BOSTES | BOARD OF STUDIES TEACHING & EDUCATIONAL STANDARDS NSW

Physics
Stage 6

Draft Writing Brief

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Contents

1. Introduction

In 2014, the Board of Studies, Teaching and Educational Standards NSW (BOSTES) commenced a review of NSW senior secondary syllabuses for English, Mathematics, Science and History learning areas to determine directions for the incorporation of senior secondary Australian curriculum. BOSTES conducted consultation in August and September 2014 on proposed directions outlined in the *NSW Senior Secondary Review & Evaluation: English, Mathematics, Science and History* document.

The broad directions for each learning area, developed following consultation, were endorsed by BOSTES in December 2014 and are available in Section 2 of this Draft Writing Brief.

The development of the *Physics Stage 6 Draft Writing Brief* takes account of the broad directions.

The Draft Writing Brief:

- proposes the nature and number of courses within each learning area
- proposes options for course structures
- provides information about how Australian curriculum content may be modified, reordered and supplemented for inclusion in the draft syllabus.

Following consultation on the Draft Writing Brief, a Consultation Report, detailing feedback received and the key matters arising from consultation will be published. The BOSTES endorsed final Writing Brief will inform the directions for draft syllabus development.

The draft syllabus for Physics will be available for consultation during 2016. It will include the elements of a syllabus and Australian curriculum content identified with codes, learning across the curriculum content identified by icons, further information about meeting the diversity of learners and internal and external assessment.

A summary of the BOSTES syllabus development process is available at http://www.boardofstudies.nsw.edu.au/syllabuses/syllabus-development/.

Diversity of learners

NSW senior secondary syllabuses will be inclusive of the learning needs of all students. The draft syllabuses will be designed to accommodate teaching approaches that support student diversity under the sections ‘Students with special education needs’, ‘Gifted and talented students’ and ‘Students Learning English as an additional language or dialect (EAL/D)’.

For example:

Special education needs

All students with special education needs are entitled to participate in and progress through the curriculum. Some students may require additional support or adjustments to teaching, learning and assessment activities. Adjustments are measures or actions taken in relation to teaching, learning and assessment that enable a student to access syllabus outcomes and content and demonstrate achievement of outcomes.

Most students with special education needs will undertake regular Board Developed courses and/or Board Endorsed courses. Students with special education needs can access Years 11 and 12 outcomes and content in a range of ways. They should choose the most appropriate courses for the HSC in keeping with their goals, interests and learning needs.

Students may engage with:

- syllabus outcomes and content with adjustments to teaching, learning and/or assessment activities
- selected outcomes and content appropriate to their learning needs
- selected Years 11–12 Life Skills outcomes and content appropriate to their learning needs.

2. Broad directions

The following broad directions for syllabus development have been informed through consultation with stakeholders. These broad directions guide development of the NSW Science Stage 6 syllabuses.

1. In the revision and development of the courses, consideration be given to how the courses provide flexibility to meet the needs of all students.
2. In the revision of the current content-heavy courses, provision be made for the reduction and integration of content. This may be organised using the concept of 'Big Ideas' of Science.
3. The nature and practice of Science is reflected in the inclusion of working scientifically using first-hand investigations, secondary sources, models and modelling.
4. The Science courses be reviewed to allow flexibility of pedagogy and delivery. This may include cross-disciplinary study, project-based research and STEM learning.
5. Opportunities be considered to extend students' learning in Science by revising each course's content and requirements.
6. The Senior Science course rationale, structure and assessment requirements be reviewed to focus on developing scientifically literate students.
7. The Senior Science course rationale, structure and assessment requirements be reviewed with a focus to support a range of post-school contexts.
8. Assessment and HSC examination specifications be reviewed to ensure appropriate opportunities for assessment of a wide range of student performance including assessing analytical and critical thinking, first-hand investigations, the use of secondary sources and research projects.
9. The Science syllabuses should provide for the continual inclusion of contemporary and relevant material.
10. The rationale, outcomes and content of the Science Life Skills Stage 6 course be reviewed to better meet the needs of the students for whom the course is intended, as well as to provide an appropriate progression from Science Life Skills Stage 5 outcomes and content and alignment with the regular Science Stage 6 courses where appropriate.

Australian curriculum

BOSTES began its syllabus development process for Stage 6 English, Mathematics, Science and History in 2014. This follows state and territory education Ministers' endorsement of senior secondary Australian curriculum in these learning areas as the agreed and common base for development of state and territory senior secondary courses. It was also agreed that states and territories would have the flexibility to integrate the approved senior secondary Australian curriculum as appropriate. The development of Draft Writing Briefs will determine how Australian curriculum content can be modified, reordered and supplemented in each learning area while remaining compatible with the NSW senior years assessment and examinations structures.

3. Rationale

ⓘ for your information

The rationale describes the distinctive nature of the subject and outlines its relationship to the contemporary world and current practice. It explains the place and purpose of the subject in the curriculum:

- why the subject exists
- what the theoretical underpinnings are
- what makes the subject distinctive
- why students would study the subject
- how it contributes to the purpose of the Stage 6 curriculum.

✍ consult

Proposed rationale for Physics Stage 6

Students of Physics Stage 6 will, as physicists, develop and use a range of skills including the ability to communicate succinctly and concisely, to think logically, to make evidence-based judgements and to think creatively and imaginatively. This subject will also provide a foundation for students to critically consider information and to make informed decisions about contemporary physical issues in their everyday lives.

The course is designed for students who have substantial achievement in Science Stage 5 including those who wish to continue with the study of science and specifically physics at tertiary level.

Scientific knowledge and understanding and methods of working scientifically have led physicists to gain a better understanding of the natural phenomena that occur in the universe. By working scientifically and using models, laws and theories, students design and conduct qualitative and quantitative investigations both individually and collaboratively. They investigate questions and hypotheses, manipulate variables, analyse data, evaluate claims, solve problems and develop and communicate evidence-based arguments and models.

Thinking in Physics involves using differing scales, including macro-scales, micro-scales and nano-scales, using specialised representations such as formulae and equations; visualising, explaining and predicting physical phenomena and being creative, as when examining the diverse phenomena when analysing how systems interact throughout the universe on multiple scales. The study of Physics provides a foundation for undertaking investigations in a wide range of scientific fields, often providing the unifying link across interdisciplinary studies.

The application of physical knowledge and understanding is required to tackle major global issues and challenges now and into the future. These include issues of sustainability, efficient production and use of energy, the interrelationship between energy and matter, and Earth’s position in the universe including the exploration of space.

4. Aim

ⓘ for your information

In NSW syllabuses, the aim provides a succinct statement of the overall purpose of the syllabus. It indicates the general educational benefits for students from programs based on the syllabus.

The aim, objectives, outcomes and content of a syllabus are clearly linked.

✍ consult

Proposed aim for Physics Stage 6

The aim of the Physics Stage 6 Syllabus is to develop students':

- appreciation of physics as an experimental science where models and theories are refined, and new models and theories are developed through independent and collaborative research that continues to have significant impacts on society
- abilities to debate and critically evaluate scientific arguments and claims, to communicate to a range of audiences physical understanding or findings and to propose possible solutions to problems
- understanding of the theories and models used to describe, explain and make predictions about physical systems, structures and properties by considering the factors that affect these and how they can be controlled to produce desired products or outcomes
- respect for all living things and the environment, and understanding of how physics and physical practices are used and are integral to developments in many fields of human endeavour.

5. Objectives

ⓘ for your information

In NSW syllabuses, objectives provide specific statements of the intention of a syllabus. They amplify the aim and provide direction to teachers on the teaching and learning process emerging from the syllabus. They define, in broad terms, the knowledge, understanding, skills, values and attitudes to be developed through study in the subject. They act as organisers for the intended outcomes.

✍ consult

Proposed objectives for Physics Stage 6

Values and attitudes

Students:

- develop positive, informed values and attitudes towards physics
- recognise the importance and relevance of physics in their lives now and for the future.

Skills

Students:

- develop skills in applying the processes of Working Scientifically.

Knowledge and understanding

Students:

- develop knowledge and understanding of mechanics
- develop knowledge and understanding of energy
- develop knowledge and understanding of fields
- develop knowledge and understanding of ideas and implementations.

6. Outcomes

ⓘ for your information

In NSW syllabuses, outcomes provide detail about what students are expected to achieve at the end of each stage in relation to the objectives. They indicate the knowledge, understanding and skills expected to be gained by most students as a result of effective teaching and learning. They are derived from the objectives of the syllabus.

✍ consult

Proposed outcomes for Physics Stage 6

Outcomes will be developed for each year. The following table presents a sample of some of the proposed outcomes.

Values and attitudes

Objectives
Students: • develop positive, informed values and attitudes towards physics • recognise the importance and relevance of physics in their lives now and for the future

Skills

Objective	
Students: • develop skills in applying the processes of Working Scientifically	
Preliminary course outcomes A student:	**HSC course outcomes** A student:
PHP-1 proposes questions or hypotheses to be investigated scientifically and predicts outcomes	PHH-1 evaluates questions and/or hypotheses to be investigated scientifically and predicts evidence-based outcomes
PHP-2 designs investigations, considers risks and ethical issues, identifies appropriate materials and suggests related data for collection	PHH-2 justifies the design of risk-assessed, ethical investigations involving appropriate materials and selects and collects relevant primary- and secondary-sourced data

Knowledge and understanding

Preliminary course Unit 1	
Objective Students: develop knowledge and understanding of Mechanics	
Preliminary course outcomes A student:	
PHP-8	describes and analyses motion in terms of scalar and vector quantities and makes quantitative measurements for distance, displacement, speed, velocity and acceleration
PHP-9	describes and explains events in terms of Newton's laws, the Law of Conservation of Momentum and Relativity

HSC course Unit 3	
Objective Students: develop knowledge and understanding of Fields	
HSC course outcomes A student:	
PHH-8	analyses and evaluates investigations into uniform circular motion, projectile motion, satellite motion and gravitational and electromagnetic phenomena
PHH-9	describes and analyses transformations and transfer of energy in electromagnetic devices, as well as with motion in electric, magnetic and gravitational fields

Preliminary course Unit 2	
Objective Students: develop knowledge and understanding of energy	
Preliminary course outcomes A student:	
PHP-10	explains and analyses wave interactions and the effects of those interactions in regard to transfer of energy
PHP-11	explains and calculates the effects of energy transfers and energy transformations in electrical circuits

HSC course Unit 4	
Objective Students: develop knowledge and understanding of ideas and implementations	
HSC course outcomes A student:	
PHH-10	describes and evaluates how the quantum theory of light and matter explains blackbody radiation, the photoelectric effect and atomic emission and absorption spectra
PHH-11	investigates the implementation of technologies such as GPS navigation, lasers, modern electric lighting, medical imaging, nanotechnology, semiconductors, quantum computers and particle accelerators

7. Course structure and options

ⓘ for your information

Rather than stipulate a single approach the Draft Writing Brief proposes options for possible course structure. The consultation process will inform the final structure which may be one of the options, or may involve a combination of the ideas presented.

The following provides an outline of some proposed Preliminary and HSC course structures for the Physics Stage 6 Syllabus with indicative course hours and the arrangement of course content, along with outlining relationships between specific components and between core and options.

✍ consult

Overview of Preliminary course structures – Physics 2 Unit course – 120 hours

<table>
<tr><th>Preliminary course</th><th>Option 1</th><th>Option 2</th><th>Option 3</th></tr>
<tr><td>Structure</td><td>Maintain the current (120 hours) Preliminary course structure</td><td>Four topics of equal length (30 hours)</td><td>Four topics of equal length (25 hours) and a depth study component (20 hours)</td></tr>
<tr><td rowspan="2">Content</td><td rowspan="2">Review and update the content to include the relevant aspects of the Australian curriculum
Eg:
The World Communicates (30 hours)
Electrical Energy in the Home (30 hours)
Moving About (30 hours)
The Cosmic Engine (30 hours)</td><td colspan="2">Revise the course content to integrate the relevant aspects of the Australian curriculum and consider the quantitative analytical aspects of the course</td></tr>
<tr><td>Eg:
Kinematics (30 hours)
Dynamics (30 hours)
Waves (30 hours)
Electricity (30 hours)</td><td>Eg:
Kinematics (25 hours)
Dynamics (25 hours)
Waves (25 hours)
Electricity (25 hours)
Depth Study (20 hours)</td></tr>
<tr><td>Practical content</td><td>Update practical experiences to reflect</td><td colspan="2">Focus on delivering content through practical experiences</td></tr>
</table>

	revised content		
Investigation/ PBL	Maintain at least ONE open-ended investigation (OEI)		Include practical investigation/depth study component related to core (20 hours)

Overview of HSC course structures – Physics 2 Unit course – 120 hours

HSC course	Option 1	Option 2	Option 3
Structure	Maintain current HSC structure (120 hours)	Four topics of equal length (30 hours)	Four topics of equal length (25 hours) with a depth study component (20 hours)
Content	Review and update content to include the relevant aspects of the Australian curriculum Eg: • Space (30 hours) • Motors and Generators (30 hours) • From Ideas to implementation (30 hours) • One of five options (30 hours)	Revise the course and integrate the relevant aspects of the Australian Curriculum (AC) content Eg: • Gravity (30 hours) • Electromagnetism (30 hours) • Quantum Theory (30 hours) • Ideas to Implementation (30 hours)	Revise the course and integrate the relevant aspects of the Australian curriculum content Eg: • Gravity (25 hours) • Electromagnetism (25 hours) • Quantum Theory (25 hours) • Ideas to Implementation (25 hours) • Depth Study (20 hours)
Practical content	Update practical experiences to reflect revised content	Focus on delivering content through practical experiences	
Investigation/ PBL	Maintain at least one open-ended investigation (OEI)		Includes practical investigations/projects/ (depth study) component (20 hours)
Options	Update the current five options	No options	

Proposed options for course structure for Physics Stage 6

Option 1 – Physics 2 Unit (240 hours) course

This model maintains the current course structures with a view to review and update the content where required. Consideration would be given to providing for greater depth of study and allowing more time for practical learning.

The subject matter of the Physics course would recognise the different needs and interests of students and provide a structure that builds upon the foundations laid in Stage 5, yet would acknowledge that students entering Stage 6 have a wide range of abilities, circumstances and expectations.

The proposed Physics 2 Unit course would be examined for the HSC.

Revise current Preliminary course – 120 indicative hours

- The World Communicates (30 indicative hours)
- Electrical Energy in the Home (30 indicative hours)
- Moving About (30 indicative hours)
- The Cosmic Engine (30 indicative hours)

Revise current HSC course – 120 indicative hours

- Space (30 indicative hours)
- Motors and Generators (30 indicative hours)
- From Ideas to Implementation (30 indicative hours)
- Choice of one option (30 indicative hours):
  - Geophysics
  - Medical Physics
  - Astrophysics
  - From Quanta to Quarks
  - The Age of Silicon

Option 2 – Physics 2 Unit (240 hours) course

This model proposes a revision of course content to allow for practical-based learning to encourage students to learn science as it is practised.

The quantitative analytical demands of the content in this course will be considered.

The proposed Physics 2 Unit course would be examined for the HSC.

Example Preliminary course (120 indicative hours)

<table>
<tr><th>Example unit</th><th>Example modules and areas of study</th></tr>
<tr><td rowspan="2">Unit 1
Mechanics
(60 indicative hours)</td><td>Kinematics (30 hours)
Scalars and vectors
Representations of motion
Straight line motion
Two-dimensional motion</td></tr>
<tr><td>Dynamics (30 hours)
Newton’s laws of motion
Momentum
Energy
Conservation laws</td></tr>
<tr><td rowspan="2">Unit 2
Energy
(60 indicative hours)</td><td>Waves (30 hours)
Wave properties
Properties of sound
Properties of light
Properties of electromagnetic waves</td></tr>
<tr><td>Electricity (30 hours)
Electrostatics
Ohms law and electrical circuits
Electric fields
Electricity and magnetism</td></tr>
<tr><td colspan="2">Nature of the course
The Physics Preliminary course is designed to focus on learning science as it is practised. It is suggested that at least 50% of the Preliminary course time is allocated to practical aspects of the course including project work.
At least ONE open-ended investigation is to be completed.</td></tr>
</table>

Example HSC course (120 indicative hours)

<table>
<tr><th>Example unit</th><th>Example modules and areas of study</th></tr>
<tr><td rowspan="2">Unit 3
Fields
(60 hours)</td><td>Gravity (30 hours)
Universal gravitation
Motion of satellites
Space launching
Einstein’s Theory of Relativity
Space and Time</td></tr>
<tr><td>Electromagnetism (30 hours)
Magnetism
Electromagnetism
Motors
Generators</td></tr>
<tr><td rowspan="2">Unit 4
Revolutions in Modern Physics
(60 hours)</td><td>Quantum Theory (30 hours)
Introduction to the Quantum theory
Black body radiation
Photoelectric effect
Atomic emission and absorption spectra</td></tr>
<tr><td>Ideas to Implementation (30 hours)
GPS navigation and lasers
Nanotechnology
Semiconductors and superconductors
Particle accelerators</td></tr>
<tr><td colspan="2">Nature of the course
The Physics HSC course is designed to focus on learning science as it is practised. It is suggested that at least 40% of the HSC course time is allocated to practical aspects of the course including project work.
At least ONE open-ended investigation is to be completed.</td></tr>
</table>

Option 3 – Physics 2 Unit (120 hour) course with depth studies

This model introduces an investigative/project/depth study opportunity in the Preliminary and HSC course years.

The investigative depth study is designed to allow time for all students to engage more deeply with chosen aspects of the course content and to study in depth aspects of physics they may continue with at the tertiary level.

Example Preliminary course (120 indicative hours)

<table>
<tr><th>Example unit</th><th colspan="2">Example modules and areas of study</th></tr>
<tr><td rowspan="2">Unit 1
Mechanics
(60 indicative hours)</td><td>Kinematics (25 hours)
Scalars and vectors
Representations of motion
Straight line motion
Two-dimensional motion</td><td rowspan="2">Depth study related to core
(10 hours)</td></tr>
<tr><td>Dynamics (25 hours)
Newton’s laws of motion
Momentum
Energy
Conservation laws</td></tr>
<tr><td rowspan="2">Unit 2
Energy
(60 indicative hours)</td><td>Waves (25 hours)
Wave properties
Properties of sound
Properties of light
Properties of electromagnetic waves</td><td rowspan="2">Depth study related to core
(10 hours)</td></tr>
<tr><td>Electricity (25 hours)
Electrostatics
Ohms law and electrical circuits
Electric fields
Electricity and magnetism</td></tr>
<tr><td colspan="3">Nature of the course
The Physics Preliminary course is designed to focus on learning science as it is practised. It is suggested that at least 50% of the Preliminary course time is allocated to practical aspects of the course including project work.</td></tr>
</table>

Example HSC course (120 indicative hours)

<table>
<tr><th>Example unit</th><th colspan="2">Example modules and areas of study</th></tr>
<tr><td rowspan="2">Unit 3
Fields
(60 hours)</td><td>Gravity (25 hours)
Universal gravitation
Motion of satellites
Space launching
Einstein’s Theory of Relativity
Space and Time</td><td rowspan="2">Depth study related to core
(10 hours)</td></tr>
<tr><td>Electromagnetism (25 hours)
Magnetism
Electromagnetism
Motors
Generators</td></tr>
<tr><td rowspan="2">Unit 4
Revolutions in Modern Physics
(60 hours)</td><td>Quantum Theory (25 hours)
Introduction to the Quantum theory
Black body radiation
Photoelectric effect
Atomic emission and absorption spectra</td><td rowspan="2">Depth study related to core
(10 hours)</td></tr>
<tr><td>Ideas to Implementation (25 hours)
GPS navigation and lasers
Nanotechnology
Semiconductors and superconductors
Particle accelerators</td></tr>
<tr><td colspan="3">Examples of depth studies/investigative projects
Energy Sources – ‘Determining the penetrating power of alpha, beta and gamma radiation’
Maglev trains – ‘Fact or fiction! An appraisal’</td></tr>
<tr><td colspan="3">Nature of the course
The depth study/investigative project aspect is designed to allow for deeper engagement with specific content of interest to the students.
The HSC course includes 20 hours of depth study using investigative project(s) related to the core units. These could be implemented through a range of approaches with a minimum of 5 hours and a maximum of 10 hours for each depth study. The Physics course is designed to focus on learning science as it is practised. It is suggested that at least 40% of the HSC</td></tr>
</table>

course time is allocated to practical aspects of the course including project work.

Practical nature of the Physics course

Practical experiences are a core component of the Physics course.

Practical experiences should be designed to integrate the skills and knowledge and understanding outcomes in both the Preliminary and HSC courses.

Practical experiences should emphasise hands-on activities including:

- undertaking laboratory experiments including the use of appropriate ICT technologies
- fieldwork
- the use of computer simulations for modelling or manipulating data
- use of, reorganisation and representation of acknowledged secondary data
- the extraction and reorganisation of information in the form of flow charts, tables, graphs, diagrams, prose and keys
- the use of digital media to capture, obtain, manipulate, calculate and present data, information and solutions to problems.

Depth study - Investigative project(s) (5–10 hours)

It is proposed that investigative project(s) be incorporated into each of the Preliminary and HSC courses based upon the principle of learning science as it is practised. This may be a single 10 hour project or two 5 hour projects completed anytime within each unit.

Investigative project(s) opportunities are suggested for inclusion to allow schools to cater for the full range of students undertaking the course. They are incorporated to provide a vehicle for content coverage, to aid engagement and to provide students with further opportunities to demonstrate what they know and can do.

Investigative projects in both the Preliminary and HSC years may be considered for inclusion in the school-based assessment components for the HSC.

The investigative projects are to focus on:

- reviewing current knowledge/literature review
- producing an explanation or proof of a problem(s) posed or area researched
- including evidence of validity, reliability and precision in data analysis
- involving students in peer review of other students' work
- formulating logical explanations/conclusions and suggesting further research
- developing skills in designing and managing projects
- developing communication skills, including presentation skills, using relevant forms of media and reporting techniques.

The project may be a product, design, system, model, report or solution to problems posed and may be associated with fieldwork undertaken.

Extension courses

Extension courses build on the content of the 2 Unit courses. They are set at a more demanding level and have a more intensive focus. Extension courses involve complex levels of conceptualisation and provide the opportunity for students to work in increasingly independent ways. They enable high performing students to reach their potential in their senior secondary years.

BOSTES criteria ensure that Extension courses are only developed where there is a compelling educational justification. Equity across subjects is not in itself a reason for the development of Extension courses. The following criteria are applied to the establishment and maintenance of Extension courses:

- There is additional subject content necessary to achieve the purpose of the subject beyond that which can be accommodated in the 2 Unit course; which build on the content of the 2 Unit course; which is at a more demanding level; and which requires additional curriculum time for students to learn.
- It can be demonstrated that study of the Extension course will lead particular target groups to substantial, positive gains in relation to the prime purpose for each course.
- Study of the Extension course may be required or assumed necessary by tertiary institutions for study in courses beyond those in the same subject area.
- The likely candidature for the Extension course and whether there are significant resource constraints or issues in developing and offering the extended study course.

An argument for a new Extension course would have to establish that the current 2 Unit courses are not sufficiently challenging. It would need to be shown that a new Extension course could cover completely new higher level content with higher order outcomes without overlapping with the content of University courses.

Extension courses in Science could take the form of one of the following options:

A. An Extension Chemistry course and an Extension Physics course
B. A combined Extension course drawing on elements of Chemistry and Physics
C. A combined Extension course that draws from across the four science disciplines.

Some advantages and disadvantages for each option include:

A. Chemistry and Physics are high demand courses that are important to the nation’s STEM initiatives. More demanding study in these sciences will better prepare students to engage in related courses at university. Some schools will be forced to make a decision about which course they can support as an Extension course.
B. These two high candidature subjects complement each other in cross-discipline aspects of science. There may be a perception that this Extension course is only accessible by students who study both Chemistry and Physics.
C. This course could appeal to a broader range of students. A breadth in working across disciplines could act against the essential requirement of greater depth.

Extension course content could include:

Extension Chemistry	**Extension Physics**	**Extension Chemistry and Physics**	**Extension Science**
• Equilibrium constants and the effect of temperature on their value • Design an industrial process that could be used for producing an economically viable chemical	• Effects of gravity on photons of light • Emerging technologies that use the quantum theory	• Equilibrium constants and the effect of temperature on their value • Effects of gravity on photons of light	• Research emerging technologies and manipulation of DNA • Equilibrium constants and the effect of temperature on their value • Renewable and non-renewable resources in terms of cost, extraction methods and environmental impacts • Effects of gravity on photons of light

8. Learning across the curriculum

ⓘ for your information

NSW syllabuses provide a context within which to develop core skills, knowledge and understanding considered essential for the acquisition of effective, higher-order thinking skills that underpin successful participation in further education, work and everyday life including problem-solving, collaboration, self-management, communication and information technology skills.

BOSTES has described learning across the curriculum areas that are to be included in syllabuses. In Stage 6 syllabuses, the identified areas will be embedded in the descriptions of content and identified by icons. Learning across the curriculum content, including the cross-curriculum priorities and general capabilities, assists students to achieve the broad learning outcomes defined in the BOSTES *Statement of Equity Principles,* the *Melbourne Declaration on Educational Goals for Young Australians (December 2008)* and in the Australian Government's *Core Skills for Work Developmental Framework* (2013).

Knowledge, understanding, skills, values and attitudes derived from the learning across the curriculum areas will be included in BOSTES syllabuses, while ensuring that subject integrity is maintained.

Cross-curriculum priorities enable students to develop understanding about and address the contemporary issues they face.

The cross-curriculum priorities are:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia's engagement with Asia
- Sustainability

General capabilities encompass the knowledge, skills, attitudes and behaviours to assist students to live and work successfully in the 21st century.

The general capabilities are:

- Critical and creative thinking
- Ethical understanding
- Information and communication technology capability
- Intercultural understanding
- Literacy
- Numeracy
- Personal and social capability

BOSTES' syllabuses include other areas identified as important learning for all students:

- Civics and citizenship
- Difference and diversity
- Work and enterprise

9. Glossary

ⓘ for your information

A glossary will be developed for the draft Physics Stage 6 Syllabus which explains terms that will assist teachers in the interpretation of the subject.

10. Assessment and reporting

BOSTES continues to promote a standards-referenced approach to assessing and reporting student achievement in NSW, and the importance of assessment for, of and as learning as essential components of quality teaching and learning.

Information on assessment and reporting for Preliminary and HSC courses will be developed for the draft syllabus consultation in 2016.

The information will include:

- suggested components and weightings for school-based assessment of the Preliminary course
- mandatory components and weightings for school-based assessment of the HSC course
- HSC examination specifications which describe the format of the HSC examination program for Physics.

Advice about assessment in relation to the Physics syllabus is contained in *Assessment and Reporting in Science Stage 6*. This document provides general advice on assessment in Stage 6 as well as the specific requirements for the Preliminary and HSC courses.

Consultation on assessment and reporting during the Draft Writing Brief phase will focus on providing feedback about assessment and reporting practices in schools, school-based assessment requirements, the use of technology in assessment, and external assessment programs.