usefully varied – and only short in the sense of not having much time or many marks allocated. One question for example is ‘Assess Einstein’s contribution to quantum theory’ in 16 lines for 6 marks out of 100! The options are covered with a structured question each, requiring a good understanding of the special topic. From what has been seen, this appears to be a sound and comprehensive assessment system.

Secondary: History

The following is based on the 2003 and 2009 Board of Studies syllabuses.

Orientation

History, 7-10

The rationale for history at Grades 7-10 foregrounds a disciplinary rationale for history:

History is a disciplined process of inquiry into the past that allows students to locate themselves in the broad continuum of human experience. It enables students to appreciate and enjoy the human endeavors and achievements of the past, both for their own intrinsic interest and for their legacy to later generations. History provides opportunities for students to explore human actions in a range of historical contexts and encourages them to develop understanding of motivation, causation, consequence and empathy.

Skills / understandings linked to history (for example, analytical skills) are then discussed as are generic outcomes (for example, ICT and ‘understandings of civics and citizenship’).

A succinct statement of aims is provided as follows:

The aim of the *History Years 7-10 Syllabus* is to stimulate students’ interest in and enjoyment of exploring the past, to develop a critical understanding of the past and to enable them to participate as active, informed and responsible citizens.

History, 11-12

Comparable rationales to those provided for Grades 7-10, foregrounding discipline specific aims and then referencing generic outcomes, are provided at Grades 11-12 for Modern History and Ancient History.⁴ Again a succinct statement of aims is also provided as follows:

Modern History Stage 6 is designed to enable students to acquire knowledge and understanding, the skills of critical analysis and synthesis, and values and attitudes essential to an appreciation of forces that have shaped the modern world; to develop a

⁴ This report concentrates on Year 11-12 Modern History in what follows. The structure and conceptual logic of the Ancient History course closely mirrors that of the Modern History course.

lifelong interest in the study of history; and to prepare them for informed and active citizenship in the contemporary world.

Coherence and Clarity:

History, 7-10

Grades 7-10 are divided into two stages with 100 hours teaching in each stage of the course. Clear and specific goals are provided for each stage and these are presented in the table below.⁵

Objectives Students will develop:	Stage 4 Mandatory Course Outcomes. A student:	Stage 5 Mandatory Course Outcomes. A student:
A knowledge and understanding of the nature of history, past societies and periods and their legacy	4.1 describes and explains the nature of history, the main features of past societies and periods and their legacy	
A knowledge and understanding of significant developments in Australia's social, political and cultural history		5.1 explains social, political and cultural developments and events and evaluates their impact on Australian life
A knowledge and understanding of Australia's international relationships		5.2 assesses the impact of international events and relationships on Australia's history
A knowledge and understanding of Aboriginal and indigenous peoples of the world and the nature of contact history	4.2 describes significant features of Aboriginal and indigenous cultures, prior to colonization 4.3 explains the ways indigenous and non-indigenous peoples of the world have responded to contact with each other	
A knowledge and understanding of the changing rights and freedoms of Aboriginal peoples and other groups in Australia		5.3 explains the changing rights and freedoms of Aboriginal peoples and other groups in Australia
The skills to undertake the process of historical inquiry	4.4 identifies major periods of historical time and sequences people and events within specific periods of time 4.5 identifies the meaning, purpose and context of historical sources	5.4 sequences major historical events to show an understanding of continuity, change and causation 5.5 identifies, comprehends and evaluates historical sources 5.6 uses sources appropriately

⁵ An additional History Elective is also available with additional content and a further 100 hours teaching at Stages 4 and 5 (BOSNSW, 2013b). This course is not examined fully in this report.

	<p>4.6 draws conclusions about the usefulness of sources as evidence in an inquiry</p> <p>4.7 identifies different contexts, perspectives and interpretations of the past</p> <p>4.8 locates, selects and organizes relevant information from a number of sources, including ICT, to conduct basic historical research</p>	<p>in an historical inquiry</p> <p>5.7 explains different contexts, perspectives and interpretations of the past</p> <p>5.8 locates, selects and organizes relevant historical information from a number of sources, including ICT, to undertake historical inquiry</p>
The skills to communicate their understanding of history	<p>4.9 uses historical terms and concepts in appropriate contexts</p> <p>4.10 selects and uses appropriate oral, written and other forms, including ICT, to communicate effectively about the past</p>	<p>5.9 uses historical terms and concepts in appropriate contexts</p> <p>5.10 selects and uses appropriate oral, written and other forms, including ICT, to communicate effectively about the past for different audiences</p>

In addition, as a statement of the historical skills that the syllabus aims to foster is provided:

- Comprehension
- Analysis and use of sources
- Perspectives and interpretations
- Empathetic understanding
- Research
- Communication.

Attention has been given, as the table above indicates, to mapping these skills progressively across the two stages and this is achieved in a coherent way, following generic models of cognitive demand (rather than research based models of progression in history (Lee, 2005)). Thus, for example:

- Stage 5 builds on the perspectives objectives for Stage 4 in the sense that students are described as explaining aspects of historical perspectives rather than as simply identifying these aspects
- Stage 5 builds on the evidence objectives for Stage 4 in the sense that students are described as using sources in an enquiry rather than as simply describing how they could be used
- Stage 5 builds on the communication objectives for Stage 4 by adding communication aimed at different audiences.

There is little explicit comment on pedagogic approaches in the document with the exception of a page devoted to the implementation of the compulsory actual or virtual site visit component of both Stages 4 and 5.

History, 11-12

Years 11-12 are divided into two stages (a Preliminary and a Higher School Certificate course) with 120 hours each. Clear and specific knowledge and understanding goals are provided for each stage (the first table below) and one set of values and attitudes objectives are presented for the course as a whole (the second table below).⁶

Objectives A student develops knowledge and understanding about (1 and 2) and skills to (3 and 4)	Preliminary Course Outcomes A student develops the skills to:	HSC Course Outcomes A student develops the skills to:
1 key features, issues, individuals and events from the eighteenth century to the present	P1.1 describe the role of key individuals, groups and events of selected studies from the eighteenth century to the present P1.2 investigate and explain the key features and issues of selected studies from the eighteenth century to the present	H1.1 describe the role of key features, issues, individuals, groups and events of selected twentieth century studies H1.2 analyze and evaluate the role of key features, issues, individuals, groups and events of selected twentieth-century studies
2 change and continuity over time	P2.1 identify forces and ideas and explain their significance in contributing to change and continuity from the eighteenth century to the present	H2.1 explain forces and ideas and assess their significance in contributing to change and continuity during the twentieth century
3 the process of historical inquiry	P3.1 ask relevant historical questions P3.2 locate, select and organize relevant information from different types of sources P3.3 comprehend and analyze sources for their usefulness and reliability P3.4 identify and account for differing perspectives and interpretations of the past P3.5 plan and present the findings of historical investigations, analyzing and synthesizing information from different types of sources	H3.1 ask relevant historical questions H3.2 locate, select and organize relevant information from different types of sources H3.3 analyze and evaluate sources for their usefulness and reliability H3.4 explain and evaluate differing perspectives and interpretations of the past H3.5 plan and present the findings of historical investigations, analyzing and synthesizing information from different types of sources
4 communicating an understanding	P4.1 use historical terms and concepts appropriately	H4.1 use historical terms and concepts appropriately

⁶ An additional History Extension elective is also available with additional content and a further 60 hours teaching at HSC; the assumption is that students will already have achieved the outcomes of the Preliminary course (BOSNSW, 2009c). This course is not examined fully in this report.

of history	P4.2 communicate a knowledge and understanding of historical features and issues, using appropriate and well-structured oral and written forms	H4.2 communicate a knowledge and understanding of historical features and issues, using appropriate and well-structured oral and written forms
------------	--	--

Objectives A student develops responsible values and attitudes about:	A student:
5 informed and active citizenship	<ul style="list-style-type: none"> • demonstrates an appreciation of the nature of various democratic institutions • demonstrates an appreciation of the individual rights, freedoms and responsibilities of citizenship and democracy • demonstrates respect for different viewpoints, ways of living, belief systems and languages in the modern world
6 a just society	<ul style="list-style-type: none"> • articulates concern for the welfare, rights and dignity of all people • displays a readiness to counter disadvantage and change racist, sexist and other discriminatory practices • demonstrates respect for human life
7 the influence of the past on the present and the future	<ul style="list-style-type: none"> • demonstrates an awareness of the ways the past can inform and influence the present and the future • recognizes the impact of contemporary national and global developments on countries and regions, lifestyles, issues, beliefs and institutions
8 the contribution of historical studies to lifelong learning	<ul style="list-style-type: none"> • demonstrates an awareness of the contributions of historical studies to lifelong learning

There is some evidence that the curriculum aims to theorize progression between the ‘preliminary’ and HSC course outcomes in terms of knowledge and understanding objectives and that it maps progress across the two stages in a coherent way. However, progression has been mapped for some objectives only – no progression is theorized in objectives relating to aspects of historical enquiry and evidence (P3.1, 3.2 and 3.5 are identical with their H equivalents) or communication (standard 4 is identical in both cases); where progression has been mapped, and as was the case with History 7-10, generic models of cognitive demand are used to achieve this, rather than research based models of progression in history (Lee, 2005). Thus, for example:

- whereas preliminary course students ‘identify forces and ideas and explain their significance in contributing to change and continuity’, HSC students ‘explain forces and ideas and assess their significance in contributing to change and continuity’; and
- whereas preliminary course students ‘comprehend and analyze sources for their usefulness and reliability’, HSC students ‘analyze and evaluate sources’ for the same purpose.

Progression between History 7-10 and Modern History 11-12 has not been clearly achieved in curriculum design. Elements identified as important in the first curricular stage do not figure in the second – for example, there are no references in the History 11-12 document to ‘empathetic understanding’. Elements identified in the latter (for example, the ‘values and attitudes’ outcomes in the table above) do not figure with the same prominence or in the same terms in the former. Furthermore, where the two phases share common elements it is not clear that attention has been given to ensuring rising levels of demand across the two phases of history education (as can be seen when the tables of objectives above for the two stages are juxtaposed). The table below makes a comparison across the two stages of both the 7-10 and the 11-12 courses in a sample of aspects of historical learning.

History 7-10		History 11-12	
Stage 4 Mandatory Course Outcomes	Stage 5 Mandatory Course Outcomes	Preliminary Course Outcomes	HSC Course Outcomes
4.2 describes significant features of Aboriginal and indigenous cultures, prior to colonisation 4.3 explains the ways indigenous and non-indigenous peoples of the world have responded to contact with each other	5.3 explains the changing rights and freedoms of Aboriginal peoples and other groups in Australia	P1.1 describe the role of key individuals, groups and events of selected studies from the eighteenth century to the present P2.1 identify forces and ideas and explain their significance in contributing to change and continuity from the eighteenth century to the present	H1.1 describe the role of key features, issues, individuals, groups and events of selected twentieth century studies H2.1 explain forces and ideas and assess their significance in contributing to change and continuity during the twentieth century

It is apparent from the above comparisons that little attention has been given to progression: where significance is concerned at P2.1 students are expected to be able to ‘identify.... and explain’, something that they were already expected to be able to do at 4.2 and 3; where key ‘features’ of the past are concerned, students at both P1.1 and H1.1 students are simply expected to ‘describe’, something that they were already expected to do at 4.2.

History 7-10		History 11-12	
Stage 4 Mandatory Course Outcomes	Stage 5 Mandatory Course Outcomes	Preliminary Course Outcomes	HSC Course Outcomes
4.6 draws conclusions about the usefulness of sources as evidence in an inquiry 4.7 identifies different	5.6 uses sources appropriately in an historical inquiry 5.7 explains different contexts, perspectives	P3.3 comprehend and analyze sources for their usefulness and reliability P3.4 identify and	H3.3 analyze and evaluate sources for their usefulness and reliability H3.4 explain and

contexts, perspectives and interpretations of the past	and interpretations of the past	account for differing perspectives and interpretations of the past	evaluate differing perspectives and interpretations of the past
--	---------------------------------	--	---

Where understandings of historical enquiry are concerned, P3.3 adds little to what was expected at 4.6 and although it is clear that H3.4 does add to what has gone before (in requiring evaluation), it would seem that 5.7 sets a higher level of demand than P3.4.

Scope and Progression:

History, 7-10

The scope of Stages 4 and 5 is summarized in the table below. Whereas Stage 4 is an overview course in world history, framed so as to accommodate the Australian context (the emphasis on Indigenous peoples), Stage 5 is a course in Australian history.

	Stage 4	Stage 5
Purpose	Designed to provide students with an understanding of world history from ancient times to the modern world and the basic skills required for the effective study of History.	Designed to provide students with an understanding of Australian history and civics and citizenship. Students will also develop the skills required for the effective study of History.
Content	The content is divided into 4 topics with internal options: <ul style="list-style-type: none"> • Topic 1: Investigating History • Topic 2: Societies and Civilisations of the Past • Topic 3: Aboriginal and Indigenous Peoples, Colonisation and Contact History • Topic 4: (Optional Study) Shaping the Modern World. 	The content is divided into topics. Most topics have internal choice to allow for studies in <ul style="list-style-type: none"> • Topic 1: Australia to 1914 • Topic 2: Australia and World War I • Topic 3: Australia between the Wars • Topic 4: Australia and World War II • Topic 5: Australia in the Vietnam War Era • Topic 6: Changing Rights and Freedoms • Topic 7: People Power and Politics in the Post-war Period • Topic 8: Australia's social and cultural history in the Post-war Period
	All students must complete a site study in Stage 5. A virtual site study can be used if appropriate.	All students must complete a site study in Stage 5. A virtual site study can be used if appropriate.

Chronological breadth in world history at Stage 4 is ensured by the requirement that one ancient and one medieval/early modern society be studied. It is possible, however, that students could opt to study societies from one continent only. Similarly, students study Australian Indigenous peoples in the post-contact period and up to 1900 and a further Indigenous people from one of a number of continents/contexts. Here, breadth is possible but it is also possible to make narrow choices in cultural geographical terms.

Stage 5, despite having a national focus, offers a wide range of themes that are covered (social, cultural, economic and political) and there is a clear emphasis on diversity. Overall, a student who followed the mandatory course only would study the world beyond Australia in Stage 5 and have limited knowledge and understanding of the broad narrative of world history, although they would have studied regions outside Australasia and a range of time periods.

History, 11-12

The content of the Preliminary and HSC courses is summarized in the table below.

	Preliminary Course	HSC Course
Purpose	The Preliminary course is structured to provide students with opportunities to investigate key features, individuals, groups, events, concepts and historiographical issues in a range of historical contexts as background for their HSC studies.	No explicit rationale is provided
Content	<p>Part I: Case Studies – 50% At least TWO case studies should be undertaken. ONE case study must be from Europe, North America or Australia. ONE case study must be from Asia, the Pacific, Africa, the Middle East or Central/South America. Both lists of exemplar case studies are 19th and 20th century topics. They are mostly political but not exclusively (one is about sport). Teachers can design their own provided that there is no overlap with other parts of the course.</p> <p>Part II: Historical Investigation – 20% The investigation aims to provide opportunities to further develop historical inquiry and can be integrated into any aspect of the Preliminary course and need not be completed as one project. The topic can be student selected. Possible historical investigations could include: a case study, aspects of the Preliminary core study, significant individuals, groups or events. The investigation must not overlap or duplicate significantly any topic attempted for the HSC Modern History course.</p> <p>Part III: Core Study – 30% The World at the Beginning of the Twentieth Century</p>	<p>Part I: Core Study – 25% World War I 1914–1919: A Source-based Study</p> <p>Part II: National Studies – 25% Students investigate key features and issues in the history of ONE country during a specific period of the twentieth century. The options are Australia, Asia (4 options), North America, Europe (2 options) and South Africa and in most cases the focus is political.</p> <p>III: Personalities in the Twentieth Century – 25% Through the study of a modern personality, students gain an understanding of the role of the individual in a period of national or international history. The personality selected may or may not align with a student’s national or international study giving teachers and students greater flexibility of choice and the opportunity for a broader study of Modern History. Twenty-seven options are offered, these coincide mostly with the National Studies (though not in all cases – figures linked to the Arab-Israeli conflict are listed) and in most but not all cases are political figures.</p>

	Students will investigate the Preliminary core study using a source-based approach.	<p>Part IV: International Studies in Peace and Conflict – 25%</p> <p>Students investigate key features and issues of ONE International Study in Peace and Conflict.</p> <p>Students will undertake ONE International Study in Peace and Conflict. Seven options are listed and with the exception of Anglo-Irish Relations and The United Nations as Peacekeeper they overlap with countries or regions offered as National Studies. Two of the 7 are pre-1945.</p>
--	---	---

All course content (with the exception of the investigation in the preliminary course whose focus can be determined by students) is post-1800 and most content is political in focus suggesting a course of study that is likely to be circumscribed to a particular temporal and thematic focus.

There is scope for geographical breadth – a requirement to take case studies from both the cluster Europe, North America or Australia, on the one hand, and one from the cluster Asia, the Pacific, Africa, the Middle East or Central/South America, on the other. There is scope in the HSC course to extend the geographical and thematic range of students’ studies (it would be possible to study regions of the world not studied at the Preliminary Stage and also to focus on individuals whose significance is not primarily political. However, there are limited restrictions on topic combinations in the HSC course and it would be possible to maintain a narrow focus in this year, focusing in greater depth on countries and regions covered in the preliminary phase. There is clearly scope for deep study in the course through the inclusion of an investigation in the preliminary year, or the inclusion of case studies and the studies of key individuals. Thus, the features of the curriculum architecture that enable a narrow range of focus also provide scope for additional depth of study.

Levels of Demand:

History, 7-10

The level of demand has already been addressed above, where conceptual issues are concerned. The content looks achievable in the 100 hours per stage that are suggested. Extensive consideration is given to making the curriculum accessible. A ten page section, reframing syllabus content in terms of ‘life skills objectives’, begins with the statement:

The Board of Studies recognizes that a small percentage of students with special education needs may best fulfill the mandatory curriculum requirements for History by undertaking Life Skills outcomes and content

The ‘elective’ extension to the mandatory course provides scope for additional focus on history and also, through units such as ‘constructing history’ which ‘focuses on the development of students’ understanding of the nature of history and the ways in which different

perspectives/interpretations of the past are reflected', for a fuller focus on methodological aspects of the discipline, thus providing additional challenge for high achievers and students with particular interest in history.

History, 11-12

The content looks achievable in the 120 hours per stage that are suggested. In contrast to the 7-10 syllabus, where extensive consideration is given to making the syllabus accessible, this issue is not explicitly addressed at Years 11-12, presumably on the assumption that students who will struggle with history would choose a different course.

An 'elective' extension course is also provided at Years 11-12 to allow students to build on the outcomes of the core course by extending their understanding of 'historiography and historical enquiry and communication', thus providing additional challenge for high achievers and students with particular interest in history.

Assessment:

History, 7-10

Teacher assessment and reporting strategies are described at some length in the syllabus. It is hard to judge the extent to which assessment practices are likely to align with the specification from these pages, since no exemplar assessments are contained in them, however, it is clear:

- that AfL strategies are integral to the practice model proposed
- that a range of assessment strategies congruent with key aspects of historical thinking – historical inquiry reports, fieldwork and presentations – are proposed.

History, 11-12

The Preliminary year of the 11-12 syllabus is entirely teacher assessed and 100 of the 200 assessment marks for the HSC year are teacher assessed also. As with the Year 7-10 course, it is clear:

- that AfL strategies are integral to the practice model proposed
- that a range of assessment strategies congruent with key aspects of historical thinking – historical inquiry reports, fieldwork and presentations – are proposed.

A sample HSC examination analyzed shows that assessment clearly aligns well with the syllabus content. A range of question types (source questions, essay questions) and answer modes (multiple choice, discursive answers) are present allowing for the full range of syllabus outcomes to be assessed.

Key competencies:

History, 7-10

Key competencies are identified in the syllabus' introduction. These are grouped into two lists, the first focusing on individual development, democratic participation and diversity and the second on skills 'essential for all students to succeed in and beyond their schooling' including

communication, analytical and collaborative working skills. These issues are addressed later in the document as follows:

The key competencies reflect core processes of historical inquiry and are explicit in the objectives and outcomes of the syllabus:

- *collecting, analyzing and organizing information* through developing research skills, using a range of methods including ICT, analyzing sources of information and organizing information appropriate to the inquiry task
- *communicating ideas and information* through selecting appropriate forms of communication for specific purposes, using oral, written, computer-based and other forms appropriate for an historical investigation
- *planning and organizing activities* through students working as individuals or members of groups to conduct historical investigations
- *solving problems* through the exploration of issues and investigation of historical problems based on evaluation of sources
- *using technology* through applying technological processes to locate historical information and evaluate the information obtained from such sources. Students will also develop expertise in using technological processes to communicate effectively about the past for different audiences.

History, 11-12

Key competencies are identified in the syllabus' introduction. History is presented as contributing 'to the development of skills that are of great importance in today's workforce.' These issues are addressed later in the document as follows:

The key competencies of collecting, analyzing and organizing information and communicating ideas and information reflect core processes of historical inquiry and are explicit in the objectives and outcomes of the syllabus. The other key competencies are developed through the methodologies of the syllabus and through classroom pedagogy in the following ways:

- students work as individuals and as members of groups to conduct historical investigations, and through this, the key competencies *planning and organizing activities* and *working with others and in teams* are developed
- when students construct timelines or analyze statistical evidence, they are developing the key competency *using mathematical ideas and techniques*
- during investigations, students will need to use appropriate information technologies and so develop the key competency *using technology*
- finally, the exploration of issues and the investigation of the nature of historical problems contribute towards students' development of the key competency *solving problems*.

It is clear that many of these competencies are likely to be developed by the course, for example, through the scope for individual investigation that it provides. It is not clear from the syllabus that mathematical competencies will be promoted by historical study in any significant depth.

Secondary: Geography

The following is taken from the 2001 syllabus.

Orientation:

In the syllabus there are 10 pages of orientation including aims and objectives, justification and overview. It is very heavily outcomes oriented around four themes and an unusually heavy stress on values, attitudes, and civic competences. Subjects/disciplines are seen as resources that have been drawn upon.

The aim of Human Society and Its Environment is to develop in students the values and attitudes, skills, and knowledge and understandings that:

- enhance their sense of personal, community, national and global identity;
- enable them to participate effectively in maintaining and improving the quality of their society and environment.

Human Society and Its Environment draws upon disciplines such as history, geography, economics, anthropology, archaeology, political science, environmental studies, Aboriginal studies, religious studies and sociology. The content in this syllabus is drawn from many sources, including recent research into historical and geographical thinking in young children and into the development of civic participation skills and citizenship ideals

The outcomes and content in the Human Society and Its Environment K–6 syllabus are organized in four strands:

- *Change and Continuity*
- *Cultures*
- *Environments*
- *Social Systems and Structures.*

Coherences and Clarity:

The 'Foundation Statements' attempt to set out the goals:

For Stage 3:

Students explain how shared culture, heritage and language, including those of Aboriginal peoples, contribute to Australian and community identity. They explore cultural diversity by examining how cultures change through interactions with other cultures and the environment.

Students analyze Australian and global environments, identifying environmental issues and problems and they explore ways in which individuals and groups can contribute to solutions for these. They investigate human interactions with environments and recognize ecologically sustainable development. Students recognize various beliefs and practices and explain how these influence interactions with environments. They sketch, label and use maps, applying appropriate conventions and terminology.

Students identify Australia's social and economic connection to the world and the rights and responsibilities of Australian and global citizens. They examine decision-making processes at state and federal levels and explain the structures, roles and responsibilities of government. They examine changes in work practices and the rights and responsibilities of producers and users of goods and services. Students apply knowledge of participatory democracy to formulate plans and create possible solutions illustrating fairness and social justice for school, local, national and global problems.

There follows twenty pages of outcomes statements ('indicators') spread across the three stages, 25 pages of contents similarly arranged and a further six pages on 'scope and sequencing' of the content matter. There is therefore a high level of specificity.

Scope:

From the perspective of geography, and the place of geographical knowledge in this syllabus, is far from clear (apart from the reference to map related skills) what the role of geography is and its contribution. Even reference to environmental 'issues' and 'sustainable development' is arguably undervaluing geographical knowledge ... for example, there is little reference especially at this level of geographical features and processes (description and explanation).

Level of demand:

From a geographical point of view, there is a heavy emphasis on human perspectives, feelings and value positions. This, arguably, leads to a superficial level of geographical knowledge expectations in this syllabus. For example, from the content overview under the 'environmental' theme, we read that student:

- Demonstrates an understanding of the interconnectedness between Australia and global environments and how individuals and groups can act in an ecologically responsible manner
- Explains how various beliefs and practices influence the ways in which people interact with, change and value their environment.

Progression:

A great deal of attention has been given to this – both within the document and between this and subsequent documents (see below). This is ostensibly technically impressive, detailed work. The document also makes detailed statements about pedagogic strategy – an aspect of 'progression' often overlooked.

Assessment:

Assessment for this stage is teacher-based, with an emphasis on AfL.

Key competencies:

This aspect of the curriculum document is heavily emphasized.

Stage 6 (Years 11-12)

Orientation:

From the Board of Studies syllabus document, dated 1999 (with some revisions) the aims are perfunctory – or succinct depending on one’s view:

The aim of Geography Stage 6 is to enable students to study the spatial and ecological dimensions of biophysical and human phenomena in a changing world

The ‘Objectives’ are also brief:

Through the study of Geography Stage 6, students will develop knowledge and understanding about:

- the characteristics and spatial distribution of environments
- the processes that form and transform the features and patterns of the environment
- the global and local forces which impact on people, ecosystems, urban places and economic activity
- the contribution of a geographical perspective

Skills to:

- investigate geographically
- communicate geographically.

And informed and responsible values and attitudes towards:

- ecological sustainability
- a just society
- ethical research practices
- active and informed citizenship
- responsible, autonomous life-long learning.

Coherence and clarity:

As with the lower years syllabus this is achieved mainly through statements of outcomes, tabulated at two levels, Preliminary and HS Certificate level. This is done at a far lower level of detail than the stage three HSE syllabus.

Scope:

The content is set out at the two levels. Of note are the following features:

- the senior geography project: an independent investigation and report requiring fieldwork
- relative lack of emphasis on physical geography – at least geomorphology and earth science processes
- heavy emphasis on bio systems and ecology
- the application of mathematical techniques to the analysis of data is mandatory.

Level of Demand:

The level of demand is difficult to judge from the syllabus document alone which is a lower level of specificity than lower years' documents. It seems on the face of it appropriate – requiring global perspectives and an understanding at a deeper system level of environment, urban society and economy.

Progression:

Steps are taken in the document to show how this syllabus links to previous students' experiences. More convincingly there is a built in progression between the Preliminary and Certificate stages courses.

Assessment:

The assessment framework appears well balanced. This is done by:

- examination to provide 'a measure of student achievement in a range of syllabus outcomes that can be reliably measured in an examination setting.' The examination is well balanced between multiple choice, short answer and more extended writing tasks. The latter requires answers to questions covering all syllabus topics
- Internal assessment devised locally according to clear guidelines and weighting between assessment objectives: internal assessment emphasizes fieldwork applications and investigation skills.

Although individual components of the internal assessment may lack relevance in terms of their size, there is no doubt that the internal assessment as a whole is of great significance.

Key competencies:

These are visible – at least implied – in the objectives. Investigation and communication skills emphasized in the project and in the internal assessment aspects of key competencies have some prominence.

Vocational education

Orientation:

Approved areas of study include business, finance, hospitality, tourism, construction, engineering, visual arts, information technology and community work. Students in Years 9 and 10 are cautioned that they should only undertake a VET course if it suits their individual needs.

“It is not necessarily appropriate for all schools, or for all students. It should be seen as one strategy within a suite of strategies used by schools to address engagement, retention and participation in education and training.”

Coherence and Clarity:

The Australian TAFE system is highly regarded internationally and across Australia, they describe themselves as:

TAFE NSW is Australia's leading provider of vocational education and training with more than 500,000 enrollments each year. Whether you're an individual looking for your first job, a promotion, a career change or a pathway to a degree or you're an employer seeking training solutions for your workforce, TAFE NSW can deliver a range of courses and services to suit your needs.

This is reflected in a high degree of public support. “TAFE NSW has been the gold standard in the Australian vocational education and training system for generations meeting the collective needs of society, students and industry” (Community and Public Sector Union 2014). The framework constitutes a set of clear specifications for all occupational areas. They state that VET courses provide opportunities for students to:

- acquire a range of technical, practical, personal and organizational skills valued both within and beyond the workplace
- acquire underpinning knowledge and skills related to work, employment and further training
- gain experiences that can be applied in a range of contexts, including work, study and leisure
- receive formal VET sector qualifications awarded for the achievement of competencies recognized by industry
- make informed career choices and improve transition from school to work.

Scope:

Lower Secondary school based technology and applied studies is part of an agreed Australian curriculum for Technologies. It is incorporated with Science. In years 9 and 10 options include:

- Active Volunteering
- Agri food
- Animal studies
- Automotive
- Business
- Construction creative
- Hospitality
- Information and digital literacy
- Manufacturing

- Retail
- Tourism.

Specifications also include the softer employment core skills such as these taken from the Retail specifications:

- Communicate in the workplace to support team and customer outcomes
- Work effectively in a customer service environment
- Apply safe work practices
- Organize and maintain work areas
- Operate retail technology
- Plan a career in the retail industry
- Use hygienic practices for food safety
- Provide basic emergency life support
- Use, communicate and search securely on the internet
- Undertake manual handling
- Electives
- Plan a career in community pharmacy
- Prepare and serve espresso coffee

In Years 11 and 12 the skills align with the TAFE qualifications framework, for example Technology has specifications for:

- Design and Technology
- Engineering Studies
- Food Technology
- Industrial Technology
- Information Processes and Technology
- Software Design and Development
- Textiles and Design.

For older students TAFE competencies cover a full range of employment competencies up to and including Higher Education. These are regularly updated, most recently in 2013.

Levels of Demand:

In lower secondary school technology is a formal part of the science curriculum. Topics covered include both content and learning processes:

Content strands

- Built Environments
- Information and Communication
- Living Things
- Physical Phenomena
- Products and Services

- Earth and its Surroundings

Learning processes

- Investigating
- Designing and Making
- Using Technology

Assessment is against specifications of performance level, locally administered. For example:

- Early Stage 1 Explores and identifies ways in which built environments suit their users
- Early Stage 2 Recognizes and uses various means of communication
- Early Stage 3 Identifies ways in which living things are different and have different needs
- Early Stage 4 Explores and identifies ways some forms of energy are used in their daily lives
- Early Stage 5 Recognizes the relationship between everyday products and people's needs
- Early Stage 6 Explores and identifies ways the environment influences their daily lives

Vocational qualifications from year 10 onwards are supported by the TAFE qualifications framework.

Progression:

The certification available for VET within the Australian Qualifications Framework is at Certificate (level 1 to 4, 4 being the highest), Diploma and Advanced Diploma.

Assessment:

Students may leave school with a NSW Higher School Certificate which is a combination of in school assessments and external examinations. Guidance on school based assessment states:

Assessment is the process of gathering information and making judgments about student achievement for a variety of purposes. In the Preliminary and HSC courses those purposes include:

- assisting student learning
- evaluating and improving teaching and learning programs
- providing evidence of satisfactory achievement and completion in the Preliminary course

For students opting for vocational studies assessment is against TAFE credit based criteria. For some qualifications and units of competency, this may be assessed in the workplace. In TAFE NSW some units of competency, modules and courses are graded pass, distinction or credit. Not all units of competency or modules are graded.

Key competencies:

Employability skills are included in both the school, and TAFE, programs

Queensland

History and Background

Queensland is Australia's second largest state and contains just over 22% of Australia's total area (1,730,648 square kilometers). Its capital is Brisbane, which is Australia's third largest city. At the last census of 2011 it had over 4.5 million people of whom 3.6% were of Indigenous origin and 19% were born overseas. Ten percent speak a language other than English at home.

There are 1702 schools in Queensland, 1235 of which are government schools that serve 492,000 students and 467 are non-governmental private schools that serve 239,500 students (Australian Bureau of Statistics 2014). The State operates and is the main funder of public schools; most of private schools' public funding comes from the federal government. Children have 13 years of schooling: one year of preparatory followed by seven years of primary and five years of secondary. Students must be "learning or earning" for two years after they complete compulsory schooling or reach age 17 or obtain a Queensland Certificate of Education or Certificate III (or higher) vocational qualification (ACARA 2009b). In 2011 83% of 20-24 year olds had a Year 12 leaving certificate or its equivalent, although numbers were much lower for Indigenous students – 62.5% (COAG 2013b).

One of the factors that sets Queensland schools apart from other school systems in Australia is its secondary assessment system (see below for more detail). In place since the 1970s, the system is based on moderated school-based teacher judgment rather than on the outcomes of externally set examinations, which had been in place prior to that. Queensland's schools have also seen a number of reforms in the late 1990s, including the New Basics (see below), which were triggered by a government study that showed that most lessons in the state were not intellectually demanding enough because of pressures to cover content, lack of pedagogical awareness and lack of understanding of Indigenous culture (Lingard and McGregor 2014). According to the Queensland Studies Authority (QSA)⁷ (2010), integrated school-based assessment:

- establishes a better preparation for learning in the early years
- strengthens learning in the middle years of schooling
- builds Year 10 as the transition to the senior phase of learning
- provides young people in the senior phase with flexible options for certification and tertiary entrance.

With the advent of a new government in 2013, the school system in Queensland is, however, under review.

⁷ The Queensland Studies Authority (QSA) was replaced in July 2014 with the Queensland Curriculum and Assessment Authority (QCAA).

Structure of the school system

Schooling in Queensland starts with a preparatory (Prep) Year followed by seven years of primary and five years of secondary school. Over the 13 years of schooling, students' studies are focused on the following learning areas:

- English
- mathematics
- studies of society and the environment
- science
- arts
- technology
- personal development
- health and physical education
- languages other than English (ESL).

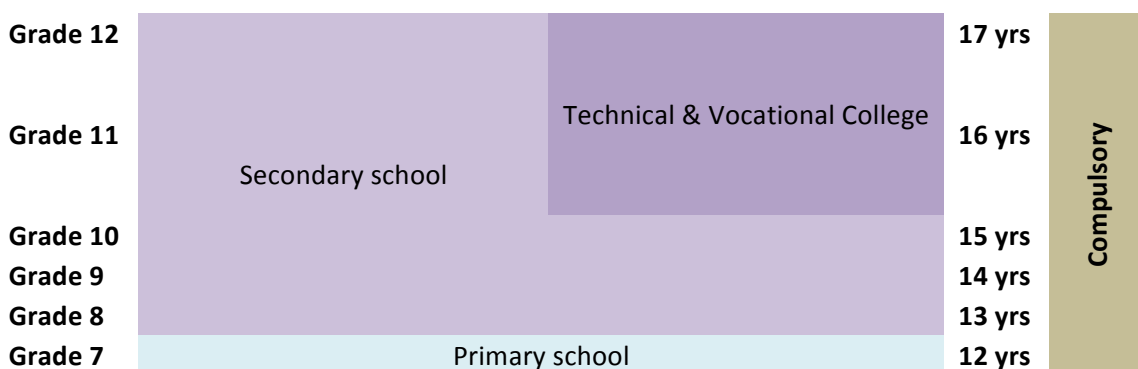
Pre-compulsory education

The Prep Year is a one year (full-time) program available to all Queensland children in the year before they start primary school. Students are encouraged to engage all five senses to form a solid foundation in social, motor, literacy and numeracy skills. The pre-school curriculum is organized around *Pre-School Curriculum Guidelines* that concentrate on five foundation learning areas: sense of self and others; health and physical understanding; social living and learning; cultural understanding; and understanding environments.

Post-compulsory education

While students must be engaged in some form of education, training or full time employment, at age 15-16, students may usually choose whether to continue in secondary school or to enter a range of technical or vocational courses at colleges of technical and further education (TAFE), senior colleges or rural training schools. At these levels, students generally have more scope to specialize and a range of elective studies is usually provided. Although there are no compulsory subjects as such, the vast majority of senior level students do study English and mathematics throughout their senior secondary course.

Queensland school structure



Grade 6		11 yrs
Grade 5		10 yrs
Grade 4		9 yrs
Grade 3		8 yrs
Grade 2		7 yrs
Grade 1		6 yrs
K	Prep	5 yrs

Vocational education and training

In 2013, the Queensland Government released a five year action plan to reform the state’s further education and training sector entitled, *Great skills: Real opportunities*, which contains an ambitious skills and training reform program that includes:

- fee-free training for Year 12 graduates in selected high priority courses
- competitive-based funding for high quality providers to deliver priority Certificate III level qualifications
- prioritizing qualifications that match job opportunities
- creating 10,000 extra apprenticeships
- establishing TAFE Queensland as an independent statutory body with a commercially focused board (Queensland Government 2013).

Students still in school can participate in vocational education and training (VET) in fields such as business studies, health services, mining services, manufacturing, agriculture, tourism and hospitality. Queensland’s VET qualifications are found at levels throughout the AQF – certificates I, II, III and IV, Diploma, Advanced Diploma, Vocational Graduate Certificate, and Vocational Graduate Diploma. VET courses at school provide credit toward the Queensland Certificate of Education and can count toward the tertiary selection rank (Queensland Government 2014a).

Special needs education

In Queensland, students with special educational needs are either catered for in mainstream classes or by special education programs, which can include special schools, special education units or special classes attached to mainstream schools. Although special education programs provided are individually tailored and different from those usually undertaken in mainstream schools, the same key learning areas and key competencies are addressed, although at a developmentally appropriate level in an age appropriate manner. Programs are documented in Individual Education Plans (IEPs) and delivered by special education teachers and support staff, including therapists, nurses and specialist advisory teachers.

School year

The school day normally consists of around five hours of tuition over five days each week (Monday to Friday). These hours of tuition are usually organized in a school day starting at around 9:00 am and finishing around 3:00 pm. The school year comprises 200 days, organized

around four terms and beginning in late January. The annual five- to six-week summer break takes place in December and January.

Policy Aims and Vision

Like the rest of the Australian states, Queensland promotes the two main goals of the Melbourne Declaration for schooling in Australia (MCEETYA 2008): that Australian schooling should promote equity and excellence and that all young Australians should become successful learners.

Queensland's Department of Education, Training and Employment (DETE) states as its policy vision that, "Queenslanders have the education and skills they need to contribute to the economic and social development of Queensland" (DETE 2013a). It also attempts to ensure that its education and training systems are aligned to the state's employment, skills and economic priorities.

Broad working goals set by the QSA included: high expectations and standards for all students; improved educational outcomes for all students; and improved public trust in schools and the education system.

21st century skills and the New Basics trial

Queensland has adopted the national 21st century skills priorities enshrined in the seven "general capabilities" of literacy, numeracy, ICT capability, critical and creative thinking, personal and social capability, intercultural understanding and ethical understanding and is integrating those capabilities, as well as the cross curriculum priorities of Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia's engagement with Asia and sustainability. Queensland has embedded the 21st century skills into its curriculum and is developing strategies and ways of incorporating these in its teaching and assessment.

Even prior to the introduction of the national curriculum and the 21st century skills associated with it, Queensland took a radical approach with a *New Basics* framework with which it sought to align curriculum, pedagogy and assessment using a new conception of the domains of knowledge that involved four curriculum organizers, 20 productive pedagogies and 20 "real world" or rich tasks over nine years of schooling (McGaw 2013a; McGaw 2013b). This four-year curriculum research trial was completed between 2001 and 2005 and involved 38 schools, which piloted four new curriculum clusters: life pathways and social futures; multi-literacies and communications media; active citizenship; and environments and technologies as curriculum organizers. The New Basics were cross-curricular – Queensland referred to them as transdisciplinary – and encompassed the eight nationally-agreed key learning areas.

Essentially, the New Basics brought together curriculum, pedagogy and assessment in a way that relied on teachers' professional knowledge and skills. It was based not on academic disciplines, but on the "imagined future worker and citizen in a global context" (Lingard &

McGregor 2014, p. 94). Lingard and McGregor note that the New Basics approach exemplified one strand of educational thinking about globalization – one that meant that education must mold the dispositions and skills of workers and citizens. New Basics contrasted with the “old basics” of reading, writing and arithmetic and was to instead give students the skills necessary for “new economies, new workplaces, new technologies, new student identities, diverse communities and complex cultures” (Education Queensland 2004, p. 2 as quoted in Lingard and McGregor, p. 99).

Teachers collaboratively graded and moderated the multi-disciplinary “rich tasks” that demonstrated learning outcomes. They determined when to implement the tasks, based on local curriculum needs. The tasks incorporated the 21st century skills of problem solving, decision making, collaboration, communication, information literacy and often social action and social responsibility thinking. According to Adamson and Darling-Hammond, studies found that students involved in this rich tasks system were more engaged than other students. The former tended to perform better than others on tasks designed to gauge high order thinking (Adamson & Darling-Hammond, 2012).

But while the experiment yielded some positive results, there were barriers it could not overcome, such as insufficient staffing and resourcing and in some cases teachers’ lack of pedagogical and content knowledge. National priorities overwhelmed state priorities when the Labor government was elected in 2007 and even had Queensland thought to extend the New Basics, its poor performance on the 2008 NAPLAN assessments (see below) would have undermined the impetus. New Basics was therefore never fully implemented.

Governance

Overall governance of Queensland schools is the responsibility of DETE. Regarding the curriculum offer, it works through the Queensland Curriculum and Assessment Authority (QCAA, formerly QSA) (Queensland DETE 2013b). Participation and feedback from each schooling sector in Queensland is included and coordinated by the QCAA. DETE’s responsibility runs across early childhood education and care, school education and training, tertiary education and employment. Its overall aims are that:

- parents and caregivers are involved in their child’s learning and development
- students, parents, caregivers, the community and industry are involved in decision making
- industry and employers are engaged in identifying and prioritizing the critical skills for the economy
- we build strong cross-sector relationships (DETE 2014a).

Textbooks

While there are no centralized procedures for adopting curriculum materials in any state or territory in Australia, some elements of centralization are found in Queensland. A network of teachers provides reviews of recommended curriculum resources to Access Ed, a branch of

Education Queensland, which disseminates this information to schools on a searchable database known as *Classroom Resource Reviews*. The great bulk of material for students is bought by parents at commercial prices. Occasionally, a government-funded project such as *Discovering Democracy* provides material free for reproduction by schools.

Accountability

To improve student performance in Queensland a new strategy was developed in 2010 that includes conducting an extensive audit of teaching and learning in each Queensland state school. This audit consists of the eight elements – an explicit improvement agenda; analysis and discussion of data; a culture that promotes learning; targeted use of school resources; an expert teaching team; systematic curriculum delivery; differential classroom learning; and effective teaching practices – and the schools are ranked against each of these eight elements on a four point scale from Outstanding to Low (ACER 2014; Lingard and Sellar 2013). One or more auditors, generally seconded school principals, spend two days gathering evidence in schools. The audit describes the school’s situation, but it is up to the school’s leadership to develop a school improvement plan. A recent ACER study argued that Queensland school audits led to better student scores on NAPLAN (ACER 2014). It stated that 97% of principals were either satisfied or very satisfied with the audit process and wanted it to continue.

Schools must also publish annual reports that include comprehensive information on: average class size; student disciplinary information; the curriculum offer, including ICT; parent, student and staff satisfaction ratings; staff information including their ethnicity and qualifications; expenditure and participation in professional development; student outcomes including attendance, retention and outcomes for Year 12 students (where relevant).

Mills et al (2014) argue that the school audit policy has resulted in increased differentiation of students based on streaming and setting. They claim that because of increased surveillance of teachers, reforms have sometimes taken second place to “safe options” (p. 332) while acknowledging that the non-punitive element of the audit can reinforce good practice. Their concern is that differentiation through streaming and setting might lead to a watered down curriculum coupled with low expectations for some students. They classified this as a perverse effect of the audit system through which teachers lacked the time to develop clear understandings of how best to differentiate among students and so fell back on streaming, setting, individual learning plans and different quality tasks for different students. According to Ben Jensen, in personal correspondence with the authors, the evidential basis of this claim, however, remains contentious.

Teacher training

Initial Teacher Training

In order to be eligible to teach both in state and non-state schools in Queensland, teachers must be registered with the Queensland College of Teachers (QCT). A number of QCT approved

initial teacher training qualifications are recognized that can lead to eligibility and are offered by universities throughout the state. Programs include:

- four-year undergraduate degrees, for example a Bachelor of Education
- dual or combined degree programs, where two degrees including an education degree, are completed at the same time, for example a Bachelor of Arts/Bachelor of Education
- postgraduate degrees, for example a Graduate Diploma in Education, for people who have already completed an academic degree in a non-education area such as a Bachelor of Science.

Where people have a vocational qualification, they may be eligible for credit toward an approved teaching degree for relevant vocational studies.

Continuous Professional Development

Teachers must engage in ongoing professional development (PD), the responsibility for which is shared between the teacher and DETE. To minimize disruption to students, whole days are set aside for PD but teachers are also encouraged to engage in it on other days, outside student contact hours. Any participation in PD outside of development days is voluntary. TAFE institutes have two or more PD days for whole staff development plus an additional ten days for employees. Both school teachers and TAFE teachers may be provided with government support to obtain formal qualifications under the *Study and Research Assistance Scheme* (SARAS). Schools must have an annual plan for the workplace, with clearly defined objectives and outcomes, identified priorities and implementation plans including timelines and budget allocations. Individual teachers negotiate their own performance development plans, based on the Queensland Professional Standards for Teachers (and, from 2014, the Australian Professional Standards for Teachers). These plans must align with their school's operational plan, the teacher's current role and career aspirations. The plans are reviewed regularly (DETE 2013c).

Curriculum

The QCAA (formerly QSA) spells out the curriculum on offer through its early years curriculum guidelines, the Queensland Curriculum, Assessment and Reporting (QCAR) Framework and the Queensland Certificate of Education (QCE). Actual content – knowledge, cultural values, ideologies, specific skill sets and competencies – is found within its syllabuses. A QSA authorized international literature review by Luke and Weir in 2008 found that syllabuses that best supported student outcomes contained a combination of “informed prescription” (i.e. essential content, centralized standards) and “informed professionalism” (i.e. professional judgment based pedagogy and assessment) that allowed both teacher professionalism and accountability.

Syllabuses contain a rationale, an overview and specification of content, guidance on how to assess in accordance with Queensland's standards. They do not prescribe pedagogy; they do,

however, point out authorized resources on material selection, unit and lesson planning, assessment, pedagogical strategies and the specific needs for identifiable student groups. Syllabuses are defined by three learning phases – the early phase concentrates on literacy and numeracy; the middle phase continues that focus through a general education of social, cultural, scientific, technological and aesthetic learning and a skill set including participation, motivation, identity and youth and community cultures; the senior phase focuses on multiple pathways through schooling and tries to accommodate students' differing aspirations, orientations and capacities. Each syllabus identifies the subject's key components and required learning, which could be content knowledge, skills and behaviors, tasks and performances, processes, competencies, capacities and/or experiences. Aspirational standards are included to guide the reporting of student achievement and are cross-curricular in nature. Guidance on school-based assessment practice, including any standardized testing and mandated moderated assessment is included (QCAA 2013).

Queensland Curriculum and Assessment Reporting (QCAR) Framework

The Queensland Curriculum and Assessment Reporting Framework (QCAR) has undergone changes since the recent local and national elections. Its basic premise is that it helps to ensure the reliability and comparability of the reporting of student achievement across Queensland's schools by spelling out schools' responsibilities for curriculum provision (national plus state curricula), assessment (both through NAPLAN and school-based assessment standards) and reporting to parents.

Through QCAR, Queensland intends that its schools will:

- provide students with the required curriculum
- assess, monitor and capture student achievement
- set high expectations for each student and respond effectively to their current levels of achievement and differing rates of learning
- prepare students to exit schooling with the foundation for successful lifelong learning and participation in the community
- keep parents and students informed of the student's achievement throughout their schooling (DETE 2013d).

Currently, while Queensland is implementing the new national curriculum (see below) the Frameworks remain policy for non-national curriculum subjects/year groups. Schools must develop and maintain curriculum, assessment and reporting plans at whole-school level, year level and unit level that address all learning areas. Student performance data must be used to modify the curriculum to support continuous improvement.

Before the latest changes, schools had to report about student progress through five interrelated components: essential learnings; standards; an assessment bank; Queensland Comparable Assessment Tasks (QCATs); and *Guidelines for Reporting*. The QCATs (phased out in 2012) were an interesting standards-based assessment tool in English, mathematics and science that was introduced in 2009. Based on performance-based assessment notions of authentic assessment and higher-order thinking skills, they were primarily diagnostic (given early in Year

4 and 6 to ascertain end of Year 3 and 5 achievement, respectively, and at the end of Year 9 to assess the learning of that year). Schools received a design brief that detailed the essential learning to be assessed and they were teacher marked, school moderated and low-stakes. They were used to report to parent and students about strengths and weaknesses, but not to measure teacher or school effectiveness (Stanley et al 2009).

According to the current Queensland government, the QCATs were made obsolete by the introduction of the Australian national curriculum and were phased out to “cut waste”, saving Queensland \$3 million annually (EducationCareer 2012).

Queensland and the Australian National Curriculum

Like other Australian states, Queensland is in the middle of a transition to the new Australian national curriculum. Where there is no national curriculum, the Queensland curriculum continues to be taught. In 2014 Queensland schools are teaching the national curriculum in English, mathematics, science, history and geography from Prep to Year 10. All students are being taught the seven general capabilities enshrined in the national curriculum: literacy; numeracy; information and communication technology; critical and creative thinking; ethical behavior; personal and social; and inter-cultural understanding as well as the three cross-curriculum priorities of Aboriginal and Torres Strait Islander histories and cultures, Asia and Australia’s engagement with Asia and sustainability.

Recommended curriculum time allocations for state schools will also be changing once the new curriculum is introduced. The following table shows the time current allocations with the 2014-2016 allocations in brackets. In all cases the time allocations for core subjects has been increased.

Learning area	Hours per year over 37-40 weeks per year (40 weeks 2014-2016)					38 weeks
	P- Year 2	Year 3-4	Year 5-6	Year 7-8	Year 9	Year 10
English	250-270 (280)	203-220 (280 Y3; 240 Y4)	185-200 (240)	111-120 (Up to 240 Y7; Up to 140 Y8)	111-120 (Up to 140)	105-114 (133)
Mathematics	166-180 (200)	166-180 (200)	148-160 (200)	111-120 (Up to 200 Y7; Up to 140 Y8)	111-120 (Up to 140)	105-114 133
Science	37-40 (40)	64-70 (70)	64-70 (70)	92-100 (100)	111-120 (120)	105-114 (114)
Health & PE	74-80	74-80	74-80	74-80	74-80	70-76

History	18-20 (20)	37-40 (40)	37-40 (40)	46-50 (50)	46-50 (50)	43-48 (48)
Geography	18-20	37-40	37-40	46-50	46-50	43-48
Economics & business			18-20	18-20	46-50	43-48
Civics & Citizenship		18-20	18-20	18-20	18-20	17-19
Arts	37-40	46-50	46-50	74-80	74-80	70-76
Languages	46-50	46-50	46-50	74-80	74-80	70-76
Design & Technology	18-20	37-40	55-60	74-80	37-40	35-38
ICT					37-40	35-38

Most of the curriculum time is allocated, but unallocated time rises in the later grades. While Prep to Year 8 has over 70% of curriculum time allocated, excluding options, Years 9 and 10 have just under 50% allocated. During 2014-2016 curriculum time in non-national curriculum subjects will be determined by the schools.

Assessment Overview

Schools have the responsibility of providing classroom assessments that align with the curriculum – both the Queensland curriculum and more recently the national curriculum. They must administer NAPLAN standardized assessments in literacy and numeracy to all students in Years 3, 5, 7 and 9 and the sample assessments in Science, Civics and Citizenship and ICT in Years 6 and 10. For students in Years 11 and 12 schools must meet the assessment requirements specified in the senior syllabuses and administer the Queensland Core Skills Test to eligible Year 12 students.

Queensland's assessment policy stresses that assessment's primary purpose is to improve student learning. Assessment for learning, assessment as learning and assessment of learning are all used for support, self-reflection and evidence gathering. The first two are supported by Queensland's reliance on school-based assessment. In the former, teachers continually monitor student learning through diagnostic and formative assessment and provide timely feedback that enables students to reflect and monitor their own progress (self-assessment). Summative assessment, again, mostly based on teacher judgment, is used to report progress to parents and students as well as for certification in upper secondary. National curriculum general capabilities and cross-curriculum priorities are not assessed separately; instead they are embedded in the learning area content. Assessment planning must take place at whole-school and year level, the latter goes as far as to spell out the range and balance of assessment types and modes.

Students are assessed on their performance through tasks including:

- written assignments
- oral presentations
- practical exercises and demonstrations
- tests and examinations
- subject specific tasks (The State of Queensland 2013).

At the upper secondary stage there are two assessment regimes for students aged 16 to 18 years. One is a system of internal, continuous, school-based, subject-specific assessment, moderated across the state by the work of review panels. The other is an external cross-curriculum test, the Queensland Core Skills Test (QCS Test). This scaling test assesses students' capabilities in relation to the more demanding aspects of the curriculum and, according to Lingard (2010) it is unusual in that its effects on pedagogy have been positive – stretching teaching, curricula and students rather than pandering to the lowest common denominator. Lingard argues that the Queensland upper secondary assessment system has resulted in teachers who are highly assessment literate and that the moderation of assessment is a beneficial form of ongoing teacher professional development and learning. He did, however, find that teachers of lower grades were less assessment literate than their upper secondary peers.

In order to ensure consistency of teacher judgment of summative tasks, the state provides marking guides within syllabuses that identify knowledge, understanding and skills to be assessed using a five-point scale. Moderation for upper secondary is in place to ensure common understanding among all teachers about assessment development, making judgments and determining overall achievement levels. Portfolios are maintained to compile representative student work for each learning area or subject. Under these strong quality assurance guidelines, schools and teachers can devise and implement syllabus-based assessments that are tailored to local needs (Maxwell and Cumming 2011).

An assessment overview is in the table below, taken from the QSA (now QCAA) website at www.qsa.qld.edu.au.