# International Comparisons in Senior Secondary Assessment

Full Report: Table Supplement

June 2012

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# Contents

## Table 1: Key features of education systems included in this study

| Education systems | Upper secondary graduation rates (general and vocational programmes)1 | Where does responsibility for education lie? | Regulatory framework | Administration of education system | Administration of examinations and qualifications at senior secondary level | Administration of university entrance | Main suite of qualifications / assessments available at senior secondary level (bold = included in this study) | Notes (includes number of universities in top lists for TES rankings) |
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| Australia – New South Wales (NSW) | no overall data available<br><br>OECD graduation rate from a general upper secondary education is 67%, and a vocational equivalent is 44% (Australia). | with individual states and territories; in NSW, this is the Board of Studies NSW | Board of Studies NSW | Board of Studies NSW | Board of Studies NSW is responsible for the Higher School Certificate (HSC) at senior secondary level. | There is no central body for university applications. Organisations such as the Universities Admissions Centre and Queensland Tertiary Admissions Centre manage admissions for particular groups or institutions.<br><br>The Australian Tertiary Admission Rank (ATAR) can also be used for admission to some institutions. | **Higher School Certificate (HSC)** | NSW has 2 universities ranked amongst the top 200 in the world. |
| Canada – Alberta | total 1st-time graduation rate: 79% (Canada)<br><br>total 1st-time graduation rate aged < 25 years: 75% (Canada) | with individual provinces and territories; in Alberta, Alberta Education is the provincial government ministry for education | Alberta Education (Government of Alberta) | Alberta Education | Provincial legislature – Alberta Education has exclusive power of education policy | There is no central body for university applications.<br><br>Institutions act independently by defining the level of achievement they expect from applicants. | **Alberta Diploma**<br><br>Certificate of High School Achievement (English Francophone)<br><br>Certificate of School Completion<br><br>Certificate of Achievement | Alberta has 1 university ranked amongst the top 200 in the world. |

[1] Data sourced from OECD, 2011a unless otherwise noted.

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| Denmark | total 1st-time graduation rate: 85%<br><br>total 1st-time graduation rate aged < 25 years: 75% | Ministry of Children and Education<br><br>(Ministry of Science, Innovation and Higher Education is responsible for higher education.) | Ministry of Children and Education | Ministry of Children and Education | Ministry of Children and Education | Admission to most courses of higher education is managed through the *Koordinerede Tilmelding*, or KOT (Coordinated Enrolment System). | ***Studentereksamen*, or STX (Upper secondary school examination)**<br><br>*Højere Forberedelseksamen*, or HF (Higher Preparatory Examination)<br><br>*Højere Handelseksamen*, or HHX (Higher Commercial Examination)<br><br>*Højere Teknisk Eksamen*, or HTX (Higher Technical Examination) | Denmark has 3 universities ranked amongst the top 200 in the world. |
| England | total 1st-time graduation rate: 92% (UK) | Department for Education<br><br>(Department for Business, Innovation and Skills (BIS) is responsible for Higher Education.) | Ofqual is the regulator for qualifications. It is not directly controlled by the government but reports to parliament. | Up to age 16, the National Curriculum approved by Department for Education. Post-16, course content is approved by Ofqual. | Course content is approved and regulated by Ofqual. It is delivered by independent providers – awarding organisations. | All universities have their own policies for admission of students.<br><br>UCAS offers a service between universities and students to match them to places. | **Advanced Level General Certificate of Education (GCE), or A level**<br><br>Diploma<br><br>**Cambridge Pre-U Diploma**<br><br>Level 3 qualifications on the NQF or QCF | The providers of exams and assessments also offer the same or similar qualifications in Wales and Northern Ireland, depending on government policy and regulatory frameworks in those countries. England has 24 universities ranked amongst the top 200 in the world. |
| Finland | total 1st-time graduation rate: 95%<br><br>total 1st-time graduation rate aged < 25: 84% | Ministry of Education and Culture | Finnish National Board of Education | Ministry of Education and Culture, supported by Finnish National Board of Education | Ministry of Education and Culture, supported by Finnish National Board of Education | Admission to 10 universities in Finland is coordinated through University Admissions Finland, although all institutions manage their own admissions. | ***Ylioppilastutkinto / Studentexamen* (Matriculation Examination)**<br><br>Vocational qualifications | Finland has 1 university ranked amongst the top 200 in the world. |

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| France | no overall graduation rates<br><br>50% of the population have graduated from a general upper secondary education, with 62% completing a vocational programme at the equivalent level (OECD, 2011a). | Ministry for Education, Youth and Community Life<br><br>(Ministry of National Education, Higher Education and Research is responsible for all standardised testing.) | National Education, Higher Education and Research | Ministry for Education, Youth and Community Life, supported at a regional level through 28 Regional Academies | National Education, Higher Education and Research | Admission is managed online by the Ministry of Higher Education and Research. | ***baccalauréat général***<br><br>*baccalauréat technolgique*<br><br>*baccalauréat professionnel* | France has 4 universities ranked amongst the top 200 in the world. |
| Hong Kong | no OECD data available<br><br>52% of the population have completed upper secondary education (Government of the Hong Kong Special Administrative Region, 2010). | Education Bureau, headed by the Secretary for Education | Education Bureau | Education Bureau | Hong Kong Examinations and Assessment Authority (HKEAA) | The central body, the Joint University Programmes Admissions System (JUPAS), is responsible for administering admissions to publicly-funded universities in Hong Kong.<br><br>Each university sets the admission requirements for specific courses, but the general entrance requirement (GER) is set by the agreement of Heads of Universities Committee (HUCOM). | **Hong Kong Advanced Level Examinations (HKALE)** (legacy qualification)<br><br>**Hong Kong Diploma of Secondary Education (HKDSE)** (new qualification) | Hong Kong has 4 universities ranked amongst the top 200 in the world. |
| International Baccalaureate Organisation (IBO) | N/A | IBO, a non-profit education foundation | N/A | IBO provides 3 programmes for students aged 3–19. It delivers qualifications in 141 countries. | IBO | All universities have their own policies for the admission of students. The IBO works with universities in nearly 140 countries | **International Baccalaureate Diploma** | N/A |

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| | | | | | | to promote broader recognition of the IB Diploma Programme. The IB Diploma is accepted by universities around the world. | | |
| Netherlands | no overall rates available<br><br>39% of the population have graduated from a general upper secondary education, 58% from a vocational programme (OECD, 2011a). | Ministry of Education, Culture and Science | Ministry of Education, Culture and Science<br><br>College Voor Examens (CVE) is responsible for national assessments. | Ministry of Education, Culture and Science<br><br>CVE | CVE contracts Cito (a national institute for educational measurement) to develop test materials. | University admissions and student grants are managed by the Dienst Uitvoering Onderwijs (DUO), or Learning Implementation Service | ***hoger algemeen voortgezet onderwijs*, or havo (higher general continued education)**<br><br>***voorbereidend wetenschappelijk onderwijs*, or vwo (preparatory scientific education)**<br><br>*voorbereidend middelbaar beroepsonderwijs* (vmbo) | The Netherlands has 10 universities ranked amongst the top 200 in the world. |
| New Zealand | total 1st-time graduation rate: 90%<br><br>total 1st-time graduation rate aged < 25 years: 77% | Ministry of Education<br><br>(Tertiary Education Commission has responsibility for Higher Education.) | Ministry of Education<br><br>New Zealand Qualifications Authority (NZQA) | Ministry of Education<br><br>NZQA | NZQA | The minimum requirement to qualify for entrance to a university is the University Entrance (UE) standard. This is set out in terms of credits students are required to achieve.<br><br>There is no central body for university applications; each institution has its own admission procedure. | **National Certificate of Educational Achievement (NCEA) Level 3** | New Zealand has 1 university ranked amongst the top 200 in the world. |

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| Norway | total 1st-time graduation rate: 91%<br><br>total 1st-time graduation rate aged < 25 years: 78% | Ministry of Education and Research | The Norwegian Parliament (the Storling) and the Government decide the framework for the education sector. The state bears the overall responsibility for regulation. | The municipalities are responsible for operating and administering primary and lower secondary schools. | The county authorities are responsible for upper secondary education and training. | The Norwegian Universities and Colleges Admission Service, NUCAS (Samordna opptak) coordinates the admission to regular undergraduate studies. | ***Vitnemål fra den Videregående Skole*** **(Certificate of Upper Secondary Education)** | Norway has 1 university ranked amongst the top 200 in the world. |
| People's Republic of China | total 1st-time graduation rate: 65% | Ministry of Education (MoE) through local government education committees | MoE | The State Education Commission (SEC) oversees education in the People's Republic of China. Many aspects such as finance, textbooks and school-based exams are devolved to local or municipal level. | National Education Examinations Authority(NEEA | Admission depends primarily on taking the annual *Gāokǎo* (National Higher Education Entrance Examination) administered by the National Education Examinations Authority (NEEA). Each course and university has its own requirements for entry. | ***Gāokǎo***<br><br>Senior High School Examination (*Huikao*)<br><br>Vocational Secondary School Diploma (*Zhixiao*)<br><br>High School Academic Proficiency Test | People's Republic of China has 6 universities ranked amongst the top 200 in the world. |
| Republic of Ireland | total 1st-time graduation rate: 91%<br><br>total 1st-time graduation rate aged < 25 years: 90% | Department of Education and Skills | State Examinations Commission (SEC)<br><br>Department of Education and Skills | Department of Education and Skills<br><br>SEC is responsible for development of the exam system. | SEC | Applications to universities and other higher education institutes in Republic of Ireland are managed centrally by the Central Applications Office (CAO). | **Leaving Certificate (Established)**<br><br>Leaving Certificate Applied Option<br><br>Leaving Certificate Vocational Programme | Republic of Ireland has 2 universities ranked amongst the top 200 in the world. |
| Republic of Korea | total 1st-time graduation rate: 89% | Ministry of Education, Science and Technology (MEST) | MEST | MEST delegates administration to municipal / provincial district offices. | Ministry of Education and the Korea Institute for Curriculum and Evaluation (KICE) | The government sets basic minimum requirements for universities regarding the student selection process. There is no central office for | ***Su-neung*****, (College Scholastic Ability Test, or CSAT)**<br><br>General High School Diploma | Republic of Korea has 4 universities ranked amongst the top 200 in the world. |

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| | | | | | | university applications. Students apply directly to the university they wish to attend. | Vocational High School Diploma | |
| USA – ACT | total 1st-time graduation rate: 76% (all USA)<br><br>total 1st-time graduation rate aged < 25 years: 76% (all USA) | US Department of Education<br><br>Responsibility for education policy and provision is devolved through state legislatures to 14,000 school districts. | US Department of Education<br><br>National Assessment of Educational Progress | US Department of Education<br><br>State authorities<br><br>School districts | State authorities | There is no central body for university applications. Institutions act independently to select students and may use interviews and admissions testing. | **ACT Test** | ACT is 1 of 2 principal types of test used for college admission.<br><br>The USA has 72 universities ranked amongst the top 200 in the world. |
| USA – New York State | total 1st-time graduation rate: 76% (all USA)<br><br>total 1st-time graduation rate aged < 25 years: 76% (all USA) | New York State Education Department | US Department of Education | Board of Regents | Board of Regents | There is no central body for university applications. Institutions act independently to select students and may use interviews and admissions testing. | **Regents Diploma** | Students take external exams in English, mathematics, science and social studies. |
| University of Cambridge International Examinations (CIE) | N/A | CIE | CIE | CIE | CIE | UCAS, which manages applications for courses in the UK, accepts the Cambridge International AS and A levels in support of applications. | **Cambridge International AS and A levels**<br><br>**Cambridge Pre-U** | AS and full A level qualifications are available in over 45 subjects.<br><br>Pre-U Diploma: principal subjects are available as stand-alone qualifications known as Cambridge International Level 3 Pre-U Certificates. |

## Table 2: Key features qualifications and assessments included in this study

| Education system | Qualification or assessment | Purpose | Usual length of study | Type | Number of courses required | Compulsory subjects | Notes |
|---|---|---|---|---|---|---|---|
| Australia – New South Wales (NSW) | Higher School Certificate (HSC) | completion of senior secondary education | 2 years | composite | 22 (12 in 1st year and 10 in 2nd year) | ▪ English | Students typically study 5 subjects, each taking about 20% of their HSC course time. Taking any of the extension courses can alter this proportion. |
| Canada – Alberta | Alberta Diploma | completion of senior secondary education | 3–5 years | composite | minimum of 20 (minimum total of 100 credits at 5 credits or less per course) | ▪ career and life management<br>▪ English<br>▪ mathematics<br>▪ physical education<br>▪ science<br>▪ social studies | Taking the 10, 20, and 30 courses in preparation for the diploma exam in any subject uses about 15% of a student's course time. |
| Denmark | *Studentereksamen*, or STX (Upper secondary school examination) | completion of senior secondary education | 3 years | composite | minimum of 13, plus electives, specialised study programme and individual project | ▪ arts subject<br>▪ classical studies<br>▪ Danish<br>▪ English<br>▪ history<br>▪ mathematics<br>▪ other foreign language<br>▪ physical education<br>▪ physics<br>▪ religious studies<br>▪ social science<br><br>plus 2 from:<br>▪ biology<br>▪ chemistry<br>▪ physical geography | Taking the A, B and C courses in any subject within the STX uses about 15% of a student's course time, except for the compulsory history A course which uses about 10% of the STX course time.<br><br>Final marks are calculated as a weighted average of course marks to reflect the level and number of courses studied. Course marks include those for work completed during the course, school assessments and the final exams administered by the Ministry. |
| England | Advanced level General Certificate of Education (GCE), or A level | completion of senior secondary education | 2 years | specific stand-alone | 2 per subject (AS in 1st year, A2 in 2nd year) | none | Over 45 subjects are available from 5 independent providers.<br><br>Students typically study between 3 and 5 subjects. Therefore a student taking 3 A levels uses about 30% of their course time for each subject. |

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| Finland | *Ylioppilastutkinto / Studentexamen* (Matriculation Examination) | university admission | 3 years | composite | not specified, but a minimum of 4 subjects are examined | Mother tongue plus 3 from:<br>■ foreign language<br>■ other national language<br>■ mathematics<br>■ general studies suite | Taking both the compulsory and specialised additional courses for a subject within the upper secondary school programme typically uses about 10% of a student's course time. However, advanced mathematics uses about 20% of the course time.<br><br>Students may take more than 4 tests but only 1 test per subject per session is allowed. |
| France | *baccalauréat général* | completion of senior secondary education | 2 years | composite | minimum of 9 subjects plus an independent group project (*travaux personnels encadrés* TPE) | In all *séries*:<br>■ French<br>■ history geography<br>■ mathematics<br>■ 2 other languages<br>■ philosophy<br>■ physical education<br>■ sciences<br>■ social sciences<br>■ TPE<br><br>In *série* ES only:<br>■ social sciences<br><br>In *séries* L and S:<br>■ sciences (biology, physics chemistry) | Taking both compulsory and specialism courses for subjects within the *baccalauréat général* typically uses about 20% of a student's study time. However this is not a straightforward comparison with other qualifications because some joint courses are regarded as single subjects. For example, history geography, and physics chemistry. The full *série* S mathematics specialism uses over 20% of the course time.<br><br>Students choose between 3 *séries* (streams): *scientifique* (science), *sciences économiques et sociales* (economics and social sciences) and *littéraire* (literature), often referred to by their 1st initials, S, ES and L.<br><br>Each stream results in a specialisation and carries different weights associated with each subject. The *baccalauréat* result is a weighted average of the TPE and individual subject exam scores (all scores are out of 20). |
| Hong Kong | Hong Kong Advanced Level Examinations (HKALE) (legacy qualification) | university admission | 2 years | single subject | for university admission a minimum of 2 at A level and 2 at AS or 1 at A level and 4 at AS, including compulsory subjects | ■ AS Chinese language and culture<br>■ AS Use of English | A typical student taking 1 A level subject alongside 4 AS subjects uses about 30% of their course time for the A level.<br><br>The HKALE has been completely replaced by HKDSE following comprehensive reform of Hong Kong's education system which included changes to degree course structures and the organisation of higher education. |

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| Hong Kong | Hong Kong Diploma of Secondary Education (HKDSE) (new qualification) | completion of senior secondary education | 3 years | composite | 4 compulsory subjects plus at least 1 elective from category A or C | ▪ Chinese language<br>▪ English language<br>▪ liberal studies<br>▪ mathematics | Subjects within the diploma each use about 10% of the HKDSE course time, although the core subjects: Chinese language, English language and mathematics can each take up to 15% of the course time.<br><br>The HKDSE has completely replaced the HKALE following comprehensive reform of Hong Kong's education system which included changes to degree course structures and the organisation of higher education.<br><br>Includes a wide range of category B applied learning courses for technical and vocational subjects. |
| International Baccalaureate Organisation (IBO) | International Baccalaureate Diploma | completion of senior secondary education | 2 years | composite | 6 subjects (3 at higher level) including extended essay plus creativity, action, service (CAS), and theory of knowledge (TOK) | ▪ TOK<br>▪ CAS<br><br>and 1 subject from each group:<br>▪ arts<br>▪ experimental sciences<br>▪ individuals and societies<br>▪ language acquisition<br>▪ mathematics and computer science<br>▪ studies in language and literature | Higher level subjects typically use about 20% of the diploma course time, standard level courses about 15%.<br><br>Subjects, other than languages, may be taught and examined in: English, French or Spanish; pilot projects are also taking place in German and Chinese.<br><br>With approval from the IBO, schools may offer alternatives to the IB courses at standard level. |
| Netherlands | *Hoger algemeen voortgezet onderwijs* (havo) | completion of senior secondary education | 5 years | composite | 5 common subjects plus 1 specialised subject combination and an independent project | ▪ culture and the arts<br>▪ Dutch<br>▪ English<br>▪ physical education<br>▪ social studies<br><br>plus 1 subject combination from:<br>▪ culture and society | Subjects within the havo typically use about 15% of the course time.<br><br>The overall achievement is determined by a combination of the results from school and nationally set assessments.<br><br>Students may choose to take the vwo exam in specific subjects. |

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| | | | | | | ■ economics and society<br>■ science and health<br>■ science and technology | |
| Netherlands | *Voorbereidend wetenschappelijk onderwijs* (vwo) | completion of senior secondary education | 6 years | composite | 7 common subjects plus 1 specialised subject combination and an independent project | ■ classical culture<br>■ culture and the arts or general science<br>■ Dutch<br>■ English<br>■ other modern language<br>■ physical education<br>■ social studies<br><br>plus 1 subject combination from:<br>■ culture and society<br>■ economics and society<br>■ science and health<br>■ science and technology | Subjects within the vwo typically use about 15% of the course time. The overall achievement is determined by a combination of the results from school and nationally set assessments. |
| New Zealand | National Certificate of Educational Achievement (NCEA) Level 3 | completion of senior secondary education | 1 year (usually following studies at Levels 1 and 2) | composite | 60 credits from Level 3 courses plus 20 credits from Level 2 or above | none | Students typically study 5 subjects, each taking about 20% of the NCEA Level 3 course time.<br><br>Courses and exams can be conducted in English or *te reo Māori* (the Maori language). |
| Norway | *Vitnemål fra den Videregående Skole* (Certificate of Upper Secondary Education) | completion of senior secondary education | 3 years | composite | 9 or 10 common core subjects plus subjects from chosen subject area and the general studies programme | ■ English<br>■ foreign languages<br>■ geography<br>■ history<br>■ mathematics<br>■ natural science<br>■ Norwegian / 1st language<br>■ religion and ethics<br>■ social sciences | Each subject within the upper secondary school programme typically uses about 10% of a student's course time.<br><br>All students take a final external exam in Norwegian and are selected to take external exams in up to 4 other subjects. |

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| People's Republic of China | *Gāokǎo* (National Higher Education Entrance Examination) | university admission | usually taken following completion of senior secondary education | composite | minimum of 4 | ▪ Chinese<br>▪ foreign language<br>▪ mathematics<br><br>plus up to 3 from within humanities or science curriculum | National exams take place over 3 days and are completely separate from the certificates issued by schools for the completion of education. |
| Republic of Ireland | Leaving Certificate (Established) | completion of senior secondary education | 2 years | composite | minimum of 5 | Irish | Students choose from 35 subjects at Ordinary or Higher level.<br><br>Students typically study 5 subjects, each taking about 20% of their Leaving Certificate course time. |
| Republic of Korea | *Su-neung*, (College Scholastic Ability Test, or CSAT | university admission | usually taken following completion of senior secondary education | composite | minimum of 5 | ▪ Korean<br>▪ mathematics<br>▪ English<br>▪ 1 additional foreign language, or Chinese characters and classics<br><br>plus social sciences or sciences or vocational education subjects | Candidates sit all 7 hours of national exams during 1 day and the results are completely separate from the certificates issued by schools for the completion of education. |
| USA – ACT | ACT Test | college readiness assessment | usually taken during senior secondary education | single subject | minimum of 4 | ▪ English<br>▪ mathematics<br>▪ reading<br>▪ science | Tests are offered up to six times per year within the USA and five times a year at locations outside the USA |
| USA – New York State | Regents Diploma | completion of senior secondary education | 4 years | composite | minimum of 22 (minimum total of 22 credits at 1 or ½ credit per course | ▪ English<br>▪ foreign language<br>▪ health<br>▪ mathematics<br>▪ parenting<br>▪ physical education<br>▪ science<br>▪ social studies<br>▪ technology<br>▪ arts | The allocation of time to subjects within the senior secondary programme is reflected in the credit value of the subject courses. For example, English uses about 20% (8 credits) and chemistry 5% (2 credits).<br><br>Students take the external Regents Examinations in English, mathematics, science and social studies. |

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| University of Cambridge International Examinations (CIE) | Cambridge International AS and A levels | university admission | 2 years | specific stand-alone | 2 per subject (AS in 1st year, A2 in 2nd year) | none | AS and full A level qualifications are available in over 45 subjects.<br><br>Students typically study between 3 and 5 subjects. Therefore a student taking 3 A levels uses about 30% of their course time for each subject. |
| University of Cambridge International Examinations (CIE) | Cambridge International Pre-U Diploma | university admission | 2 years | composite | 3 plus independent project and portfolio | ▪ global perspectives and research | Each principal subject studied within the diploma uses about 25% of the course time because a student must also study global perspective and research.<br><br>Principal subjects are available as stand-alone qualifications known as Cambridge International Level 3 Pre-U Certificates.<br><br>A typical student taking 3 principal subject certificates uses about 30% of their course time for each subject. |

## Table 3: Approaches to assessment – mathematics

| Education system | Assessment or qualification<br>Number of courses or examinations | Compulsory maths element | Maths courses | Course length | Compulsory topics | Options available | Nature of assessments | Notes |
|---|---|---|---|---|---|---|---|---|
| Australia – New South Wales (NSW) | Higher School Certificate (HSC)<br><br>22 credits<br>(12 preliminary and 10 HSC – approximately 2 credits per course) | none | Preliminary | 120 hours | ▪ preliminary syllabus | | school assessment | Students must complete the Preliminary course in order to progress to the HSC course. The basic mathematics programme of preliminary and HSC courses represents approximately 20% of the HSC course time.<br><br>NSW Board of Studies specifies the requirements for school assessment.<br><br>External assessment consists of:<br><br>HSC: 3-hour paper (with 5 minutes' reading time) consisting of 10 multi-part questions<br><br>Extension 1: 2-hour paper (with 5 minutes' reading time) consisting of 7 multi-part questions (⅓ of exam result) plus the HSC paper (⅔)<br><br>Extension 2: 3-hour paper (with 5 minutes' reading time) consisting of 8 multi-part questions (50% of exam result) plus the Extension 1 paper (50%)<br><br>A student's final score is the average of the school assessment and exam result. |
| | | | HSC | 120 hours | ▪ HSC syllabus | | school assessment and external exam | |
| | | | Extension 1 | 360 hours over 2 years | ▪ preliminary syllabus<br>▪ HSC syllabus<br>▪ extension 1 preliminary and HSC syllabus | | school assessment and external exam | |
| | | | Extension 2 | 420 hours over 2 years | ▪ preliminary syllabus<br>▪ HSC syllabus<br>▪ extension 1 preliminary and HSC syllabus<br>▪ extension 2 syllabus | | school assessment and external exam | |
| Canada – Alberta | Alberta Diploma<br><br>100 credits (5 credits or less per course) | yes | Applied Mathematics 30 (5 credits) | 125 hours | ▪ matrices and pathways<br>▪ statistics and probability | | school assessment and external exam | Students study either Applied or Pure Mathematics and must complete Applied Mathematics 10 in order to progress to Applied Mathematics 20 |

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| | | | | | ■ finance<br>■ cyclic, recursive and fractal patterns<br>■ vectors<br>■ design | | | and then Applied Mathematics 30. The same applies to Pure Mathematics 10, 20 and 30. The set of 3 courses represents approximately 15% of the diploma course time.<br><br>Alberta Education specifies the requirements for school assessment.<br><br>The Applied Mathematics diploma exam is a 2-hour paper with 33 multiple-choice questions and 7 numerical response questions.<br><br>The Pure Mathematics diploma exam is a 2-hour paper with 33 multiple-choice questions and 7 numerical response questions.<br><br>A student's final score is the average of the school assessment and exam result. |
| | | | Pure Mathematics 30 (5 credits) | 125 hours | ■ transformations of functions<br>■ exponents, logarithms and geometric series<br>■ trigonometry<br>■ conic sections<br>■ permutations and combinations<br>■ statistics | | school assessment and external exam | |
| Denmark | *Studentereksamen* (STX)<br><br>minimum of 13 subjects, plus electives, a specialised study programme and an individual project during the 3-year course | yes | Mathematics C | 125 hours | (100 hours)<br>Mathematics C syllabus | (25 hours)<br>■ reasoning and proofs<br>■ data processing<br>■ historical mathematical progress | school assessment | The C, B and A courses together represent approximately 15% of the STX course time.<br><br>The Danish Ministry for Education specifies the requirements for school assessment.<br><br>The Mathematics C and B final assessments are similar in structure to the Mathematics A final exam.<br><br>The Mathematics A final exam is a 5-hour task:<br>■ 5 questions to be completed in the 1st hour without calculators or other aids<br>■ 11 multiple-part questions (calculators, etc. are allowed) |
| | | | Mathematics B | 125 hours | (75 hours)<br>Mathematics B syllabus | (50 hours)<br>■ reasoning and proofs<br>■ mathematical modelling<br>■ additional statistical or probability theory model<br>■ data processing<br>■ historical mathematical subjects | school assessment | |

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| | | | Mathematics A | 125 hours | (50 hours)<br>■ number hierarchies<br>■ extended power concept<br>■ rational and irrational numbers<br>■ solving equations<br>■ formal expression of connections<br>■ statistical methods<br>■ ratios<br>■ trigonometry<br>■ vectors<br>■ definitions of functions<br>■ definition and interpretations of derivatives<br>■ monotony<br>■ integration methods<br>■ differential equations<br>■ mathematical models | (75 hours)<br>■ reasoning and proofs<br>■ mathematical modelling<br>■ statistical and probability models<br>■ data processing<br>■ historical mathematics topics | school assessment and external exam | |
| England | A level<br><br>2 per subject (AS and A2) | none | AS Mathematics | 180 hours | ■ core mathematics 1<br>■ core mathematics 2 | 1 for AS and 1 for A2 from:<br>■ decision mathematics 1<br>■ decision mathematics 2<br>■ mechanics 1<br>■ mechanics 2<br>■ statistics 1<br>■ statistics 2 | external exam | A typical student taking 3 A levels uses approximately 30% of their course time for each subject. However some students take Further Mathematics as a 4th subject in which case mathematics overall represents approximately 50% of their course time.<br><br>All exams are 1½-hour written papers (Total: 75 marks) |
| | | | A2 Mathematics | 180 hours | ■ core mathematics 3<br>■ core mathematics 4 | | external exam | |
| | | | AS Further Mathematics | 180 hours | ■ further pure mathematics 1 | 2 for AS and 4 for A2 from any of the above not already taken or<br>■ further pure mathematics 2<br>■ further pure mathematics 3<br>■ mechanics 3 | external exam | |
| | | | A2 Further Mathematics | 180 hours | ■ further pure mathematics 2 or further pure mathematics 3 | | external exam | |

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| | | | | | | ■ mechanics 4<br>■ mechanics 5<br>■ statistics 3<br>■ statistics 4 | | |
| Finland | *Ylioppilastutkinto / Studentexamen* (Matriculation Examination)<br><br>not specified but a minimum of 4 subjects are examined | none | Basic Mathematics | | ■ expressions and equations<br>■ geometry<br>■ mathematical models I<br>■ mathematical analysis<br>■ statistics and probabilities<br>■ mathematical models II | ■ commercial mathematics<br>■ mathematical models III | external exam | Students must successfully complete the compulsory part of the course. The complete set of mathematics courses, basic and advanced, represents approximately 20% of the upper secondary school course time.<br><br>External assessment is available twice each year and consists of a 6-hour written paper with extended answer tasks. Students choose to enter either the Basic or the Advanced exam.<br><br>The Basic Mathematics exam has 15 questions of equal worth. Students have a free choice of which 10 to answer.<br>(Total: 60 marks)<br><br>The Advanced Mathematics exam has 15 questions. Most are worth 6 marks but it includes a few 9-mark questions. Students have a free choice of which 10 to answer.<br>(Total: 60, 63 or 66 marks) |
| | | | Advanced Mathematics | | ■ functions and equations<br>■ polynomial functions<br>■ geometry<br>■ analytical geometry<br>■ vectors<br>■ probability and statistics<br>■ derivatives<br>■ radical and logarithmic functions<br>■ trigonomic functions and number sequences<br>■ integral calculus | ■ number theory and logic<br>■ numerical and algebraic methods<br>■ advanced differential and integral calculus | external exam | |
| France | *baccalauréat général*<br><br>minimum of 9 subjects plus and independent group project | yes | *série* L (literature series) | 30 hours | none | (30 hours)<br>specialised content<br>■ arithmetic<br>■ analysis<br>■ statistics and probability<br>■ geometry<br>■ mathematical arguments (analysis of reasoning and algorithmic activities) | external exam | The specialised course exam is a 3-hour paper with 4 multi-part and / or multi-step exercises.<br><br>There is no compulsory course for mathematics in *série* L. |

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| | | | *série* ES (economics and social sciences series) | 40 hours | (20 hours)<br>■ numerical functions<br>■ integral calculus<br>■ statistics and probability | (20 hours) specialised content<br>■ graphical solutions<br>■ sequences<br>■ geometry | external exam | The compulsory course exam is a 3-hour paper with 4 multi-part and / or multi-step exercises.<br><br>The specialised course exam is a 3-hour paper with 4 multi-part and / or multi-step exercises. It may contain part or whole questions from the compulsory course exam. |
| | | | *série* S (scientific series) | 75 hours | (55 hours)<br>■ analysis<br>■ geometry<br>■ probability and statistics | (20 hours) specialised content<br>■ arithmetic<br>■ geometry | external exam | These 2 courses represent approximately 20% of the *série* S course time.<br><br>The compulsory course exam is a 4-hour paper with 4 multi-part and / or multi-step exercises.<br><br>The specialised course exam is a 4-hour paper with 4 multi-part and / or multi-step exercises. It may contain part or whole questions from the compulsory course exam. |
| Hong Kong | Hong Kong Advanced Level Examinations (HKALE)<br><br>typically 2 at A level and 2 at AS, or 1 at A level and 4 at AS | none | A Level | 2-year programme | ■ mathematical induction<br>■ inequalities<br>■ binomial theorem for positive integral indices<br>■ complex numbers<br>■ polynomials with real coefficients in 1 variable<br>■ rational functions<br>■ polynomials with real coefficients<br>■ matrices<br>■ square matrices of order 2 and 3<br>■ applications to 2-d geometry<br>■ system of linear equations<br>■ conic sections in | | external exam | This course represents approximately 30% of the course time for a student taking A level Pure Mathematics and 4 other AS subjects.<br><br>Advanced Level Pure Mathematics: the exam consists of 2 equally weighted 3-hour papers in 2 sections:<br>■ section A: 6–8 short questions<br>■ section B: 5 long questions, of which students have to answer 4 |

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| | | | | | rectangular coordinates<br>■ functions and graphs<br>■ elementary functions<br>■ concept of a limit<br>■ differentiation<br>■ applications of differentiation<br>■ integration<br>■ methods of integration<br>■ applications of integration | | | |
| Hong Kong | Hong Kong Diploma of Secondary Education (HKDSE)<br><br>4 compulsory subjects plus minimum 1 elective | yes | Mathematics | 400 hours | (270 hours)<br>■ number and algebra<br>■ measures, shape and space<br>■ data handling<br>■ further learning unit | (130 hours)<br>1 from:<br>■ calculus and statistics<br>■ algebra and calculus | external exam | These 2 mathematics courses represent approximately 15% of the HKDSE course time.<br><br>External assessment consists of 2 papers for the compulsory content:<br>■ Paper 1: 2¼-hour free response paper (65%)<br>■ Paper 2: 1¼-hour multiple-choice paper (35%)<br><br>■ External assessment consists of 1 paper for the extended part: 2½-hour free response paper |
| International Baccalaureate Organisation (IBO) | IB Diploma<br><br>6 subjects (3 at higher level) and extended essay | yes | Mathematical Studies (standard level) | 150 hours | ■ introduction to the graphic display calculator<br>■ number and algebra<br>■ sets<br>■ functions<br>■ geometry and trigonometry<br>■ statistics<br>■ introductory differential calculus<br>■ financial mathematics | | school assessment and external exam | The higher level mathematics course represents approximately 20% of the diploma course time.<br><br>The IBO specifies the requirements for school assessment.<br><br>Mathematical Studies standard level assessment:<br>School-based assessment of the student's project (20%)<br>External exam consists of:<br>■ Paper 1: 1½ hours, 15 short questions (40%) |

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| | | | Mathematics (standard level) | 150 hours | ■ algebra<br>■ functions and equations<br>■ circular functions and trigonometry<br>■ matrices<br>■ vectors<br>■ statistics and probability<br>■ calculus | | school assessment and external exam | ■ Paper 2: 1½ hours, 5 extended response (40%)<br><br>Mathematics standard level assessment:<br>School-based assessment of the student's portfolio (20%)<br>External exam consists of:<br>■ Paper 1: 1½ hours, non-calculator paper (40%)<br>■ Paper 2: 1½ hours, graphic display calculator paper (40%)<br><br>Higher level assessment:<br>School-based assessment of the student's portfolio (20%)<br><br>External exam consists of: Compulsory content<br>■ Paper 1: 2 hours, non-calculator paper (30%)<br>■ Paper 2: 2 hours, graphic display calculator paper (30%)<br><br>Optional content<br>■ Paper 3: 1 hour, graphic display calculator paper (20%) |
| | | | Mathematics (higher level) | 240 hours | ■ algebra<br>■ functions and equations<br>■ circular functions and trigonometry<br>■ matrices<br>■ vectors<br>■ statistics and probability<br>■ calculus | 1 from<br>■ statistics and probability<br>■ sets, relations and groups<br>■ series and differential equations<br>■ discrete mathematics | school assessment and external exam | |
| Netherlands | *Hoger algemeen voortgezet onderwijs* (havo)<br><br>5 common subjects plus 1 specialised combination and an independent project | none | Mathematics A | 320 hours | ■ skills<br>■ differentiation<br>■ calculations and probabilities<br>■ statistics<br>■ correlation<br>■ applied analysis<br>■ binomial distribution | school study programme | school assessment and external exam | This course represents approximately 15% of the havo course time.<br><br>150 hours are allocated to the study of topics in the school assessments (40%)<br><br>170 hours are allocated to the study of topics assessed in the external exam. This is a 3-hour written paper (60%). |
| Netherlands | *Voorbereidend wetenschappelijk onderwijs* (vwo)<br><br>7 common subjects plus 1 specialised combination and an | none | Mathematics B | 440 hours | ■ skills<br>■ functions and diagrams<br>■ discrete analysis<br>■ differential and integral equations<br>■ goniometric | school study programme | school assessment and external exam | This course represents approximately 15% of the vwo course time.<br><br>200 hours are allocated to the study of topics to be assessed in the school assessments, including the practical work. The school assessment |

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| | independent project | | | | ▪ functions<br>▪ advanced geometry | | | contributes 40% of the overall score.<br><br>240 hours are allocated to the study of topics assessed in the external exam. This is a 3-hour written paper (60%). |
| New Zealand | National Certificate of Educational Achievement (NCEA) Level 3<br><br>60 credits at Level 3 plus 20 credits at Level 2 or 3 | none | Level 3 | not specified | none | calculus: 9 topics<br><br>statistics and modelling: 7 topics | school assessment and external exam | This course represents approximately 20% of the NCEA Level 3 course time.<br><br>Students wishing to study mathematics at university in New Zealand need to achieve a minimum of 14 credits. This is possible without completing any of the school-assessed options.<br><br>The New Zealand Qualifications Authority specifies the requirements for the school assessment of options. The other 12 options are assessed by separate external exams. |
| Norway | *Vitnemål fra den Videregående Skole* (Certificate of Upper Secondary Education)<br><br>9 or 10 common subjects plus chosen subject area and general studies | yes | Mathematics S1 (social sciences programme) | 140 hours | ▪ algebra<br>▪ functions<br>▪ probability<br>▪ linear optimisation | none | school assessment and external exam | Each set of 2 courses represents approximately 10% of the upper secondary school course time.<br><br>The Norwegian Ministry of Education specifies the requirements for the school assessment.<br><br>A student may be selected to take the 5-hour external exam. For each course there is a 2-part question paper. Part 1 must be handed in within 2 hours. Students must attempt all the questions (there is usually a choice in 1 question in part 2).<br>Calculators are not allowed in part 1 of the S2 paper. |
| | | | Mathematics S2 (social sciences programme) | 140 hours | ▪ algebra<br>▪ functions<br>▪ probability and statistics | none | school assessment and external exam | |
| | | | Mathematics R1 (natural sciences programme) | 140 hours | ▪ geometry<br>▪ algebra<br>▪ functions<br>▪ combinatorics and probability | none | school assessment and external exam | |
| | | | Mathematics R2 (natural sciences programme) | 140 hours | ▪ geometry<br>▪ algebra<br>▪ functions<br>▪ differential equations | none | school assessment and external exam | |
| People's Republic of China | *Gāokǎo* (National Higher Education Entrance Examination)<br><br>Chinese, a foreign language, mathematics | yes | not specified (usually taken after completion of senior secondary schooling) | not specified | ▪ compulsory content<br>▪ sets<br>▪ the concept of functions and basic and elementary functions I | ▪ geometric proof<br>▪ coordinates system and parameter equation<br>▪ inequality | | The *Gāokǎo* exams take place nationally over a 3-day period once each year, with 2 subject exams each day.<br><br>External assessment is a 2-hour paper |

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| | and up to 3 humanities or up to 3 sciences | | | | ▪ preliminary 3-dimensional geometry<br>▪ preliminary plane analytical geometry<br>▪ preliminary algorithms<br>▪ statistics<br>▪ probability<br>▪ basic elementary functions II (trigonometric functions)<br>▪ plane vectors<br>▪ trigonometric transformation<br>▪ solution of triangles<br>▪ progression<br>▪ inequality<br>▪ common logic expressions<br>▪ conic curve<br>▪ space vectors and solid geometry<br>▪ differential coefficient and its application<br>▪ inference and proof<br>▪ the expansion of series and the introduction of complex numbers<br>▪ the principle of counting constant<br>▪ probability and statistics | | | consisting of:<br>▪ part 1: multiple-choice: 12 questions (5 marks each)<br>▪ part 2: 4 short-answer questions (5 marks each) and 5 longer questions (12 marks each)<br>▪ optional: complete 1 from a choice of 3 questions (10 marks each)<br>(Total: 150 marks) |
| Republic of Ireland | Leaving Certificate (Established)<br><br>minimum 5 | none | Mathematics (higher level) | 180 hours | ▪ algebra<br>▪ geometry<br>▪ trigonometry<br>▪ sequences and series<br>▪ functions and calculus | ▪ further calculus and series<br>▪ further probability and statistics<br>▪ groups<br>▪ further geometry | external exam | This course represents approximately 20% of the Leaving Certificate course time.<br><br>External exam:<br>Paper 1: 2½ hours, 8 extended questions, students choose 6 (300 |

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| | | | | | ■ discrete mathematics and statistics | | | marks)<br><br>Paper 2: 2½ hours<br>■ section 1: 7 extended questions, students choose 5 (250 marks)<br>■ section 2: 4 extended questions, students choose 1 (50 marks) |
| Republic of Korea | *Su-neung* (College Scholastic Ability Test, or CSAT)<br><br>minimum 5 | yes | Mathematics I | not specified (usually taken after completion of senior secondary schooling) | ■ algorithms<br>■ analysis<br>■ probability and statistics | | external exam | Students take either:<br>Mathematics paper A: 1 hour 40 minutes, 25 questions (multiple choice and numerical response) on topics from Mathematics I and II plus 5 questions on student's additional study topic from:<br>■ differentiation and integration<br>■ probability and statistics<br>■ discrete mathematics<br>or<br>Mathematics paper B: 1 hour 40 minutes, 30 questions (multiple choice and numerical response) on topics from Mathematics I |
| | | | Mathematics II | | ■ algorithms<br>■ analysis<br>■ geometry | none | external exam | |
| USA – ACT | ACT<br><br>minimum 4 assessments | yes | Mathematics | none | none | none | external exam | 1 of 4 compulsory tests within the ACT<br><br>1 paper, 1 hour, with 60 multiple-choice or numerical response questions |
| USA – New York State | Regents Diploma<br><br>22 credits (1 or ½ credit per course) | yes | Mathematics B | none | ■ mathematical reasoning<br>■ number and numeration<br>■ operations<br>■ modelling / multiple representation<br>■ measurement<br>■ uncertainty<br>■ patterns/functions | none | school assessment and external exam | Students must complete the school course with satisfactory results; this represents approximately 15% of the senior school programme time.<br><br>The external assessment is a 3-hours:<br>■ part I: 20 multiple-choice questions (2 credits each)<br>■ part II: 6 questions (2 credits each)<br>■ part III: 5 questions (4 credits each)<br>■ part IV: 2 questions (6 credits each) |
| University of Cambridge International Examinations(CIE) | Cambridge International AS level and A level<br><br>2 per subject (AS and A2) | none | AS Mathematics | 180 hours | ■ pure mathematics 1 | ■ pure mathematics 2<br>■ mechanics 1<br>■ probability and statistics 1 | external exam | A typical student taking 3 A levels uses approximately 30% of their course time for each subject.<br><br>External exams taken in 1 session:<br>■ Pure Mathematics 1: 1¾ hours, (75 marks) |

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| | | | | | | | | ▪ Options: 2 papers, 1¼ hours each, (50 marks each)<br><br>Completion of AS contributes 50% to the overall A level score. |
| | | | A2 Mathematics | 180 hours | ▪ pure mathematics 1<br>▪ pure mathematics 3 | ▪ mechanics 1 with probability and statistics 1<br>▪ mechanics 1 and 2<br>▪ probability and statistics 1 and 2 | external exam | External exams taken in 1 exam session (in addition to AS external exams):<br><br>▪ Pure Mathematics 3: 1 paper, 1¾ hours (75 marks)<br>▪ Options: 2 papers, 1¼-hours each (50 marks each) |
| University of Cambridge International Examinations (CIE) | Cambridge Pre-U<br><br>3 units plus independent project and portfolio | none | Pre U certificate in mathematics | 380 hours | ▪ pure mathematics<br>▪ probability<br>▪ mechanics | none | external exam | The Mathematics course represents approximately 25% of the diploma course time.<br><br>Paper 1: 3-hour written paper; pure mathematics questions worth ⅔ of marks and probability questions worth ⅓ of marks<br>(Total: 120 marks; 50% of overall score)<br><br>Paper 2: 3-hour written paper; pure mathematics questions worth ⅔ of marks; mechanics questions worth ⅓ of marks<br>(Total: 120 marks; 50% of overall score) |

## Table 4: Approaches to assessment – chemistry

| Education system | Assessment or qualification Number of courses or examinations | Compulsory science element | Chemistry courses | Course length | Compulsory topics | Options available | Practical work | Nature of assessments | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Australia – New South Wales (NSW) | Higher School Certificate (HSC)<br><br>22 credits (12 preliminary and 10 HSC, approximately 2 credits per course) | none | Preliminary | 120 hours | ▪ the chemical Earth<br>▪ metals<br>▪ water<br>▪ energy | none | minimum 45 hours | school-assessed | Students must complete the Preliminary course in order to progress to the HSC course. These 2 courses represent approximately 20% of the HSC course time.<br><br>NSW Board of Studies specifies the requirements for school assessment.<br><br>External assessment is by a 3-hour exam (with 5 minutes' reading time) consisting of:<br>Core:<br>▪ part A: multiple choice (20 marks)<br>▪ part B: short-answer questions, some with parts, at least 1 worth 6–8 marks (55 marks)<br><br>Options:<br>▪ 1 question for each option, consisting of short answer parts, at least 1 part worth 6–8 marks (25 marks)<br><br>A student's final score is the average of the school assessment and exam result. |
| | | | HSC | 120 hours | core 90 hours<br>▪ production of materials<br>▪ the acidic environment<br>▪ chemical monitoring and management | options 30 hours for 1 of:<br>▪ industrial chemistry<br>▪ shipwrecks, corrosion and conservation<br>▪ the biochemistry of movement<br>▪ the chemistry of art<br>▪ forensic chemistry | minimum 35 hours | school-assessed and external exam | |
| Canada – Alberta | Alberta Diploma<br><br>100 credits (5 credits or less per course) | Yes<br><br>(10 credits in science, chemistry, biology or | Chemistry 20<br><br>(5 credits) | 125 hours | ▪ the diversity of matter and chemical bonding<br>▪ forms of matter: gases<br>▪ matter as | none | not specified | school-assessed | Students must complete Science 10 in order to progress to Chemistry 20 and then Chemistry 30. These 3 courses represent approximately 15% of the |

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| | | physics) | | | solutions, acids and bases<br>▪ quantitative relationships in chemical changes | | | | course time.<br><br>Alberta Education specifies the requirements for school assessment. |
| | | | Chemistry 30<br><br>(5 credits) | 125 hours | ▪ thermochemical changes<br>▪ electrochemical changes<br>▪ chemical changes of organic compounds<br>▪ chemical equilibrium focusing on acid-base systems | none | not specified | school-assessed and external exam | External assessment is by a 2-hour paper consisting of:<br>▪ 44 multiple-choice questions<br>▪ 16 numerical response questions<br>(60 marks)<br><br>A student's final score is the average of the school assessment and exam result. |
| Denmark | *Studentereksamen* (STX)<br><br>minimum of 13 subjects, plus electives, a specialised study programme and an individual project during the 3-year course | | Chemistry C | 75 hours | ▪ molecular structure<br>▪ quantity calculations<br>▪ chemical reactions<br>▪ experimental work | school selected supplementary materials which are relevant to students | integral to course | school-assessed and external exam | The C, B and A courses together represent approximately 15% of the STX course time.<br><br>The Danish Ministry for Education specifies the requirements for school assessment.<br><br>The Chemistry C and B final assessments are similar in structure to the Chemistry A final exam.<br><br>The Chemistry A final exam is a 5-hour task. The student must prepare and carry out experimental work, analyse and report the results either in writing or by presentation to the examiner. |
| | | | Chemistry B | 125 hours | ▪ molecular structure<br>▪ quantity calculations<br>▪ knowledge of substances, including their uses<br>▪ chemical reactions<br>▪ experimental work | school selected supplementary material to include industrial chemical processes, connecting school chemistry to the wider science community | integral to course | school-assessed and external exam | |
| | | | Chemistry A (must be combined with Mathematics B) | 125 hours (plus Mathematics B 125 hours) | ▪ the structure of substances<br>▪ quantity calculations<br>▪ knowledge of substances, including their uses | school selected supplementary material to include at least 1 recent chemical research subject and relate to everyday life and contemporary media | integral to course with a minimum of 20 hours' independent activity | school-assessed and external exam | |

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| | | | | | ▪ chemical reactions<br>▪ experimental work | debates | | | |
| England | A level<br><br>2 per subject (AS and A2) | none | AS | 180 hours | ▪ practical skills in chemistry 1<br>▪ atoms, bonds and groups<br>▪ chains, energy and resources | none | integral to course | school-assessed and external exam | A typical student taking 3 A levels uses approximately 30% of their course time for each subject.<br><br>Each unit is examined separately with the AS and A2 outcomes contributing equally to the overall A level qualification.<br><br>The awarding organisation (OCR) specifies the requirements for school assessment of practical work (AS and A2: 40 marks each).<br><br>External assessment of each unit in this specification is available in January and June and consists of mainly short-answer questions with multiple parts and some extended writing:<br><br>▪ Atoms, Bonds and Groups, 1 hour (60 marks)<br>▪ Chains, Energy and Resources, 1¾ hours (100 marks)<br>▪ Rings, Polymers and Analysis, 1 hour (60 marks)<br>▪ Equilibria, Energetics and Elements, 1¾ hours (100 marks)<br><br>Total marks available:<br>AS course: 200 marks<br>A2 course: 200 marks |
| | | | A2 | 180 hours | ▪ practical skills in chemistry 2<br>▪ rings, polymers and analysis<br>▪ equilibria, energetics and elements | none | integral to course | school-assessed and external exam | |

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| Finland | *Ylioppilastutkinto* / Studentexamen (Matriculation Examination)<br><br>not specified but a minimum of 4 subjects are examined | none | Finnish Upper Secondary School Chemistry Curriculum | 140 hours (per course) | ▪ chemistry for people and for the environment | specialised additional courses<br>▪ the micro world of chemistry<br>▪ reactions and energy<br>▪ metals and materials<br>▪ reactions and equilibrium | integral to course | external exam | Students must successfully complete the compulsory chemistry course. The compulsory course plus the 4 specialised additional courses use approximately 10% of the upper secondary school course time.<br><br>External assessment is available twice each year and consists of a 6-hour written paper with extended answer tasks, 10 worth 6 marks and 2 more demanding worth 9 marks. This includes 1–4 cross-subject questions. Students have a free choice of which 6 questions to complete.<br><br>(Total: 36, 39 or 42 marks) |
| France | *baccalauréat général série scientifique*<br><br>minimum of 9 subjects plus an independent group project | Physics and chemistry core<br><br>Life and Earth sciences core | *classe de première* (1st year) Physics and Chemistry | 60 hours specifically for chemistry | 30 hours<br>▪ chemistry and measures<br>▪ organic chemistry<br>▪ chemistry and energy | none | 30 hours | none | Physics and chemistry are assessed together; there is a compulsory and an additional specialism course. Taking both joint courses represents approximately 20% of the *série* S course time.<br><br>The Ministry for Education specifies the requirements for practical assessment in schools. Students complete a 1-hour task for either physics or chemistry (4 marks).<br><br>External assessment takes place in June and consists of a written 3½-hour paper with 3 tasks:<br>▪ 2 multi-part tasks assessing both physics and chemistry |
| | | | *classe terminale* (final year) Physics and Chemistry | 60 hours specifically for chemistry | chemical transformations of systems<br>▪ kinetic<br>▪ thermodynamic (spontaneous and forced transformations)<br>▪ organic chemistry | chemist's activities<br>▪ separation, purification and identification<br>▪ synthesis<br>▪ analysis<br>▪ from raw materials to usual products | 30 hours | school-assessed and external exam | |

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| | | | | | | | | | (12 marks)<br>■ 1 multi-part task assessing either physics or chemistry (4 marks)<br><br>Total: 16 marks |
| Hong Kong | Hong Kong Advanced Level Examinations (HKALE)<br><br>Typically 2 at A level and 2 at AS, or 1 at A level and 4 at AS | none | A level | 2-year programme | ■ atoms, molecules and stoichiometry<br>■ the electronic structure of atoms and the periodic table<br>■ energetics<br>■ bonding and structure<br>■ chemical kinetics<br>■ chemical equilibrium<br>■ periodic properties of the elements in the periodic table<br>■ the s-block elements<br>■ the p-block elements<br>■ the d-block elements<br>■ fundamentals of organic chemistry<br>■ chemistry of organic compounds<br>■ chemistry in action | none | integral to course | school-assessed and external exam | This course represents approximately 30% of the HKALE course time for a student taking A level Chemistry and 4 AS subjects.<br><br>Students are expected to carry out 15 practicals in Year S6 and 8 in Year S7. The practicals are teacher-assessed and then externally moderated (20%).<br><br>External assessment consists of 2 papers, 3 hours each (40% each).<br><br>Unlike England's GCE A level and the Cambridge International A level, the Hong Kong AS and A level courses are independent of each other. |
| Hong Kong | Hong Kong Diploma of Secondary Education (HKDSE)<br><br>4 compulsory subjects plus minimum 1 elective | none | Chemistry | 270 hours | (198 hours)<br>■ planet Earth<br>■ microscopic world I<br>■ metals<br>■ acids and bases<br>■ fossil fuels and carbon | (52 hours)<br>study 2 from:<br>■ industrial chemistry<br>■ materials chemistry<br>■ analytical chemistry | (20 hours) investigative study in chemistry | school-assessed and external exam | The chemistry course represents approximately 10% of the HKDSE course time.<br><br>School-based assessment (20%, made up of 8% basic chemical analysis and 12% experiments) |

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| | | | | | compounds<br>■ microscopic world II<br>■ redox reactions, chemical cells and electrolysis<br>■ chemical reactions and energy<br>■ rate of reaction<br>■ chemical equilibrium<br>■ chemistry of carbon compounds<br>■ patterns in the chemical world | | | | External assessment consists of 2 papers:<br>■ Paper 1: compulsory content, 2½ hours (60%)<br>■ Paper 2: elective / option content, 1 hour (20%) |
| International Baccalaureate Organisation (IBO) | IB Diploma<br><br>6 subjects (3 at higher level) and extended essay | at least 1 group 4 subject experimental sciences | Chemistry | Higher level 240 hours | ■ quantitative chemistry<br>■ atomic structure<br>■ periodicity<br>■ bonding<br>■ energetics<br>■ kinetics<br>■ equilibrium<br>■ acids and bases<br>■ oxidation and reduction<br>■ organic chemistry<br>■ measurement and data processing | ■ modern analytical chemistry<br>■ human biochemistry<br>■ chemistry in industry and technology<br>■ medicines and drugs<br>■ environmental chemistry<br>■ food chemistry<br>■ further organic chemistry | integral to the course | school-assessed and external exam | The higher level chemistry course represents approximately 20% of the diploma course time.<br><br>Candidates are expected to complete 60 hours of practical activities and project work which contribute 24% of final score.<br><br>External assessment consists of 3 papers:<br>■ Paper 1: 1 hour (20%)<br>■ Paper 2: 2¼ hours (32%)<br>■ Paper 3: 1¼ hours (20%) |
| Netherlands | *Hoger algemeen voortgezet onderwijs* (havo)<br><br>5 common subjects plus 1 specialised combination and an independent project | none | Chemistry | 320 hours | ■ skills<br>■ analysis of and reflections on science and technology<br>■ substances and materials 1, inorganic<br>■ substances and materials 2, | none | 40 hours | school-assessed and external exam | The chemistry course represents approximately 15% of the havo course time.<br><br>150 hours are allocated to the study of topics to be assessed in the school assessments (40%).<br><br>170 hours are allocated to the |

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| | | | | | organic<br>■ substances and materials 3, biochemical<br>■ controlling reactions<br>■ chemical industry<br>■ acids and bases<br>■ reactions and electrical current | | | | study of topics assessed in the external exam. This is a 3-hour written paper (60%). |
| Netherlands | *Voorbereidend wetenschappelijk onderwijs* (vwo)<br><br>7 common subjects plus 1 specialised combination and an independent project | none | Chemistry | 440 hours | ■ skills<br>■ substances, structures and bonding<br>■ carbon chemistry<br>■ biochemistry<br>■ features of reactions<br>■ chemical technology<br>■ acids and bases<br>■ redox | none | 40 hours | school-assessed and external exam | The chemistry course represents approximately 15% of the vwo course time.<br><br>200 hours are allocated to the study of topics to be assessed in the school assessments, including the practical work (40%).<br><br>240 hours are allocated to the study of topics assessed in the external 3-hour written exam (60%). |
| New Zealand | National Certificate of Educational Achievement (NCEA) Level 3<br><br>60 credits at Level 3 plus 20 credits at Level 2 or 3 | none | Level 3 | not specified | none | ■ carry out an extended practical investigation involving quantitative analysis<br>■ determine the concentration of oxidant or reductant by titration<br>■ describe oxidation-reduction processes<br>■ describe aspects of organic chemistry<br>■ describe properties of aqueous systems<br>■ describe the | required in first 2 options listed | school-assessed and external exam | The chemistry course represents approximately 20% of the NCEA Level 3 course time.<br><br>Students wishing to study chemistry at university in New Zealand need to achieve a minimum of 14 credits. This is possible without completing the 2 practical options.<br><br>The New Zealand Qualifications Authority specifies the requirements for the school assessment of the 2 practical options. The other 4 topics are assessed by separate external exams. |

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| | | | | | | properties of particles of particles and thermochemical principals | | | |
| Norway | *Vitnemål fra den Videregående Skole* (Certificate of Upper Secondary Education)<br><br>9 or 10 common subjects plus chosen subject area and general studies | none | Chemistry 1 | 140 hours | ▪ language and models in chemistry<br>▪ methods and experimentation<br>▪ water chemistry<br>▪ acids and bases<br>▪ organic chemistry | none | integral to the course | school-assessed | These 2 courses represent approximately 10% of the upper secondary school course time.<br><br>The Norwegian Ministry of Education specifies the requirements for the school assessment.<br><br>Students may be selected for a practical oral exam in both Chemistry 1 and 2.<br><br>A student may be selected to take the 5-hour external exam. Both papers are distributed at the beginning of the exam.<br><br>Paper 1 consists of 20 multiple-choice questions and 4 short-answer questions. It must be submitted after 2 hours (40%).<br><br>Paper 2 consists of 3 long tasks which require research and extended answers. It is an open-book exam although there is no access to the internet; It must be submitted after 5 hours (60%). |
| | | | Chemistry 2 | 140 hours | ▪ research<br>▪ analysis<br>▪ organic chemistry<br>▪ redox reactions<br>▪ materials | none | integral to the course | school-assessed or external exam | |
| People's Republic of China | *Gāokǎo* (National Higher Education Entrance Examination)<br><br>Chinese, a foreign language, | none | *Gāokǎo* (science syllabus includes physics and biology) | not specified (usually taken after completion of senior secondary | ▪ chemical scientific characteristics and basic methods of chemical research<br>▪ basic concepts | ▪ chemistry and technology<br>▪ physical structures and properties<br>▪ foundations of organic chemistry | not tested | external exam | The *Gāokǎo* exams take place nationally over a 3-day period once a year, with 2 subject exams each day.<br><br>External assessment is a 2½- |

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| | mathematics and up to 3 humanities or up to 3 sciences | | | schooling) | and theories of chemistry<br>■ common inorganic substances and their applications<br>■ common organic substances and their applications<br>■ foundations of chemistry experiments | | | | hour combined science paper. The chemistry assessment consists of:<br><br>■ part 1: multiple-choice: 6 questions (2 marks each) and 6 questions (4 marks each)<br>■ part 2: 4 short-answer questions with multiple parts, (8–11 marks each)<br>■ optional: complete 1 from 3 question sets; each set contains: 1 multiple-choice question (6-marks) and 1 multi-part short answer question (14 marks)<br><br>Total: 100 marks |
| Republic of Ireland | Leaving Certificate (Established)<br><br>minimum 5 | none | Chemistry (higher level) | 180 hours | ■ periodic table and atomic structure<br>■ chemical bonding<br>■ stoichiometry, formulas and equations<br>■ volumetric analysis<br>■ fuels and heats of reaction<br>■ rates of reaction<br>■ organic chemistry<br>■ chemical equilibrium<br>■ environmental chemistry: water | study 1 of the following combinations<br>■ additional industrial chemistry and atmospheric chemistry<br>■ materials and additional electrochemistry and the extraction of metals | integral to the course | external exam | The chemistry course represents approximately 20% of the Leaving Certificate course time.<br><br>There is a list of mandatory experiments which all candidates must carry out and record. Knowledge of practical work is assessed through written response questions in the terminal paper.<br><br>There is a 3-hour written exam (100%). |
| Republic of Korea | *Su-neung* (College Scholastic Ability Test, or CSAT)<br><br>minimum 5 | none | Chemistry I | Not specified (usually taken after completion of senior secondary schooling) | ■ surrounding materials<br>■ chemistry and mankind | none | integral to the course | external exam | There is no practical assessment.<br><br>Students take up to 4 tests from the science suite of Biology I and II, Chemistry I and II, Earth Sciences I and II, Physics I and II. |

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| | | | Chemistry II | Not specified (usually taken after completion of senior secondary schooling) | ▪ state of matter and liquid<br>▪ structure of matter<br>▪ chemical reaction | none | integral to the course | external exam | Each test is a 30-minute 20-question multiple-choice paper. |
| USA – ACT | ACT<br><br>minimum 4 | none | Science | none | none | none | none | external exam | There is a 35-minute paper with 40 multiple-choice or numerical response questions relating to 1 of 7 pieces of text. The test includes biology, chemistry, Earth sciences and physics content. |
| USA – New York State | Regents Diploma<br><br>22 credits (at 1 or ½ credit per course) | yes | Physical Setting / Chemistry | 175 hours | ▪ atomic concepts<br>▪ periodic table<br>▪ moles / stoichiometry<br>▪ chemical bonding<br>▪ physical behaviour of matter<br>▪ kinetics / equilibrium<br>▪ organic chemistry<br>▪ oxidation-reduction<br>▪ acids, bases, and salts<br>▪ nuclear chemistry | none | integral to the course | school-assessed and external exam | The chemistry course represents approximately 5% of the senior secondary course time.<br><br>Students must complete the school course including 20 hours of laboratory experience with satisfactory results and the laboratory performance test before the written exam.<br><br>The external assessment is a 3-hour exam (100%). |
| University of Cambridge International Examinations (CIE) | Cambridge International AS and A level<br><br>2 per subject (AS and A2) | none | AS Level | 180 hours | ▪ physical chemistry<br>▪ inorganic chemistry<br>▪ organic chemistry | none | 36 hours | external exam | A typical student taking 3 A levels uses approximately 30% of their course time for each subject.<br><br>External exams taken in 1 session:<br>▪ 2-hour practical paper (23%)<br>▪ 1-hour multiple-choice (31%)<br>▪ 1¼-hour structured questions (46%). |

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| | | | A level | 180 hours | ■ physical chemistry<br>■ inorganic chemistry<br>■ organic chemistry | none | 36 hours | external exam | External exams are taken in 1 exam session (in addition to AS external exams which contribute 50%).<br><br>■ 1¾-hour A2 structured questions (38%)<br>■ 1¼-hour practical paper planning, analysis and evaluation (12%) |
| University of Cambridge International Examinations (CIE) | Cambridge Pre-U<br><br>3 subjects plus independent project and portfolio | none | Pre U certificate in chemistry | 380 hours | ■ physical chemistry parts A and B<br>■ inorganic chemistry parts A and B<br>■ organic chemistry parts A and B<br>■ analysis parts A and B | none | 76 hours | school-assessed and external exam | The chemistry course represents approximately 25% of the course time.<br><br>The school must confirm the compulsory matriculation has been completed successfully by the student before they can take the external exams:<br>■ 1 multiple-choice paper, 1-hour (15%)<br>■ 2 written papers, 2¼ hours each (35% each)<br>■ 1 practical paper, 2 hours (15%). |

## Table 5: Approaches to assessment – English

| Education system | Assessment or qualification Number of courses or examinations | Compulsory English element | English courses | Course length | Compulsory topics | Options available | Nature of assessments | Notes |
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| Australia – New South Wales (NSW) | Higher School Certificate (HSC)<br><br>22 credits (12 preliminary and 10 HSC approximately 2 credits per course) | yes | Preliminary | 120 hours | Areas of study are developed by teachers and require students to explore a concept through:<br>■ close study of 1 text<br>■ responding to and composing a wide range of related texts<br>■ making connections between texts and the area of study<br>■ synthesising aspects of a variety of texts<br>■ presenting coherently integrated interpretations of the concept | Electives are developed by teachers and require students to explore the ways particular texts, forms, media, contexts or aspects of language shape meaning. | school assessment | Students must complete the Preliminary course in order to progress to the HSC course. These 2 courses represent approximately 20% of HSC course time.<br><br>NSW Board of Studies specifies the requirements for school assessment.<br><br>External assessment is by 2 papers, each 2 hours (with 10 minutes' reading time).<br><br>Paper 1 has 3 sections:<br>■ section I: short-answer questions on unseen texts (15 marks)<br>■ section II: extended composition (15 marks)<br>■ section III: sustained response to texts (including 1 prescribed; 15 marks)<br>Total: 45 marks<br><br>Paper 2 requires:<br>3 sustained answers on texts (20 marks each):<br>■ a comparison of texts<br>■ a critical analysis of 1 prescribed text<br>■ a sustained analysis of texts (1 prescribed and 1 freely chosen)<br>Total: 60 marks<br><br>A student's final score is the average of the school assessment and exam result. |
| | | | HSC | 120 hours | The close study of at least 5 types of prescribed text, plus a wide range of additional related texts and textual forms:<br><br>section 1:<br>students analyse and explore texts and apply skills in synthesis<br><br>section 2:<br>module A: comparative study of texts and contexts<br>module B: critical study of texts<br>module C: representation and text | none | school assessment and external exam | |

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| Canada – Alberta | Alberta Diploma<br><br>100 credits (5 credits or less per course) | yes | English Language Arts 10–1 | | ▪ explore thoughts, ideas, feelings and experiences<br>▪ comprehend literature and other texts in oral, print, visual, and multimedia forms, and respond personally, critically and creatively<br>▪ manage ideas and information<br>▪ create oral, print, visual and multimedia texts, and enhance the clarity and artistry of communication<br>▪ respect, support and collaborate with others | none | school assessment | Students must pass the English Language Arts (ELA) 10–1 and 20–1 courses in order to take the ELA 30–1 course. These 3 courses represent approximately 15% of the diploma course time.<br><br>The exam is in 2 parts:<br>▪ part A: written response<br>▪ part B: reading<br><br>The exam is designed to take 2½ hours, but students can take an additional ½ hour for each component if they need it.<br><br>A student's final score is the average of the school assessment and exam result. |
| | | | English Language Arts 20–1 | | | none | school assessment | |
| | | | English Language Arts 30–1 | | | none | school assessment and external exam | |
| England | General Certificate of Education (GCE) A level<br><br>2 per subject (AS and A2) | none | AS | 180 hours | ▪ aspects of narrative<br>▪ dramatic genres | none | school assessment and external exam | A typical student taking 3 A levels uses approximately 30% of their course time for each subject.<br><br>Each unit is assessed separately with the AS and A2 outcomes contributing equally to the A level qualification.<br><br>External exams in January or June.<br><br>AS level:<br>▪ aspects of narrative: external exam, 2 hours, open book (84 marks; 60% of AS; 30% of A level)<br>▪ dramatic genres: coursework (60 marks; 40% of AS; 20% of A level)<br><br>A level: the AS assessments plus:<br>▪ texts and genres: external exam, 2 hours, closed book (80 marks; 20% of A level)<br>▪ further and independent reading: coursework (60 marks; 20% of A level) |
| | | | A2 | 180 hours | ▪ text and genres<br>▪ further and independent reading | none | school assessment and external exam | |

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| Hong Kong | Hong Kong Advanced Level Examinations (HKALE)<br><br>typically 2 at A level and 2 at AS, or 1 at A level and 4 at AS | AS Use of English | Literature in English | 2-year programme | Students choose 1 of the following to study for Paper 1:<br>▪ good and evil<br>▪ travel and discovery<br>▪ love and death<br><br>Students choose 1 of the following to study for Paper 2:<br>▪ modern literature<br>▪ women in literature<br>▪ Shakespeare our contemporary | none | external assessment | The total score is a combination of externally marked coursework and external exams.<br><br>Paper 1 (50% of total score)<br>▪ part 1: 2-hour exam (66% of paper)<br>▪ part 2: portfolio of written work (34% of paper)<br><br>Paper 2 (50% of total score)<br>a 3-hour exam split into 2 parts:<br>▪ part 1 (34% of paper)<br>▪ part 2 (66% of paper) |
| Hong Kong | Hong Kong Diploma of Secondary Education (HKDSE)<br><br>4 compulsory subjects plus minimum 1 elective | English Language | Literature in English | 270 hours | ▪ knowledge of literacy forms and conventions<br>▪ appreciation and response<br>▪ language enhancement | none | school assessment and external exam | This course represents approximately 10% of the HKDSE course time.<br><br>School assessment: portfolio (20% of final score)<br><br>External exams:<br>▪ Paper 1: appreciation, 2½ hours (30% of final score)<br>▪ Paper 2: essay-writing, 3 hours (50% of final score)<br><br>The total score is a combination of school assessment and external exams. |
| International Baccalaureate Organisation (IBO) | IB Diploma<br><br>6 subjects (3 at Higher level) and extended essay | none | Language A1: English (higher level) | 340 hours | ▪ world literature<br>▪ detailed study<br>▪ groups of works<br>▪ school's free choice | none | school assessment and external exam | The higher level Language A1 represents approximately 20% of the diploma course time.<br><br>The school carries out 2 oral assessments (each 15% of overall score).<br><br>External assessment (70%)<br>2 written papers:<br>▪ Paper 1: commentary, 2 hours (25%)<br>▪ Paper 2: essay, 2 hours (25%)<br>plus 2 assignments (10% each) |

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| New Zealand | National Certificate of Educational Achievement (NCEA) Level 3<br><br>60 credits at Level 3 plus 20 credits at Level 2 or 3 | none | Level 3 | | none | ▪ write in a range of genres<br>▪ explore the language of and think critically about a variety of oral, written and visual texts<br>▪ speak with confidence<br>▪ media or drama production<br>▪ conduct research | school assessment and external exam | The English course represents approximately 20% of the NCEA Level 3 course time.<br><br>Students wishing to study at university in New Zealand need to achieve a minimum of 8 credits at Level 2 or above in English or *te reo Māori*.<br><br>The New Zealand Qualifications Authority specifies the requirements for the school assessment of the 3 school-assessed options.<br><br>The other 4 topics are assessed by separate external exams, 45 minutes each. |
| Republic of Ireland | Leaving Certificate (established)<br><br>minimum 5 | none | Higher | 180 hours | Students study a minimum of 4 texts, 1 of which must be a Shakespearean drama:<br>▪ in-depth study of a single text from a range of 5 options<br>▪ comparative study of 3 texts (chosen from a prescribed list of 39 texts)<br>▪ a selection from the work of 8 prescribed poets | none | external exam | The Higher English course represents approximately 20% of the Leaving Certificate course.<br><br>2 external exam papers:<br>▪ English I: written paper, 2 hours 20 minutes (200 marks; 50%)<br>▪ English II: written paper, 3 hours 20 minutes (200 marks; 50%) |
| USA – ACT | ACT Test<br><br>minimum 4 | none | ▪ English<br>▪ Reading<br>▪ Writing | none | none | none | external exam | English and reading are 2 of the 4 compulsory elements in the ACT. The Writing test is optional.<br><br>English<br>A 75-item multiple-choice test (45 minutes):<br>▪ punctuation: 10 items (13%)<br>▪ grammar and usage: 12 items (16%)<br>▪ sentence structure: 18 items (24%)<br>▪ strategy: 12 items (16%) |

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| | | | | | | | | ■ organisation: 11 items (15%)<br>■ style: 12 items (16%)<br><br>Reading<br>A 40-item multiple-choice test (35 minutes) in response to 5 texts:<br>■ prose fiction: 10 items (25%)<br>■ humanities: 10 items (25%)<br>■ social studies: 10 items (25%)<br>■ natural sciences: 10 items (25%)<br><br>Writing<br>An optional test (30 minutes) |
| USA – New York State | Regents Diploma<br><br>22 credits (at 1 or ½ credit per course) | yes | | | ■ language for information and understanding<br>■ language for literary response and expression<br>■ language for critical analysis and evaluation<br>■ language for social interaction | | external exam | The English course represents approximately 20% of the senior secondary course time.<br><br>Paper 1 (3 hours)<br>■ part A: a listening exercise with 6 multiple-choice questions and an extended persuasive writing task<br>■ part B: a reading exercise with 9 multiple-choice questions and an extended journalistic writing task<br><br>Paper 2 (3 hours)<br>■ part A: a reading task with 10 multiple-choice questions and an extended writing task unifying ideas from the 2 provided texts<br>■ part B: an extended writing task in the form of a critical essay; no stimulus materials are provided<br><br>The total score is a combination of school assessment and external exams; however from January 2011 there is only one 3-hour written exam. |
| University of Cambridge International Examinations (CIE) | Cambridge International AS Level and A level<br><br>2 per subject (AS | none | AS | 180 | ■ poetry and prose<br>■ drama | none | external exam | A typical student taking 3 A levels uses approximately 30% of their course time for each subject.<br><br>External exams taken in 1 session: |

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| | and A2) | | | | | | | ▪ poetry and prose: written paper, 2 hours (50% of AS)<br>▪ drama: written paper, 2 hours (50% of AS)<br><br>Completion of AS contributes 50% to overall A level score. |
| | | | A2 | 180 | ▪ Shakespeare and other pre-20th-century texts<br>▪ 1 of the optional topics | 1 of the following:<br>▪ 20th-century texts<br>▪ comment and appreciation<br>▪ coursework (available by special application only) | external exam | External exams are taken in 1 exam session (in addition to AS external exams).<br><br>▪ Shakespeare and other pre-20th-century texts: written paper, 2 hours (25%)<br>▪ optional topics: written paper, 2 hours (25%) |
| University of Cambridge International Examinations (CIE) | Cambridge International Pre-U<br><br>3 subjects plus independent project and portfolio | none | Pre U certificate in Literature in English | 380 | ▪ poetry and prose<br>▪ drama<br>▪ comment and analysis<br>▪ personal investigation | none | external exam | The chemistry course represents approximately 25% of the diploma course time.<br><br>The 4 external exams contribute equally to overall score.<br><br>▪ poetry and prose: written paper, 2 hours, with 2 essay questions<br>▪ drama: written paper, 2 hours, with 2 essay questions<br>▪ comment and analysis: written paper, 2 hours (with 15 minutes for reading and annotations). 1 compulsory essay question and a choice from 2 others.<br>▪ personal investigation – externally marked essay project |

## Table 6: Approaches to assessment – history

| Education system | Assessment or qualification Number of courses or examinations | Compulsory history element | History courses | Course length | Compulsory topics | Options available | Nature of assessments | Notes |
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| Australia – New South Wales | Higher School Certificate (HSC)<br><br>22 credits (12 preliminary and 10 HSC approximately 2 credits per course) | ancient history | Preliminary | 120 hours | ▪ part I: introductions<br>▪ part II: study of ancient societies, sites and sources<br>▪ part III: historical investigation | none | school assessment | Students must complete a preliminary course in order to progress to the HSC course. These 2 courses represent approximately 20% of the HSC course time.<br><br>NSW Board of Studies specifies the requirements for school assessment.<br><br>External assessment is by a 3-hour paper (with 5 minutes' reading time) consisting of:<br>▪ section I: 3 short-answer questions related to source materials (25 marks)<br><br>For sections II, III and IV there is a question for each topic.<br>▪ section II: 1 multi-part question on part II option (25 marks)<br>▪ section III: 1 multi-part question on part III option (25 marks)<br>▪ section IV: 1 extended response question on part IV option (25 marks)<br><br>A student's final score is the average of the school assessment and exam result. |
| | | | HSC | 120 hours | ▪ part I: core study (teacher chooses 2 case studies)<br><br>parts II, III and IV contain a number of optional topics. Students study 1 topic in each part:<br><br>▪ part II: ancient societies<br>▪ part III: personalities in their times<br>▪ part IV: historical periods | | school assessment and external exam | |
| Australia – New South Wales | Higher School Certificate (HSC)<br><br>22 credits (12 preliminary and 10 HSC approximately 2 credits per course) | modern history | Preliminary | 120 hours | ▪ part I: case studies<br>▪ part II: historical investigation<br>▪ part III: core study: the world at the beginning of the 20th century | none | school assessment | Students must complete a preliminary course in order to progress to the HSC course. These 2 courses represent approximately 20% of the HSC course time.<br><br>NSW Board of Studies specifies the |

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| | | | HSC | 120 hours | ■ part I: core study: World War I (teacher chooses 2 case studies)<br><br>Parts II, III and IV contain a number of optional topics. Students study 1 topic in each part:<br><br>■ part II: national studies<br>■ part III: personalities in the 20th century<br>■ part IV: international studies in peace and conflict | none | school assessment and external exam | requirements for school assessment.<br><br>External assessment is by a 3-hour paper (with 5 minutes' reading time) consisting of:<br>■ section I: 3 short answer questions on part 1 topics (25 marks)<br><br>For sections II, III and IV there is a question for each 1.<br>■ section II: an extended response question on part II option (25 marks)<br>■ section III: a 2-part question on part III option (25 marks)<br>■ section IV: 1 extended response question on part IV option (25 marks)<br><br>A student's final score is the average of the school assessment and exam result. |
| Denmark | *Studentereksamen* (STX)<br><br>minimum of 13 subjects, plus electives, a specialised study programme and an individual project during the 3-year course | yes | History A (must be combined with an additional language A course) | 190 | ■ pre-1453: the creation of society<br>■ 1453–1776: a new world view<br>■ 1776–1914: breakdown and tradition<br>■ 1914–1989: the fight for the good society<br>■ 1989 to today: the global society | none | school assessment and external exam | This course represents approximately 10% of the STX course time.<br><br>The Danish Ministry of Education specifies the requirements for school assessment.<br><br>For the History A final exam the student is given 24 hours' notice and 10–15 pages of material. The student must research the subject and analyse the material provided before making a 30 minute presentation including taking questions from the examiner. |

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| England | General Certificate of Education (GCE) A level<br><br>2 per subject (AS and A2) | none | AS | 180 hours | Each of these units contains a number of options; students study 1 topic within each part.<br>■ historical themes in breadth<br>■ British history breadth studies | none | external assessment | A typical student taking 3 A levels uses approximately 30% of their course time for each subject.<br><br>Each unit is examined separately with the AS and A2 outcomes contributing equally to the overall A level qualification.<br><br>The awarding organisation (Edexcel) specifies the requirements for school assessment of course work for Historical enquiries, 2 extended essays (each 10% of overall A level score)<br><br>External assessment of the other 3 units in this specification is available in January and June.<br><br>■ historical themes: 1-hour 20 minute written exam, (50% of AS marks; (25% of A level marks)<br>■ British history: 1-hour 20 minute written exam (50% of AS marks; 25%of A level marks)<br>■ depth studies: 2-hour written exam (30% of A level marks) |
| | | | A2 | 180 hours | ■ depth studies and associated historical controversies contain a number of options; students study 1 topic<br>■ historical enquiries | none | school assessment and external exam | |
| Finland | *Ylioppilastutkinto Studentexamen* or Matriculation Examination.<br><br>not specified but a minimum of 4 subjects are examined | none | Finnish Upper Secondary School History Curriculum | | ■ man, the environment and culture<br>■ European man<br>■ international relations<br>■ turning points in Finnish history | advanced special studies:<br>■ Finland from prehistoric times to autonomy<br>■ meeting of cultures | external assessment | Students must successfully complete the 3 compulsory history courses. These, together with the 2 advance special study courses represents approximately 10% of the upper secondary school programme time.<br><br>External assessment is available twice each year and consists of a 6-hour written paper with extended answer tasks, 10 worth 6 marks and 2 more demanding worth 9 marks. This includes 1–4 cross-subject questions. Students have a free |

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| | | | | | | | | choice of which 6 questions to complete.<br>(Total: 36, 39 or 42 marks) |
| France | *baccalauréat général*<br><br>minimum of 9 subjects plus an independent group project | none | Geography and History | 50 hours | ▪ the industrial age and its civilisation, from the mid-19th century to 1939<br>▪ France from the mid-19th century to 1914<br>▪ war, democracy and totalitarianism (1914–45) | none | external assessment | Geography and history are assessed together. The joint course represents approximately 20% of the *série* ES course time.<br><br>External assessment takes place in June and consists of a 4-hour written paper. Students complete 1 written task for geography and 1 for history from a given selection of 2 or 3 for each subject. The balance of marks between the subjects may not be equal. |
| Hong Kong | Hong Kong Advanced Level Examinations (HKALE)<br><br>typically 2 at A level and 2 at AS, or 1 at A level and 4 at AS | none | A level | 2-year programme | ▪ modern western history, c.1800–1980<br>▪ modern Asian history, c.1800–1980 | none | external exam | This course represents approximately 30% of the course time for a student taking A level history and 4 other AS subjects.<br><br>The exam consists of two 3-hour papers, each carrying 50% of the total subject marks. Each paper is divided into 2 parts: part I and part II as follows:<br><br>▪ part I: 1¼-hour written paper (20%)<br>▪ part II: 1¾-hour written exam (30%) |
| Hong Kong | Hong Kong Diploma of Secondary Education (HKDSE)<br><br>4 compulsory subjects plus minimum 1 elective | none | History | 270 hours | ▪ the making of the modern world<br>▪ modernisation and transformation in 20th-century Asia<br>▪ conflicts and cooperation in the 20th-century world | 1 from<br>▪ comparative studies<br>▪ issue-based studies<br>▪ local heritage studies | school assessment and external exam | The history course represents approximately 10% of the HKDSE course time.<br><br>The Hong Kong Examination Authority specifies the requirements for school assessment of coursework.<br>Total: 20% of overall score<br><br>The external exam tests the compulsory content and consists of: |

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| | | | | | | | | ▪ Paper 1: 1¾-hour written paper (50%)<br>▪ Paper 2: 1¼-hour written paper (30%)<br>Total: 80% of overall score |
| International Baccalaureate Organisation (IBO) | International Baccalaureate Diploma<br><br>6 subjects (3 at Higher level) and extended essay | none | History (standard level) | 150 hours | ▪ historical investigation | 1 from<br>history of Europe and the Islamic world<br>20th century world history | school assessment and external exam | The higher level history course represents approximately 20% of the diploma course time.<br><br>The IBO specifies the requirements for school assessment of coursework.<br><br>Standard Level assessment consists of:<br><br>School assessment: approx. 20 hours (25%)<br><br>External exams:<br>▪ Paper 1: 1-hour written exam (30%)<br>▪ Paper 2: 1½-hour written exam (45%)<br><br>Higher level assessment consists of:<br>School assessment: approx. 20 hours (20%)<br><br>External exams:<br>▪ Paper 1: 1-hour written exam (20%)<br>▪ Paper 2: 1½-hour written exam (25%)<br>▪ Paper 3: 2½-hour written exam (35%) |
| | | | History (higher level) | 240 hours | ▪ route 1 and<br>▪ route 2 and<br>▪ aspects of history | 1 from:<br>▪ history of Europe and the Islamic world plus aspects of history of medieval Europe and the Islamic world<br>▪ 20th-century world history plus aspects of the history of (1 from): Africa; Americas; Asia and Oceania; Europe and the Middle East | school assessment and external exam | |
| Netherlands | *Hoger algemeen voortgezet onderwijs* (havo)<br><br>5 common subjects plus 1 specialised combination and an | none | History | 320 hours | ▪ historical awareness<br>▪ general knowledge of historical time periods<br>▪ historical topics<br>▪ history of the constitutional state | none | school assessment and external exam | History is available within 2 of the available subject combinations and represents approximately 15% of the havo course time.<br><br>150 hours are allocated to the study of topics to be assessed in the |

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| | independent project | | | | and of parliamentary democracy<br>■ orientation study and career | | | school assessments (40%).<br><br>170 hours are allocated to the study of topics assessed in the external exam. This is a 3-hour written paper (60%). |
| Netherlands | *Voobereidend wetenschappelijk onderwijs (vwo)*<br><br>7 common subjects plus 1 specialised combination and an independent project | none | History | 440 or 480 hours depending on the chosen subject combination | ■ historical awareness<br>■ general knowledge of historical time periods<br>■ historical topics<br>■ history of the constitutional state and of parliamentary democracy<br>■ orientation study and career | none | school assessment and external exam | History is available within 2 of the available subject combinations and represents approximately 15% of the vwo course time.<br><br>A minimum of 200 hours are allocated to the study of topics to be assessed in the school assessments (40%)<br><br>A minimum of 240 hours are allocated to the study of topics assessed in the external exam. This is a 3-hour written paper (60%) |
| New Zealand | National Certificate of Educational Achievement (NCEA) Level 3<br><br>60 credits at level 3 plus 20 credits at level 2 or 3 | none | Level 3 History | not specified | none | ■ plan and carry out independent historical research<br>■ communicate and present historical ideas clearly to show understanding of an historical context<br>■ analyse and evaluate evidence in historical sources<br>■ examine a significant decision made by people in history, in an essay<br>■ examine a significant historical situation in the context of change, in an essay | school assessment and external exam | The history course represents approximately 20% of the NCEA Level 3 course time.<br>Students wishing to study history at university in New Zealand need to achieve a minimum of 14 credits.<br><br>The New Zealand Qualifications Authority specifies the requirements for the school assessment of the 2 school options. The other 3 topics are assessed by separate external exams. |

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| Norway | *Vitnemål fra den Videregående Skole* (Certificate of Upper Secondary Education)<br><br>9 or 10 common subjects plus chosen subject area and general studies | yes | History and Philosophy 1 | 140 hours | ■ the ancient world and myths<br>■ classical antiquity and the art of discourse<br>■ the Middle Ages and the use of source documents<br>■ the Renaissance and explanation<br>■ the Age of Enlightenment and perspectives<br>■ modern times and critical thinking | none | school assessment | The history course represents approximately 10% of the upper secondary school course time.<br><br>The Norwegian Ministry of Education specifies the requirements for the school assessment.<br><br>A student may be selected to take the external exam for History and Philosophy 2. Students are provided with a research topic and suggested materials 24 hours before the exam. The exam is a 5-hour research and extended writing task on a specific issue. |
| | | | History and Philosophy 2 | 140 hours | ■ human beings in modern times<br>■ knowledge and the pursuit of truth<br>■ existence and meaning<br>■ community, production and consumption<br>■ political ideas and ideologies<br>■ understanding, awareness and application of history | none | school assessment and external exam | |
| People's Republic of China | *Gāokǎo* or National Higher Education Entrance Examination<br><br>Chinese, a foreign language, mathematics and up to 3 humanities or up to 3 sciences | none | Humanities | not specified (usually taken after completion of senior secondary schooling) | ■ ancient China<br>■ ancient Greece and Rome<br>■ the modern world<br>■ modern China<br>■ the contemporary world<br>■ contemporary China | optional content:<br>■ major reforms history<br>■ democratic thought and practice in modern society<br>■ 20-century war and peace<br>■ commentary on Chinese and foreign historical figures<br>■ exploring the profound mysteries of history | external assessment | The *Gāokǎo* exams take place nationally over a 3-day period once a year, with 2 subject exams each day.<br><br>External assessment is a 2½-hour combined humanities paper. The history assessment consists of:<br>■ Paper 1: 25 multiple-choice questions on compulsory content (50 marks)<br>■ Paper 2: Written paper with 3 longer answer questions on compulsory content (34 marks) |

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| | | | | | | ▪ world cultural heritage collections | | and a choice of 2 longer answer questions from 6 on the optional content (16 marks)<br>(Total: 100 marks) |
| Republic of Ireland | Leaving Certificate (Established)<br><br>minimum 5 | none | History | 180 hours | ▪ working with evidence<br>▪ topics for study | students study 4 topics within 1 of the following study areas:<br>▪ early modern 1492–1815<br>▪ later modern 1815–1993 | external exam | The history course represents approximately 20% of the Leaving Certificate course time.<br><br>The final exam consists of:<br>research study:<br>▪ planning (3%)<br>▪ evaluation of sources (5%)<br>▪ extended essay (12%)<br>(Total: 20% of overall score)<br><br>external exam: 2 hours 50 minutes, written paper:<br>▪ 1 document-based multiple-part question (20%)<br>▪ 3 extended answers on topics studied (20%each)<br>(Total: 80% of overall score) |
| Republic of Korea | *Su-neung* or College Scholastic Ability Test (CSAT)<br><br>minimum 5 | none | Korean History | not specified (usually taken after completion of senior secondary schooling) | ▪ correct understanding of Korean history<br>▪ prehistoric culture and formation of the nation<br>▪ development of ancient society<br>▪ development of medieval society<br>▪ performance of contemporary society | none | external exam | Students take up to 4 tests from the social studies suite of:<br>▪ ethics<br>▪ Korean history<br>▪ Korean modern and contemporary history<br>▪ world history<br>▪ politics<br>▪ economics<br>▪ society<br>▪ culture<br>▪ law and society<br>▪ Korean geography<br>▪ economic geography<br>▪ world geography<br><br>Each test is a 30-minute 20-question multiple-choice paper |
| | | | Korean Modern and Contemporary History | | ▪ politics<br>▪ economics<br>▪ society<br>▪ culture | none | external exam | |
| | | | World History | | ▪ time, space and human beings<br>▪ dawn of civilisation and ancient | none | external exam | |

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| | | | | | civilisation<br>■ expansion of the Asian world and east–west exchanges<br>■ feudal society in Europe<br>■ growth of Asian society<br>■ growth and expansion of modern society in Europe<br>■ modern development of the Asian world<br>■ imperialism and World Wars I and II<br>■ development of the world after the wars | | | |
| United States of America – New York State | Regents Diploma<br><br>22 credits (1 credit or ½ credit per course) | none | US History and Government | | ■ introduction<br>■ constitutional foundations for the United States democratic republic<br>■ industrialisation of the United States<br>■ the progressive movement<br>■ at home and abroad: prosperity and depression, 1917–40 | none | school assessed and external exam | Students must complete the school course which represents approximately 15% of the senior school programme time.<br><br>External exam is by a 3-hour written paper consisting of 50 multiple-choice questions, an extended writing task , a reading task with 9 short texts each followed by 1 or more short-answer questions and then an extended writing task incorporating material from the texts.<br><br>The essays contribute about a third of the final score. |
| University of Cambridge International Examinations | Cambridge International AS level and A level<br><br>2 per subject (AS and A2) | none | AS Level<br>A level | 180 hours<br>180 hours | none<br>none | AS 1 topic, A level 2 topics from:<br>■ modern European history, 1789–1939<br>■ south-east Asia: from colonies to nations, 1870–1980<br>■ international history, 1945–91 | external exam<br>external exam | A typical student taking 3 A levels uses approximately 30% of their course time for each subject.<br><br>Candidates who wish to follow a staged assessment route to the A level qualification take the AS qualification first. |

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| | | | | | | ■ the history of tropical Africa, 1855–1914<br>■ the history of the USA, c.1840–1968<br>■ Caribbean history, 1794–1900 | | AS candidates take a 3-hour written paper on the topic studied.<br><br>A level candidates take 2 written papers, each 3-hours, 1 in each topic studied. |
| University of Cambridge International Examinations | Cambridge International Pre-U<br><br>3 plus independent project and portfolio | none | Pre U certificate in History | 380 hours | | 2 options from:<br>■ British history<br>■ European history<br>■ US history<br>■ African and Asian history<br>plus 1 specialist study from a list provided by CIE | external exam | The history course represents approximately 25% of the diploma course time.<br><br>External assessment consists of:<br><br>■ 2 written papers, each 2¼ hours, 1 on each option studied (25% each)<br>■ specialist study: 2-hour extended essay paper using source documents (25%)<br>■ personal investigation (25%) |

## Table 7: Analysis of syllabus content – mathematics

| **Education system** | **Australia – NSW** | **Canada – Alberta** | | **Denmark** | **England** | | **Finland** | **France** | | | **Hong Kong** | | **IB Organisation** | | | **Netherlands** | | **New Zealand** | | **Norway** | **People's Republic of China** | **Republic of Ireland** | **Republic of Korea** | **USA** | | | **CIE** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qualification** | HSC | Diploma | | STX | A level | | Matriculation Examination | *baccalauréat général* | | | HKALE | HKDSE | IB Diploma | | | havo | vwo | NCEA Level 3 | | *Vitnemål* | *Gāokǎo* | Leaving Certificate | CSAT | ACT | Common Core | NY State Regents Diploma | A level | Pre-U |
| **Subject title** | Maths Extension 1 | Applied Maths 30 | Pure Maths 30 | Maths A | Maths | Further Maths | Maths Basic | Maths Extended | *série S* specialism | *série ES* specialism | *série L* specialism | Pure Maths | Maths | Maths Studies | Maths Standard Level | Maths Higher Level | Maths B | Maths A | Calculus | Statistics and Modelling | Maths S1 S2 | Maths R1 R2 | Maths | Maths Higher Level | Maths A | Maths B | Maths | Maths | Maths B | Maths | Maths |
| **Content / topic** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Pure maths** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| algebra & functions | x | | x | x | x | x | | x | | x | | x | x | x | x | x | x | | x | x | x | x | x | x | x | x | x | x | x | x |
| coordinate geometry | x | | x | x | x | x | | x | x | x | x | x | x | x | | | x | | x | | | | x | x | x | | x | x | x | x |
| sequences & series | x | | x | | x | x | x | x | x | x | x | x | x | x | x | x | | | x | | x | x | x | x | x | x | | x | x | x | x |
| differentiation | x | | | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | | | x | | x | x |
| integration | x | | | x | x | x | | x | x | x | | x | x | | x | x | x | | x | | | x | x | x | x | | | | | x | x |
| numerical methods | x | | | | x | x | | x | | x | | | x | | | | | | | x | x | | | x | | | | | | x | x |
| trigonometry | x | x | x | x | x | x | x | x | | | | x | x | x | x | x | x | | x | | | x | x | x | | | x | x | x | x | x |
| hyperbolic functions | | | | | | x | | | | | | | | | | | | | | | | | | x | | | | | | | |
| exponentials & logarithms | x | | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x |
| vectors | | x | | x | x | x | x | x | x | x | | | x | | x | x | | | | | | x | x | x | x | | | x | x | x | x |

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| complex numbers | | | | | | x | | | x | x | | x | x | | | x | | | x | | | | x | x | | | x | x | x | x | x |
| matrices | | x | | | | x | | | | | | x | x | | x | x | | | | | | | | x | x | x | x | x | | | |
| groups | | | | | | | | | | | | | | | | x | | | | | | | | x | | | | | | | |
| proof | x | | | | | x | | | x | x | x | x | x | | | x | x | | x | | | x | x | | x | x | x | x | x | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Mechanics** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| vectors | | x | | | x | x | | | | | | | x | | x | x | | | | | | x | x | | | | | x | x | x |
| kinematics | x | | | | x | x | | | x | x | | | | | x | x | x | | x | | | | | | x | | | | x | x |
| dynamics | x | | | | x | x | | | | | | | | | | | x | | | | | | | | | | | | x | x |
| statics | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | x | x |
| moments | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | x | |
| centres of mass | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | x | |
| work & energy | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | x | |
| motion in a circle | | | | | | x | | | | | | | | | | | | | | | | | | x | | | | | x | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Statistics and probability** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| representing data | | x | | x | x | x | | | | | | | x | x | x | | x | x | | | x | | x | x | x | x | x | x | x | x | x |
| sampling | | x | | x | | x | | | x | x | | | x | | | | | x | | x | | | x | x | x | x | | x | x | x | |
| probability | x | x | x | | x | x | x | x | x | x | x | | x | x | x | x | | x | | x | x | x | x | x | x | x | x | | x | x | x |
| correlation & regression | | | | x | x | x | | | | | | | | x | | | | x | | x | | | x | x | x | x | | x | x | | x |
| random variables | | | | | x | x | x | x | x | x | | | x | | x | x | | | | x | | | x | | x | x | | | | x | x |
| distributions | | x | x | | x | x | x | x | x | x | | | x | | x | x | | x | | x | x | | x | | x | x | | | x | x | x |
| testing estimation & ci | | | | x | x | x | | | | | | | x | x | | x | | | | x | x | | | | | | | | | x | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Decision maths** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| algorithms | | | | | x | x | x | x | x | x | x | | | | | x | | | | | | | x | | x | x | | | | | |
| linear programming | | | | | x | x | x | | | | | | x | | | | | x | | x | x | | | | | | | | | | |
| critical path analysis | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| matchings | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| transportation problems | | | | x | x | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| allocation problems | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| game theory | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| flows in networks | | | | | x | x | | | | | | | | | | | | | | | | | | | | | | | | | |
| dynamic programming | | | | | x | x | | | | | | | | | | | | | | | | | | x | | | | | | | |
| graphs | | | | | | | | | | | | | | | | x | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Use of technology** | x | x | x | x | | | x | x | x | x | x | | x | | | | x | x | x | | x | | | | | | x | x | x | | |
| **Problem-solving** | x | x | x | x | x | x | x | | x | x | x | x | x | x | x | x | x | x | x | x | x | x | x | | x | | | | x | x | x |

**Notes:**
x = topic covered

# Table 8: Analysis of syllabus content – chemistry

| **Education system** | **Australia – NSW** | **Canada – Alberta** | **Denmark** | **England** | **Finland** | **France** | **Hong Kong** | | **IB Organisation** | **Netherlands** | | **New Zealand** | **Norway** | **People's Republic of China** | **Republic of Ireland** | **Republic of Korea** | **USA – New York State** | **CIE** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qualification** | HSC | Diploma | STX | A level | Matriculation Examination | *baccalauréat général* | HKALE | HKDSE | IB Diploma | havo | vwo | NCEA Level 3 | *Vitnemål* | *Gaokǎo* | Leaving Certificate | CSAT | Regents Diploma | A level | Pre-U |
| **Content / topic** | | | | | | | | | | | | | | | | | | | |
| empirical formula | x | | x | x | | | x | x | x | x | x | | x | | x | x | x | x | x |
| molecular formula | x | | x | x | | x | x | x | x | x | x | | x | x | x | x | x | x | x |
| balanced equations | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x | x |
| Avogadro constant | x | | x | x | | x | x | x | x | | | | | x | x | x | | x | x |
| relative atomic mass etc. | x | x | x | x | | x | x | x | x | x | | | x | x | x | x | | x | x |
| calculations of reacting masses | x | | x | x | x | x | x | x | x | x | x | | x | x | | | | x | x |
| calculations of reacting volumes | x | x | x | x | | x | x | x | x | x | x | | x | x | | x | | x | x |
| calculations of % yield | | x | x | x | x | x | x | x | x | x | x | | | | x | | | x | x |
| atom economy | | | | x | | | x | x | x | x | | | | | | | | x | x |
| principles of green chemistry | | | | | | | x | x | x | | | | x | x | | x | | x | x |
| ideal gas equation | | x | x | x | x | P | x | x | x | x | x | | | x | x | x | x | x | x |
| titration calculations of all types | x | x | x | x | | x | x | x | x | x | x | | x | | x | x | x | x | x |
| atomic structure | x | | x | x | x | x | x | x | x | x | | | x | x | x | x | x | x | x |
| s, p, d, orbitals | | | x | x | x | | x | x | x | x | | | | I | I | I | | x | x |
| periodic table elements to Z=36 | x | | x | x | x | x | x | x | x | x | | | x | x | x | x | | x | x |
| ions | x | | x | x | | x | x | x | x | x | x | | x | x | | x | x | x | x |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| isotopes | | | x | x | | P | x | x | x | | x | | x | | x | | x | x | x |
| mass spectroscopy | | | x | x | | | x | O | x | | x | | | x | x | | | x | x |
| all types of bonding | x | | x | x | x | I | x | x | x | x | x | | | O | x | x | x | x | x |
| shapes of molecules | | | x | x | | I | x | x | x | x | x | | x | x | x | x | x | x | x |
| energetics | I | x | x | x | x | I | x | x | x | | | | x | x | x | x | x | x | x |
| calculations of energetics | I | x | x | x | | | x | x | x | | | | x | x | x | x | | x | x |
| entropy | | | x | x | | | x | | x | | | | x | x | | x | x | x | x |
| feasibility | | x | x | x | | | x | | x | | | | x | | | | x | x | x |
| kinetics | | | x | x | x | x | x | x | x | x | x | | x | x | | x | x | x | x |
| all factors that affect rate of reactions | x | x | x | x | x | x | x | x | x | x | | | x | x | x | x | x | x | x |
| collision theory | | | x | x | | I | x | O | x | x | | | | x | | x | x | x | x |
| rate equations | | | x | x | | | x | x | x | | | | | x | | x | | x | x |
| rate determining step | | | x | x | | | x | x | x | | | | | | | x | | x | x |
| equilibria | x | x | x | x | x | x | x | x | x | | x | | x | x | | x | x | x | x |
| factors that affect equilibrium | x | x | x | x | x | x | x | x | x | | x | | x | x | | x | x | x | x |
| equilibrium constant | O | | x | x | | x | x | x | x | | x | | x | x | | x | | x | x |
| equilibrium calculations | | | x | x | | x | x | x | x | | x | | x | x | | x | | x | x |
| acid-base equilibrium | x | x | x | x | x | x | x | x | x | I | x | | x | x | | x | x | x | x |
| redox (e transfer) | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x | x |
| oxidation states | x | x | x | x | x | | x | x | x | x | x | | x | x | | x | x | x | x |
| standard electrode potentials | x | | | x | x | | x | x | x | x | x | | x | x | | x | | x | x |
| inorganic chemistry and trends across PT | x | | x | x | | | x | x | x | | | | | x | | x | x | x | x |
| group trends of metals and non-metals | x | | x | x | | | x | x | x | | | | | x | | x | x | x | x |
| transition metals | | | | x | | | x | x | x | | | | | O | | | | x | x |
| transition metal properties and reactions | | | | x | | | x | x | x | | | | | O | | | | x | x |
| organic chemistry basics | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x | x |
| structural isomerism | I | x | x | x | x | | x | x | x | x | | | x | O | x | | | x | x |
| optical isomerism | | | x | x | x | | x | x | x | | | | x | O | | | | x | x |
| types of reaction mechanisms | | x | x | x | x | | x | | x | x | | | x | x | | | | x | x |
| benzene reaction mechanisms | | | | x | | | x | | x | | | | I | x | | | | x | x |
| hydrocarbons | x | x | x | x | x | x | x | x | x | x | x | | x | x | x | x | x | x | x |
| alcohols | I | x | x | x | x | x | x | x | x | x | x | | x | x | x | | x | x | x |
| haloalkanes | x | x | | x | | I | x | x | x | x | x | | x | | x | | x | x | x |
| organic synthesis | | | x | x | | x | x | x | x | | | | x | x | x | | | x | x |
| arenes | | | x | x | | | x | | x | | x | | x | x | x | | | x | x |
| aldehydes | | | x | x | | I | x | x | x | | x | | x | O | x | | x | x | x |
| ketones | | | x | x | | I | x | x | x | | x | | x | O | x | | x | x | x |
| carboxylic acids | I | x | x | x | | I | x | x | x | x | x | | x | x | x | | | x | x |
| esters | x | x | x | x | | | x | x | x | x | x | | x | O | x | x | | x | x |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| amines | | | x | x | x | | x | x | x | | x | | x | x | | | x | x | x |
| amino acids | | | x | x | x | | x | | x | x | | | x | x | | | x | x | x |
| amides | | | x | x | x | OI | x | x | x | | | | | | | | x | x | x |
| modern analytical methods e.g. mass spec, IR | I | | x | x | x | | x | O | x | | | | x | | x | | | x | x |
| NMR | | | x | x | | | | O | x | | | | x | | | | | x | x |
| chromatography | | | x | x | | x | x | O | x | | x | | x | | x | x | | x | x |
| biochemistry | O | | x | | x | | | | O | x | x | | x | | | x | | x | |
| materials and their applications | O | | | | | | | O | O | | | | | x | | x | x | x | x |
| industrial chemistry | O | | x | | | | | O | O | | | | | x | O | | | | |
| local context | x | | | | | | | | | | | | | x | | x | | | |

**Notes:**
x = topic covered
O = optional
I = incomplete coverage
P = in physics part of syllabus (France only)
Finland and New Zealand analysis is incomplete due to nature of materials seen

# Table 9: Analysis of syllabus content – English

| **Education system** | **Australia – NSW** | **Canada – Alberta** | **England** | **Hong Kong** | | **IB Organisation** | **New Zealand** | **Republic of Ireland** | **USA – New York State** | | **CIE** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qualification** | HSC | Diploma | A level | HKALE | HKDSE | IB Diploma | NCEA Level 3 | Leaving Certificate | Regents Diploma pre-2011 | Regents Diploma from 2011 | A level | Pre-U |
| **Content / topic** | | | | | | | | | | | | |
| study and written analysis of whole literary texts | x | x | x | x | x | x | O | x | x | x | x | x |
| whole-text prose fiction study | x | O | x | x | x | x | O | O | O | O | x | x |
| whole-text poetry study | x | O | x | x | x | x | O | x | O | O | x | x |
| whole-text drama study | O | O | x | x | x | x | O | O | O | O | x | x |
| whole-text Shakespeare study | x | O | x | x | x | x | O | x | O | O | x | x |
| whole-text film study | O | O | | x | x | | O | O | | | | |
| study of non-fiction texts | O | | | x | | O | O | O | | | | |
| whole-text literary study (pre-1800) | O | O | x | | O | x | O | O | O | O | O | O |
| whole-text literary study (pre-1900) | O | O | x | | x | x | O | O | O | O | x | x |
| whole-text literary study (post-1900) | O | O | x | x | x | x | O | O | O | O | O | x |
| whole-text literary study (post-1990) | O | O | x | O | x | O | O | O | O | O | O | O |
| whole-text genre study | O | | x | | | x | | O | | | | O |
| whole-text comparative study | x | | x | x | x | x | | x | | | | x |
| study of whole texts in translation | O | | O | | | x | | O | | | | |
| study of media/multi-media texts | O | | | O | O | | O | | | | | |
| study of literary critical/theoretical writings | x | | x | O | | | | | | | | O |
| independent research of literary topic / texts leading to extended essay | O | | x | O | O | x | O | | | | O | x |
| independent research of non-literary topic leading to extended essay | O | | | | | | O | | | | | |
| response to unseen literary extracts | x | M | | x | x | x | O | x | M | M | O | x |
| response to unseen non-fiction extracts | x | M | | x | | | O | O | M | M | | O |
| response to unseen visual texts | x | M | | | | | | O | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| reading comprehension | x | | | | | | | x | M | M | | |
| aural comprehension | O | | | | | | | | M | M | | |
| English usage (grammar, punctuation, syntax, style) | x | | | | | | | O | | | | |
| re-creative response to literary text | x | | O | O | | O | | | | | | |
| creative / personal response to stimulus materials | x | x | | O | O | | O | x | | | | |
| writing in response to non-fiction material (written) | x | | | x | | | | x | x | x | | |
| writing in response to non-fiction material (aural) | O | | | | | | | | x | | | |
| writing for a specific purpose / audience | x | | | O | O | | | x | | | | |
| personal writing (diaries, reviews) | O | | | O | O | | | O | | | | |
| oral presentation on literary text(s) | O | | | | | x | O | | | | | |
| oral presentation on non-literary topic | O | | | | | | O | | | | | |
| speaking and listening (coursework) | x | | | | | | | | | | | |

**Notes:**
x = topic covered
O = optional
M = multiple choice

# Table 10: Analysis of syllabus content – history

| Education system | Australia – NSW | | Denmark | England | Finland | France | Hong Kong | | IB Organisation | Netherlands | | New Zealand | Norway | People's Republic of China | Republic of Ireland | Republic of Korea | USA – New York State | CIE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qualification** | HSC – Ancient History | HSC – Modern History | STX | A level | Matriculation Examination | *baccalauréat général* | HKALE | HKDSE | IB Diploma | havo | vwo | NCEA Level 3 | *Vitnemål* | *Gāokǎo* | Leaving Certificate | CSAT | Regents Diploma | A level | Pre-U |
| **Content / topic** | | | | | | | | | | | | | | | | | | | |
| prehistory (before 3500 BC) | | | | | x | | | | | | x | | | | | x | | | |
| ancient history (3500 BC to 400 AD) | | | | | | | | | | | | | | | | | | | |
| national | | | | | | | | | | | | | O | | | x | | | O |
| regional | | | x | | x | | | | | | x | | x | | | x | | | O |
| global | x | | | | | | | | | | | | O | x | | x | | | |
| Middle Ages (400 AD to 1500 AD) | | | | | | | | | | | | | | | | | | | |
| national | | | x | O | x | | | | O | | x | | x | x | | x | | | O |
| regional | | | x | | x | | | | O | | x | | x | | | x | | | O |
| global | | | x | | | | | | | | | | O | x | | x | | | O |
| early modern (1500–1800) | | | | | | | | | | | | | | | | | | | |
| national | | | x | x | x | | | | | | x | | O | x | O | x | x | | O |
| regional | | | x | O | x | | | | | | x | | x | | O | x | | O | O |
| global | | O | x | O | | | | | | | | x | x | x | O | x | x | | |
| modern (1800 to present day) | | | | | | | | | | | | | | | | | | | |
| national | | x | x | x | x | x | x | x | O | | x | x | x | x | O | x | x | O | O |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| regional | | x | x | O | x | x | x | x | O | | x | | x | O | O | x | | O | O |
| global | | x | x | O | x | x | x | x | O | | x | | x | x | O | x | x | O | O |
| national coverage (estimated syllabus content of national history) | 0% | L | M 15 | M 25 | M 30 | M 50 | L | M 15 | L | | M 10 | M 50 | M 15 | H | M 50 | 0–100 | M 90 | L | L |

**Notes:**
x = topic covered
O = optional
L = low – but could depend on options
M = minimum coverage, numbers indicate approximate percentage
H = high, focus is entirely national

- These time periods are arbitrary categories generated for the purposes of this study. They are taken from time periods used on the Historical Association website (www.history.org.uk/resources/general_resources_20.html accessed on 13th May 2012). They are not definitive and do not necessarily reflect how history is categorised in different parts of the world.
- Geographies have been classified as:
  - national – pertaining to the national history of the education system
  - regional – pertaining to the continent in which the system sits
  - global – pertaining to other areas outside the home continent. This does not indicate that the specification offers total global coverage.

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Any enquiries regarding this publication should be sent to us at:

Office of Qualifications and Examinations Regulation
Spring Place
Coventry Business Park
Herald Avenue
Coventry CV5 6UB

2nd Floor
Glendinning House
6 Murray Street
Belfast BT1 6DN

Telephone 0300 303 3344
Textphone 0300 303 3345
Helpline 0300 303 3346