

Jobs are changing, so should education

“A levels are no longer fit for purpose.”

Venki Ramakrishnan, President of the Royal Society.

Jobs are going to be changed by new technologies such as artificial intelligence. Some will be lost altogether and others will be created that don't even exist yet.

If we want our young people to be able to succeed in this changing workplace, we need to make sure our schools and colleges are teaching them the knowledge and skills they will need. This should include the opportunity to study a wide range of subjects to 18, and to develop valuable transferable skills such as communication, problem solving, and team work.

While pre-16 education is relatively broad, the current post-16 education system in the UK is very narrow. In England, Wales and Northern Ireland, students typically study three A levels. In reality the average number of qualifications taken is now 2.7 per student¹. Scotland has a similar narrowing. UK students following this much narrower curriculum are at a disadvantage without some of the skills and knowledge that feature in broader international systems.

How should education change?

A broad and balanced range of subjects from different disciplines². Sciences and maths need to sit alongside subjects like English, history, geography, modern languages and the arts as part of a new style of education that is available to everyone up to age 18.

Subjects which are taught in an interconnected way, with themes linked across different disciplines.

An assessment system that allows for the teaching of skills in addition to knowledge, including problem solving, collaboration, creative thinking, communication.

A curriculum developed with input from employers, which includes the skills and knowledge they value the most.

Our ask

We need post-16 curriculum change within the next ten years to ensure our young people leave education with the broad and balanced range of skills they will need to flourish in a changing world of work. This should start with a review into post-16 learning in the next parliament.

“Our challenge today is that we have to educate people for jobs that don't exist yet and the only way to do this is to be flexible and adapt education and training continuously³.”

OECD Directorate for Education, Employment and Social Affairs.

1. D Thompson & Anil Keshwani (Education Datalab), 2017. Post-16 Qualification and Subject Mix – a Report for the Royal Society.

2. Royal Society, 2014. Vision for science, mathematics and computing education.

3. OECD Directorate for Education, Employment and Social Affairs <http://oecdinsights.org/2016/12/21/the-future-of-work-a-world-of-new-and-changing-skills/>

How does the UK compare internationally?

Many countries have moved, or are moving, towards a broader and more diverse and balanced curriculum in order to equip the next generation with the skills that will help them adapt to new technologies and a changing world. Countries that provide a broader post-16 education give young people both breadth of knowledge and depth of understanding, as well as skills that allow them succeed in the world of work.

Compulsory subjects compared across 24 countries (upper secondary level)

Country/State	First language is compulsory	Mathematics is compulsory	A second language is compulsory	Science is compulsory	One or more other subjects is compulsory
British Columbia (Canada)	✓	✓	✓	✓	✓
Czech Republic	✓	◻	◻	—	—
Estonia	✓	✓	✓	✓	✓
Finland	✓	✓	✓	✓	✓
France	—	✓	✓	—	✓
Hong Kong	✓	✓	✓	—	✓
Hungary	✓	✓	✓	✓	✓
Ireland	✓	✓	—	—	—
Japan	✓	✓	—	✓	✓
Korea	✓	✓	✓	✓	✓
Massachusetts (USA)	✓	✓	✓	✓	✓
Netherlands	✓	—	✓	—	✓
New South Wales (Australia)	✓	—	—	—	—
New Zealand	●	●	●	—	—
Rhineland-Palatinate (Germany)	✓	✓	✓	✓	✓
Russia	✓	✓	✓	✓	✓
Singapore	—	◻	—	◻	✓
Spain	✓	✓	✓	✓	✓
Sweden	✓	✓	✓	✓	✓
Taiwan	✓	✓	✓	✓	✓
England	NO COMPULSORY SUBJECTS				
Scotland					
Wales					
Northern Ireland					

KEY ✓ Subject is compulsory ● Subject is in effect compulsory — Subject is not compulsory
 ◻ Students must choose a subject from two or more categories (for example, mathematics or a language as in the case of the Czech Republic)

Source: J Hodgen, D Pepper & L Niaz (2019) Update to table 3 from Nuffield Foundation report: *Is the UK an Outlier*, 2010. Commissioned by Royal Society.

How do education systems differ across the UK?

Education in the UK is a devolved policy area, with England, Scotland, Wales and Northern Ireland each responsible for their own education systems.

	England	Scotland	Wales	Northern Ireland
Compulsory school age	16, but must be in full time education, training, or part time work and education until 18	16	16	16
When are students assessed?*	16, 18	15 – 16, 17 – 18	16, 18	16, 18
What type of post-16 exams do they take? (typically available)	AS levels, A levels Typically, students take 3 A levels. AS levels no longer count towards an A level following reforms from 2015 onwards, and are now a separate qualification.	Highers, Advanced Highers Typically, students take 5 Higher subjects, with some UK universities requiring Advanced Highers in certain subjects.	AS levels, A levels AS levels remain a contributory part of the A level qualification, and can also be taken as a stand alone qualification.	AS level, A levels The open qualification market in Northern Ireland means there is a mixture of AS and A levels depending on which exam board is chosen.
How do further education (FE) colleges operate?	Open to age 16+ Available courses include: academic courses, vocational and technical courses, and other work-based learning including apprenticeships. Some FE colleges also offer HE qualifications.	Open to age 16+ Available courses include: Highers, Advanced Highers, vocational and technical courses including apprenticeships. Some FE colleges also offer HE qualifications.	Open to age 16+ Available courses include: A levels, vocational and technical courses including apprenticeships. Some FE colleges also offer HE qualifications.	Open to age 14+ Available courses can include: A levels, vocational and technical courses or other work-based learning including apprenticeships. Some FE colleges also offer HE qualifications.
What types of vocational qualifications are available?	Among others: OCR Nationals: equivalent to GCSE BTECs: can be studied as a full time course or alongside GCSEs and A Levels From 2020: T Levels – new 2 year technical programmes (alternative to A Levels).	Scottish Vocational Qualifications (SVQs). Work-based qualifications with no formal exams	Among others: OCR Nationals: equivalent to GCSE BTECs: can be studied as a full time course or alongside GCSEs and A Levels	Among others: OCR Nationals: equivalent to GCSE BTECs: can be studied as a full time course or alongside GCSEs and A Levels
Who is responsible for education policy?	Department for Education (DfE) (UK Government)	Scottish Parliament, Education Scotland	Department for Education and Skills (Welsh Government)	Department of Education (DE) (Northern Ireland Executive)

* High stakes external assessment

Why do we need a broad and balanced curriculum?

The limitations of a narrow curriculum are already being identified across the UK, as well as within schools, employers and parents. Wales and Northern Ireland are taking active steps to address this.

Scotland

“Fall in pupils studying key subjects should be a red flag. A narrow curriculum is not in the interests of Scotland’s pupils but we continue to see subjects drop in terms of the number of pupils sitting it.”

Iain Gray MSP, Scottish Labour education spokesman

Wales

Wales is developing a new curriculum with an emphasis on ‘equipping young people for life’. Rather than a focus on narrow subject areas, the new curriculum has six ‘Areas of Learning and Experience’: expressive arts; health and wellbeing; humanities; language, literacy and communication; mathematics and numeracy; science and technology.

“Advances in technology and globalisation have transformed the way we live and work. These changes have profound implications for what, and how, children and young people need to learn. After all, tablets and smart phones didn’t even exist when the last curriculum was introduced in 1993.

Schools and teachers need more flexibility to respond to this environment, using a new curriculum which will promote high achievement and engage the interest of all children and young people to help them reach their potential.”

GOV.WALES

Schools

“Assessment objectives from GCSE specifications were being tracked back to as early as year 7, meaning many pupils spend their secondary education learning narrowed and shallow test content rather than broader and more in-depth content across a subject area.”

Amanda Spielman, Chief Inspector, Ofsted

England

“The high-stakes system has led to a narrowing of the curriculum with a focus on English and maths at the expense of other subjects like science, humanities and the arts. It is right that schools are held to account for their performance but the government should act to lower the stakes and help teachers to deliver a broad, balanced and fulfilling curriculum.”

Neil Carmichael, former Chair, Education Select Committee

Northern Ireland

“The Key Stage 4 Entitlement Framework is a core element of the Northern Ireland Curriculum. The Entitlement Framework ensures that schools provide pupils with access to a broad, balanced and relevant curriculum. It provides pupils with access to a range of courses which are linked to relevant learning and career pathways.”

CCEA

Employers

“We need a whole education approach to young people including the ability to work in teams, to be resilient, and to present well. Facts matter in education, times tables matter. Basic maths and literacy are the gateways to good careers. But we can teach them in more engaging ways which develop other skills.”

Neil Carberry, former Managing Director, CBI

Parents

More than half of parents believe young people should be encouraged to study a broader range of subjects than they currently do. Improving work experience, maths and digital skills are top priorities for parents.

Kantar Institute⁴

4. Online survey of 1000 parents, December 2018.

What factors affect the options open to young people?

The UK's existing post-16 education systems are too narrow, but within them, lots of young people are not even studying the broadest range of subjects that could be offered to them. These young people are at a disadvantage in the changing world of work.

The following pages show how different factors can affect the number and type of qualifications students are able to take post-16.

To move towards a broader and more balanced curriculum for all young people, these factors must be taken into account.

About the data (figures 1 – 4)

The following data is from England only, however many of the factors and trends identified are applicable to the wider UK. Whilst the number of subjects taken is a useful indicator of curriculum breadth, taking a higher number of qualifications does not necessarily represent a broad and balanced curriculum (e.g. someone who takes 3 A levels may take exclusively science subjects).

Definitions

IB: International Baccalaureate or AQA Baccalaureate.

A levels: Students taking A levels or Pre-U qualifications.* In some cases, this is accompanied by an additional substantive vocational qualification.**

Other: Other (primarily vocational) sets of qualifications.

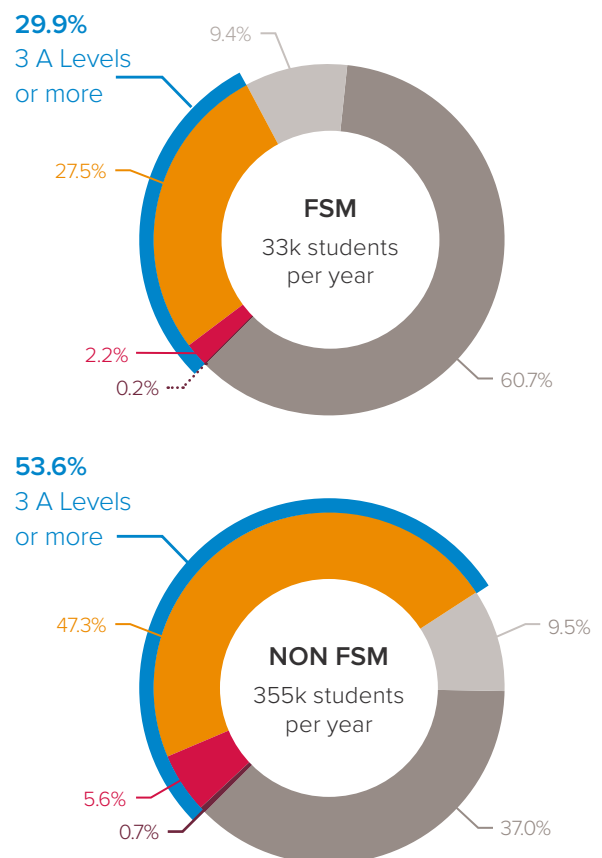
* The Pre-U is a diploma-type qualification which is accepted by higher education institutions for entry.

** Substantive vocational qualifications are those equivalent in size to one or more A Levels. We have excluded General Studies and Citizenship A level subjects.

Source: D Thompson & Anil Keshwani (Education Datalab), 2017. Post-16 Qualification and Subject Mix – a Report for the Royal Society

FIGURE 1: Your family's income

Family income has a significant impact on the number of subjects a young person takes. **Less than a third of students who claim for free school meals (FSM) go on to study 3 or more A levels, compared to more than half of students from better-off backgrounds.**



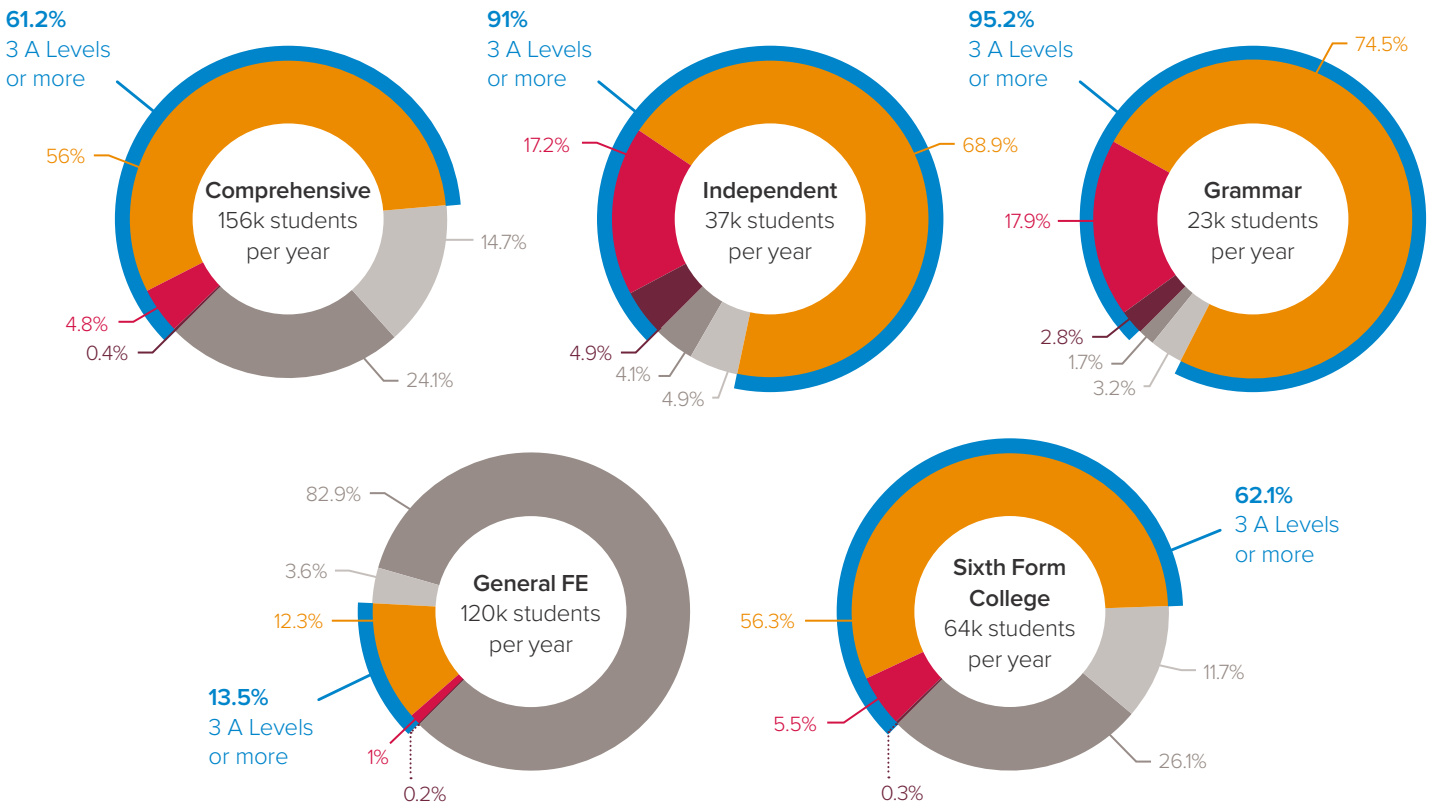
KEY

■ IB ■ 4+ A levels ■ 3 A levels ■ 2 A levels ■ Other

Note: figures are rounded. Available data only (averages for 2011 – 16)

FIGURE 2: What type of school you go to

There are stark differences in the number of subjects taken by students depending on what type of school they attend. Students in comprehensive schools are far less likely to take more than three A levels compared to their counterparts in grammar or independent schools. Many FE colleges offer a much wider range of courses than schools or sixth form colleges, therefore unsurprisingly the vast majority of young people attending them study 'other' qualifications.



Note: figures are rounded.

Available data only (averages for 2011 – 16).

KEY ■ IB ■ 4+ A Levels ■ 3 A Levels ■ 2 A Levels ■ Other

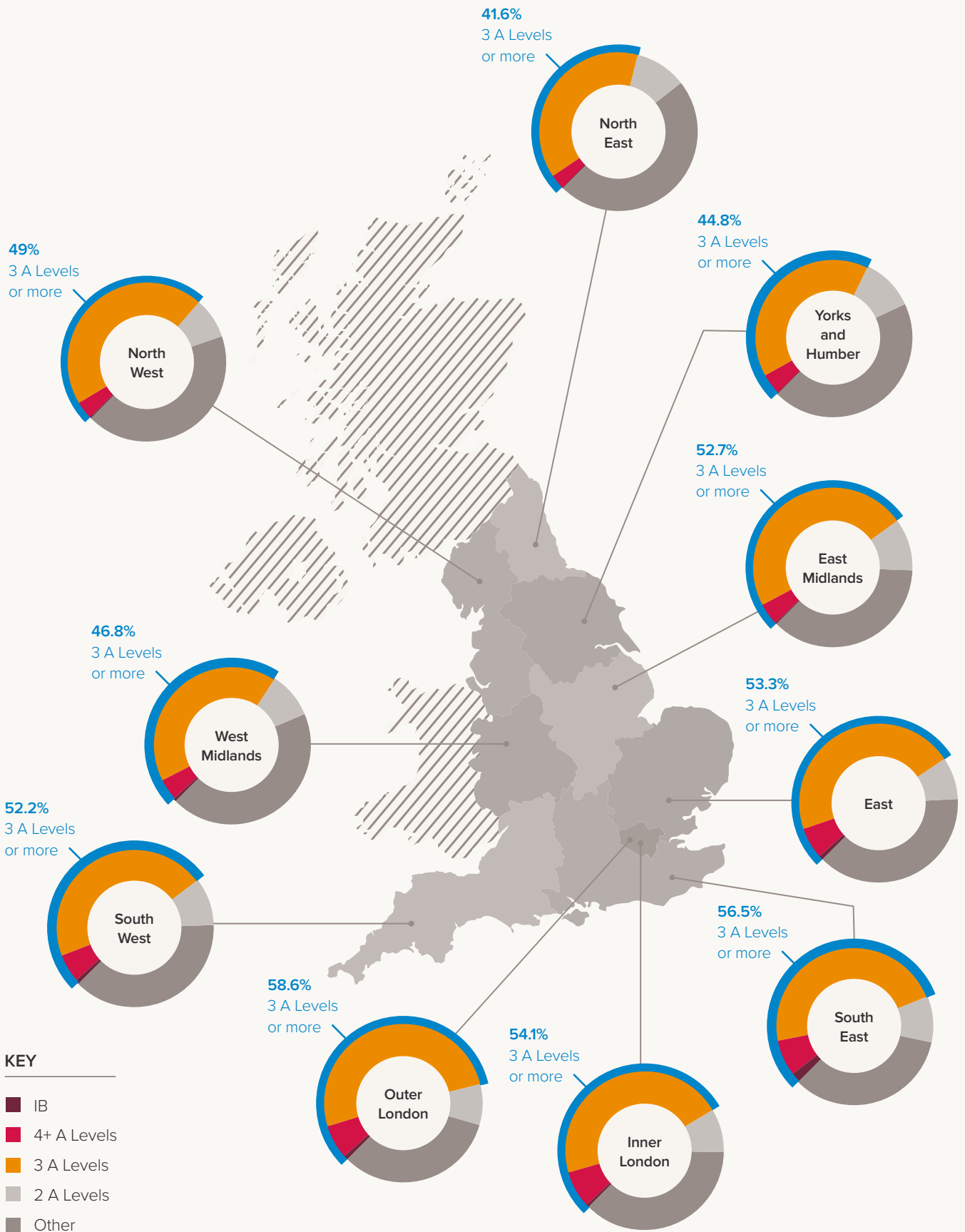
FIGURE 3: Your gender

Girls are likelier to study a higher number of subjects than boys, however in recent years the average number of subjects taken by both has gone down.



FIGURE 4: Where you live

Where a young person lives can have a significant impact on the number of subjects they take. For example, in the South East 57% of students take 3 or more A levels compared to the North East where it is only 42%.



Note: figures are rounded. Available data only (averages for 2011 – 16)

What could a different post-16 system look like?

There are lots of different ways a broad and balanced curriculum could be structured. Below are three examples of existing systems which offer the opportunity to study a range of subjects, often making connections between disciplines and teaching additional key skills such as research or community service.

Example 1

International Baccalaureate

A final assessment in each of six subject groups (language and literature; language acquisition; individuals and societies; sciences; mathematics; the arts).

Extended essay based on students' own research and in-depth study.

A 'theory of knowledge' piece, with a focus on critical thinking and learning across students' chosen subjects.

'Creativity, activity, service' – a range of experiences such as learning a piece of music, a physical activity such as being a sports coach, or community service. Students reflect and report on their chosen experience.

Example 2

3 A levels plus core maths plus EPQ

This model is similar to the National Baccalaureate and the AQA Baccalaureate, which are both taken in a number of UK schools.

It fits around current UK subject and curriculum structure.

Students would study 3 A-level subjects over two years, as is standard practice.

Students would also take Core Maths as a post-16 qualification.

Students would complete an Extended Project Qualification (EPQ), a comprehensive research project into a topic of their choice. It usually involves an extended essay and presentation at the end of the course.

Example 3

French baccalaureate model

Students choose from one of three streams, each with a different specialisation (sciences, economics and social science, and literature).

Within each stream students take French language classes and a philosophy course.

There is also a 'personal project', similar to the EPQ, in each of the streams. Students undertake a year-long research project and must produce a written report and an oral presentation on their work at the end of the course.

Within the science stream the main required courses include Earth and Life Sciences, Mathematics, Physics and Chemistry, History and Geography, and a foreign language.

There are lots of different ways a broad and balanced curriculum could be delivered. A review into post-16 learning should consider the many ways in which the post-16 curriculum could be improved and the factors which affect the options open to young people, in order to provide them with the best possible opportunities.

Find out more: royalsociety.org/changing-education