ROYAL SOCIETY OF CHEMISTRY

SUSTAINABILITY

Green shoots: A sustainable chemistry curriculum for a sustainable planet

Priorities for chemistry education on sustainability and climate change identified by young people and educators

Introducing our new perspectives series

In a world where global challenges and advances in technology bring both uncertainty and new possibilities, the chemical sciences have a critical role to play. But what will that role be? How can we maximise the impact we make across academia, industry, government and education? And what actions should we take to create a stronger, more vibrant culture for research that helps enable new discoveries?

Our perspectives series addresses these questions through four lenses: talent, discovery, sustainability and science culture. Drawing together insights and sharp opinion, our goal is to increase understanding and inform debate – putting the chemical sciences at the heart of the big issues the world is facing.

Sustainability

Our planet faces critical challenges – from plastics polluting the oceans, to the urgent need to find more sustainable resources. But where will new solutions come from? How can we achieve global collaboration to address the big issues? And where can the chemical sciences deliver the biggest impacts?

Science Culture

Scientific research and innovation is becoming increasingly multidisciplinary and collaborative. How do we create the open, inclusive, dynamic environments that will allow scientists to thrive and make their maximum contribution to global prosperity? And how should we recognise and incentivise the breadth of skills and diversity of people, contributions and achievements that enable new discoveries and breakthroughs?

Talent

Talent is the lifeblood of the chemical sciences. But how do we inspire, nurture, promote and protect it? Where will we find the chemical scientists of the future? And what action is required to ensure we give everyone the greatest opportunity to make a positive difference?

Discovery

Chemistry is core to advances across every facet of human life. But where do the greatest opportunities lie? How will technology and the digital era shape the science we create? And what steps should we take to ensure that curiosity-driven research continues to unlock new opportunities in unexpected ways?

Find out more at **www.rsc.org/new-perspectives**

Foreword 04

Key findings 05

Action plan 07

Recommendations for a sustainable curriculum 08

Introduction 10

What a good chemistry education should achieve 12

Our findings in full:

What young people and educators told us about sustainability and climate change 13

1: The importance of teaching young people about sustainability and climate change 13

2: What do young people and educators think about current climate change and sustainability teaching in science and chemistry? 16

3: What are the biggest barriers to teaching about sustainability and climate change? 18

4: What sustainability related knowledge and skills should be included in the chemistry curriculum? 22

5: How should sustainability and climate change be taught? 25

6: Making young people aware of careers in sustainability and climate change 26

Appendix: Our chemistry curriculum framework 28

References 30

Front cover illustration: Amelia Flower, Folio Art

Foreword

Tom Welton

Dudley Shallcross

Sustainability has never been higher on the agenda, and rightly so. From unprecedented flooding and wildfires, to record high temperatures, around the world people are losing their homes, their livelihoods and their lives because of climate change.

We have a duty and an opportunity to prepare young people to take on these challenges, and to find fulfilling jobs in the growing green economy.

Inspiring and relevant chemistry teaching has a key role to play, because the chemical sciences are essential in enabling a transition to a more just and sustainable world.

Previous research by the Royal Society of Chemistry found that eight in ten chemical researchers are working on environmental challenges, from the measurement and analysis of air pollutants to developing sustainable packaging materials and scaling up clean energy technologies.

Unfortunately, our new survey of school students and educators in the UK and Ireland shows that we are not adequately preparing the next generation to fulfil their potential in the chemical sciences. They made their views clear: sustainability and climate change are not prioritised enough in chemistry lessons or careers guidance.

This has to change. The decisions we make today will have far-reaching consequences and that includes how we educate our children. A five year old starting education today will leave school in 2035, by which time sustainability skills will be even more essential.

That is why we are calling for policymakers in the UK and Ireland to ensure that climate change and sustainability are embedded throughout chemistry curricula from the ages of 5 to 19 years. We hope this report and our curriculum action plan will aid them in this endeavour.

Our aim is for every learner to receive an inspiring and relevant chemistry education in the areas of climate change and sustainability, whether they go on to pursue further study in this area, or play their role as a scientifically literate citizen.

Whatever choices a young person makes about their career, they will live and work in a world affected by climate change. They need a scientific foundation so they can engage fully with the issues that shape society and make informed choices about their lives.

We are committed to collaborating with policymakers and educators to revitalise the chemistry curriculum, and ensure that our community continues to be a catalyst for positive change.

Professor Tom Welton OBE
President, Royal Society of Chemistry

Professor Dudley Shallcross
Education Division President, Royal Society of Chemistry

Key findings

We conducted a survey of 11 to 18 year olds and a survey of educators working with children aged 5 to 19 years old across the UK and Ireland to find out what they think of the way climate change and sustainability are currently taught in science and chemistry lessons.

Educators and young people think that climate change and sustainability should be priorities for the chemistry curriculum. Four in five young people and four in five educators see these topics as a priority for the chemistry curriculum.

Two thirds of secondary chemistry educators think that the chemistry curriculum should have more content on climate change and sustainability. This number rises to nine in ten for those teaching primary school age.

While most chemistry educators are confident teaching about climate change and sustainability, they face a number of barriers. These include the way the curriculum is designed and a lack of time and resources for those working with younger age groups, and lack of subject knowledge and fear of controversy for those teaching ages 16 to 19 years.

Chemistry educators think carbon literacy, the lifecycle and impact of materials, the finite nature of resources and pollution are the most important topics for everybody to learn about by the time they leave school. Many also feel the curriculum could be improved by reducing some content, eg on fossil fuels, and adding more on specific sustainability topics.

Young people are very worried about climate change and they want to take action. Four in five young people feel climate change is an urgent priority to solve and three in four are actively looking for ways to help.

Young people are interested in careers in sustainability, but there is room to improve awareness of the options in the chemical sciences. Seven in ten young people believe studying chemistry can lead to sustainability jobs and nearly six in ten educators are at least somewhat aware of the relevant career options. However, three in ten educators are somewhat or very unaware of careers for chemical scientists in sustainability.

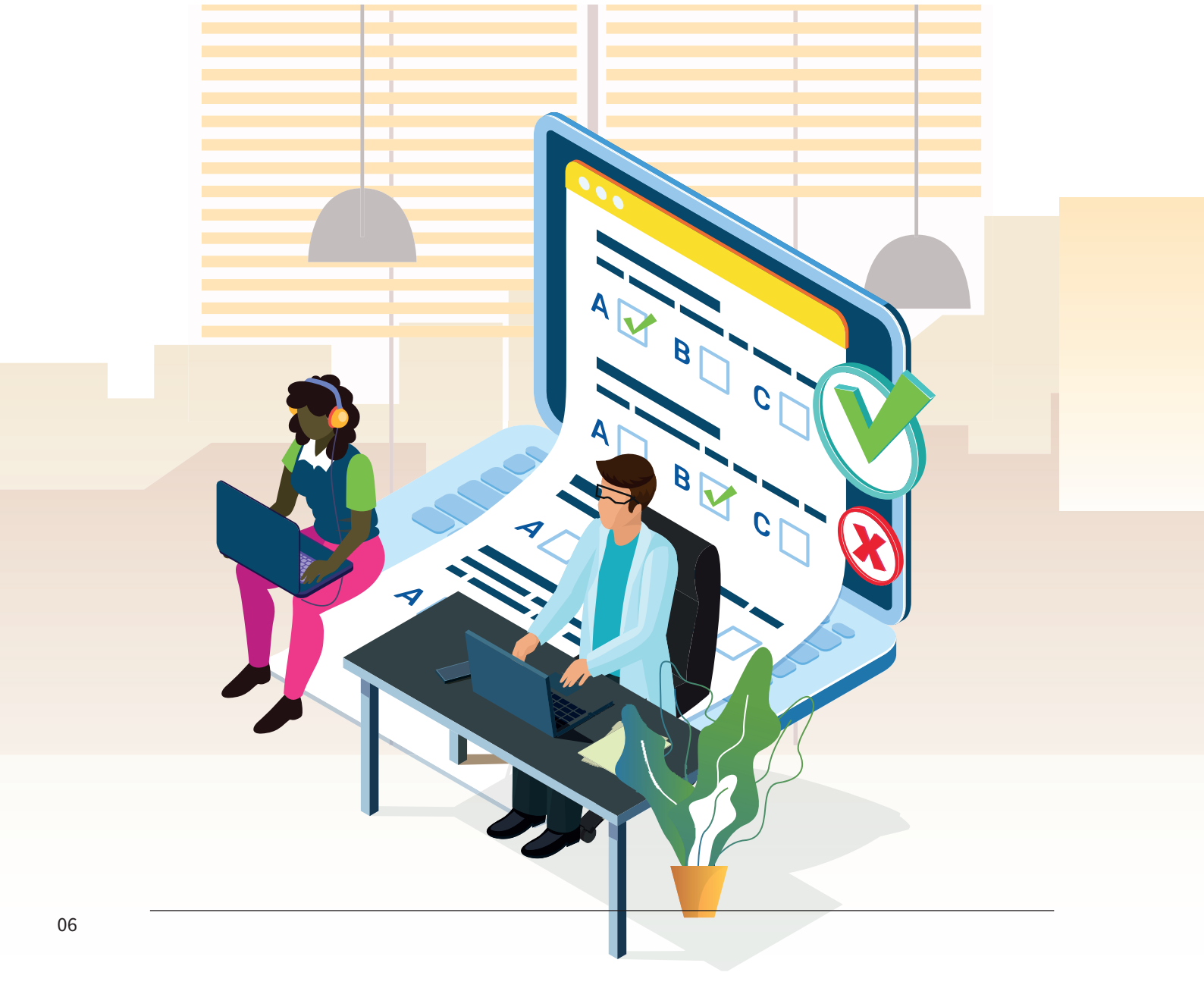
Survey of young people

We partnered with the brand consultancy and research agency Mobas to conduct a quantitative online survey with 11 to 18-year-olds across the UK in August 2021, to provide robust, representative data on attitudes, needs and behaviours. A total of 549 completed surveys were received.

Alongside the online survey, we conducted ten Vox Pop videos with young people aged 16 to 18 years. Participants were asked to create a short video response to a set of questions around climate change and sustainability. This is a highly engaging way to directly hear the views of young people, in their own words, about the things that matter to them.

Survey of education professionals

An online survey was conducted of professionals working in education for ages 5 to 19 years across the UK and the Republic of Ireland. 619 responses were received in total in from June to July 2021.



Action plan

We are calling on Governments to do the following

- **Urgently prioritise updating the school chemistry curriculum so it prepares all young people to fully participate in efforts to tackle climate change and sustainability challenges.**
- **Ensure young people have the skills and careers information needed to progress into green jobs in the chemical sciences and contribute to the future green economy.**

As a scientific organisation, we commit to the following

- **We will communicate clearly the scientific basis for climate change and the unequivocal role of human activity on climate change** in our discussions with policy makers, stakeholders and our community.
- **We will work with policymakers to ensure the chemistry curriculum prepares future generations for a changing world**. We will use the findings of this report and our ongoing work to engage with policymakers and influence curriculum development across the UK and Ireland.
- **We will continue to provide resources and professional development opportunities for chemistry educators** to enable them to teach effectively about climate change and sustainability.
- **We will continue to enable young people to explore their career options in sustainability and climate change** by developing and promoting our career resources for educators and students. We will showcase a diverse range of roles, people and paths.

Recommendations for a sustainable curriculum

Sustainability and climate change should be embedded throughout science and chemistry curricula for ages 5 to 19 years.

In the 5–11 curriculum, the focus should be on helping learners understand that:

- Climate change is a major global challenge, but there are solutions we can adopt to mitigate its impact.
- Human activity has an impact on our environment, both good and bad.
- Science plays an important role in developing solutions for a sustainable world. This is especially important as the evidence suggests that children start to make their mind up about whether science is 'for them' by the time they leave primary school[1].

In the 11–19 curriculum:

- Young people need to learn in more depth about the chemistry underpinning climate change, particularly related to carbon literacy, the finite nature of resources, the lifecycle of materials and pollution.
- Young people also need to learn about the role they can play in looking after the environment.
- The curriculum should communicate clearly the strong scientific evidence on the impact of climate change and the role of human activity in causing it.
- The curriculum should cover fundamental chemistry concepts and skills, and bring them together in the context of sustainability and climate change.
- Students must be equipped with the knowledge, understanding and skills that will motivate them to progress into careers in the chemical sciences or related disciplines.

Curricula should…

…be designed flexibly to emphasise sustainability and climate change, while not over-burdening students and educators with content. Many educators identified a lack of time as a barrier to teaching about climate change. There is an opportunity to review the curriculum and reduce the emphasis on certain topics that are becoming less relevant, such as fossil fuels, while increasing the emphasis on climate change and sustainability.

…be organised so that students build progressively on their knowledge and skills related to sustainability and climate change at each stage.
This is in line with our recommended approach to curriculum development more widely (see page 28).

…make clear the scientific basis for climate change, including the unequivocal role of human actions in causing the problem. This is particularly important at ages 16 to 19 years, because four in ten educators of this age group said they worried that teaching about sustainability and climate change would be seen as controversial by others.

…communicate the real-world relevance of the chemical ideas that are studied, the contribution that chemistry makes to our society, and the ways in which the chemical sciences are essential to solving climate change and sustainability issues. The future of the green economy relies on attracting talented young people into relevant further study, training and work, and the curriculum should inspire young people to do so.

Introduction

Young people are acutely aware of the sustainability challenges we face.

Finding a way to live in harmony with the planet is the greatest challenge we face. The most recent IPCC report[2] concluded unequivocally that climate change effects are widespread and intensifying, and that human activity is responsible.

We are already feeling the impacts, from devastating forest fires to unprecedented flooding. It is unsurprising then, that public concern in the UK about climate change and the environment is at a near record high[3].

Young people especially are increasingly fearful for their futures. A recent global survey of 16 to 25 year olds found that 84% are worried about climate change and half feel sad, anxious, angry, powerless, helpless and guilty[4]. This is borne out by our own research with young people in the UK, presented in this report.

We need to educate young people to deal with these challenges and thrive in the green economy.

The decisions we make today will have far-reaching consequences and that includes how we educate our children. A five year old starting education today will leave school in 2035, by which time climate change will be an even more pressing priority.

The job market is also likely to look very different, as the UK works toward achieving net zero emissions by 2050[5]. The Government aims to support two million green jobs by 2030[6].

We have a responsibility to equip young people to engage with the challenges they will face as adults, and to pursue rewarding careers.

A thriving chemical science community is essential for a sustainable world.

The chemical sciences will play a key role in the transition to a more just and sustainable world, from reducing air pollution to developing sustainable packaging materials and scaling up clean energy technologies.

The majority of respondents to our Science Horizons Researcher Survey[7] said that their work had potential applications in one of the global challenge areas we identified, with 86% identifying applications in relation to the environment and seven in ten (68%) to energy.

Under the Government's plan to build back greener and achieve net zero emissions by 2050, we need people with the right skills and knowledge in the chemical sciences to take up green jobs.

An inspiring and relevant chemistry education is vital for everybody.

At the Royal Society of Chemistry, we are committed to enabling young people to fulfil their potential in the chemical sciences, so our community can continue to be a catalyst for change.

We believe everybody should have an inspiring and relevant chemistry education, whether they go on to pursue further study in this area, or play their role as a scientifically literate citizen.

Whatever choices a young person makes about their career, they will live and work in a world affected by climate change.

Every young person needs a strong foundation in science so they can engage fully with the issues that shape society and make informed choices about their lives.

Our research shows there is a need to improve current education on climate change and sustainability.

The Environmental Audit Committee has recently made recommendations about including environmental sustainability across all primary and secondary courses[8].

We wanted to understand what young people and educators across the UK and Ireland think of the way climate change and sustainability are currently taught, to inform possible curriculum reforms.

We conducted two pieces of research to find out: a survey of 11 to 18 year olds and a survey of chemistry educators and related professionals working with children aged 5 to 19 years old.

The message was clear. Both young people and educators think chemistry education should cover climate and sustainability issues and related careers. However, a number of barriers get in the way of educators being able to cover these topics as fully as they would like.

This report builds on our previous work to guide the development of chemistry curricula that are fit for the future.

This report presents the results of our research with young people and educators. It builds on our previous work with the chemistry education community to develop a flexible framework for curriculum design[9]. We have included a summary of this framework in this report (see pages 28 and 29).

It is essential that policymakers ensure every young person leaves school with the chemical skills and knowledge they need to thrive, which includes being able to fully participate in efforts to tackle climate change.

What a good chemistry education should achieve

At an individual level, a chemistry education should:

Inspire people with a sense of curiosity and wonder about the fundamental nature of the world around them.

Empower them to make decisions about their own lives and critically evaluate scientific and technological developments that impact society.

Equip them with the knowledge and skills to pursue further study and rewarding careers in the chemical sciences and a wide range of related fields.

At a national level, it should ensure we have a sustainable supply of people with the curiosity, knowledge and skills to:

Enable growth and productivity – the chemical sectors, add £87 billion in value to the UK economy every year[10].

Address global challenges such as climate change, water and food security, health and energy.

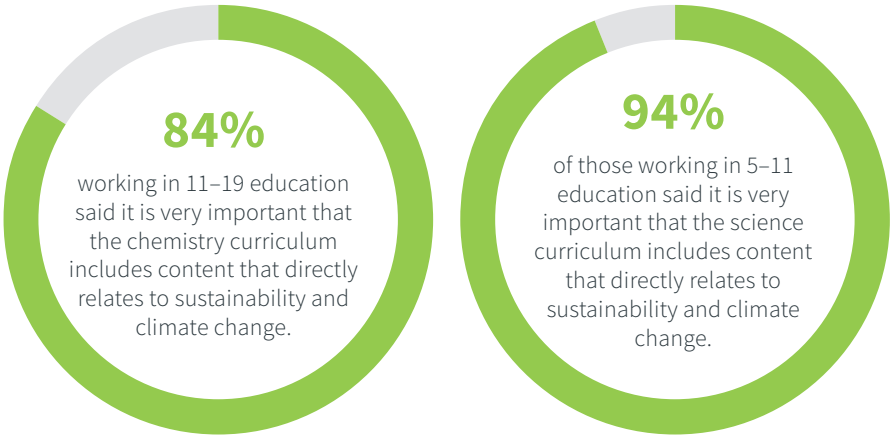
Our findings in full:

What young people and educators told us about sustainability and climate change

1 The importance of teaching young people about sustainability and climate change

Educators think climate change and sustainability are key priorities for the science and chemistry curriculum and young people also expect to be taught about these issues in their chemistry lessons. Young people are very worried about climate change and want to take action.

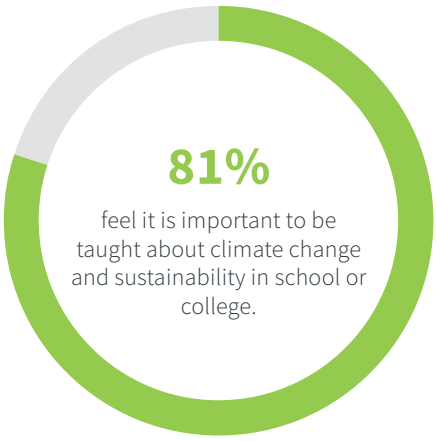
Educators think climate change and sustainability are key priorities for the science curriculum at every age.

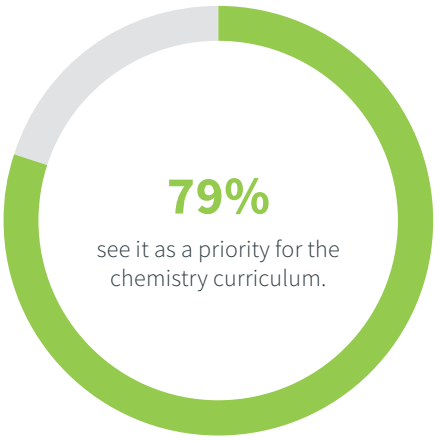


"The whole curriculum should be reviewed and space made for more understanding of environmental issues."

EDUCATOR (11–19 EDUCATION)

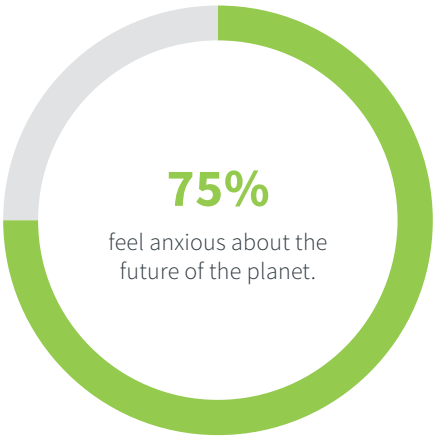
Young people also expect to be educated about climate change and sustainability at school in chemistry lessons.

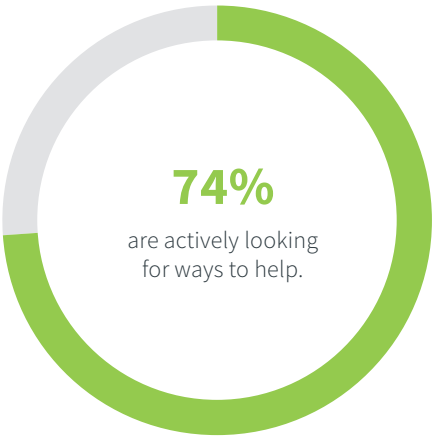




> **"I believe the young people have to look after the planet as they will be living on it... But I think it's the educator's job to make sure the children know what they have to do."**
>
> YOUNG PERSON

Young people are extremely concerned about climate change and want to take action.





> **"This is a conversation that everyone needs to be having... If everyone did one thing, it would make a huge impact."**
>
> YOUNG PERSON

Young people think that schools, colleges and universities have the biggest responsibility to promote and educate people about sustainability, followed by the Government and scientific societies.

Young people want the media to provide more detailed and balanced information on climate change.

In addition to our online survey, we asked 16 to 17 year olds to send short videos sharing their views. Many said they would like the media to provide a more detailed, balanced representation on the key issues. They highlighted the BBC as a trusted source of information in a world of 'fake news'.

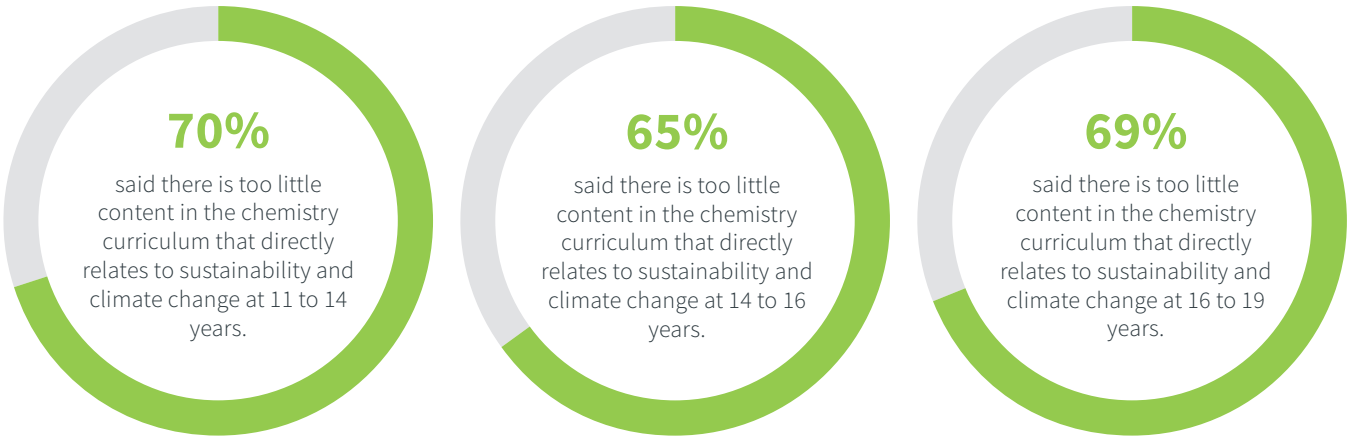
> **"Nine times out of ten, the news doesn't cover anything very well to do with climate change. I feel like it's quite hushed under the carpet. It's not something that's talked about enough."**
>
> YOUNG PERSON

2 What do young people and educators think about current climate change and sustainability teaching in science and chemistry?

Two thirds of educators teaching ages 11–19 years think the chemistry curriculum should have more content on climate change and sustainability, rising to nine in ten for those teaching primary school age.

Opinion is fairly evenly split among young people about whether they need more or better quality science teaching on climate change and sustainability.

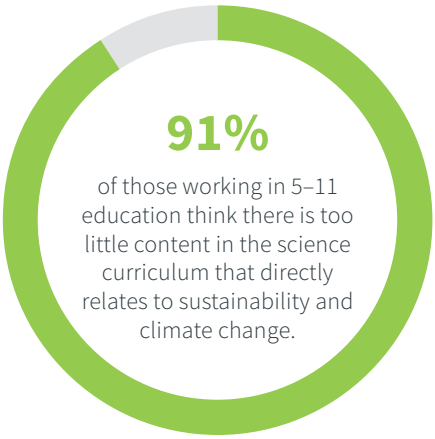
Educators think there is not enough content on climate change and sustainability in current curricula for ages 11 to 19 years.



"It is important that students know how valuable chemistry is in the fight against climate change... to encourage students to take chemistry at a higher level as there is so much to offer them."

EDUCATOR (11–19 EDUCATION)

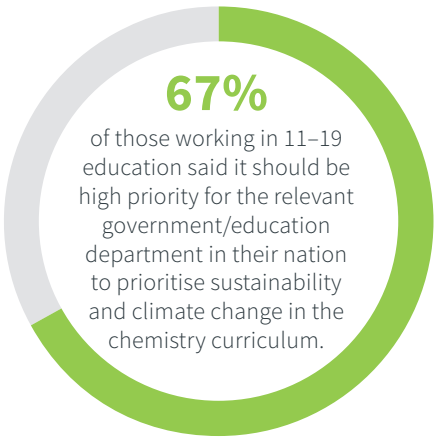
Primary school educators feel even more strongly that there should be more content on sustainability and climate change in the science curriculum.



> "Personally I think [sustainability] should be the bedrock of the whole science curriculum (and the other subjects as well)."
>
> **EDUCATOR (5–11 EDUCATION)**

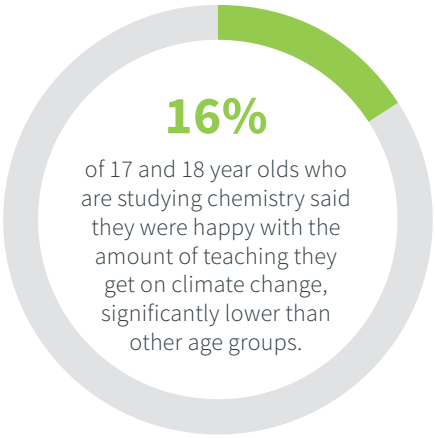
Educators want the Government to prioritise sustainability and climate change in the chemistry curriculum.

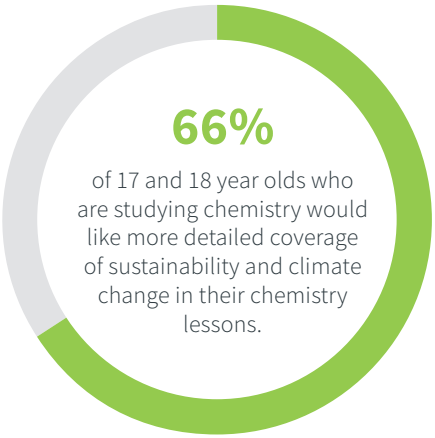
> "The overall curriculum should be changed to accommodate the topics of sustainability and climate change."
>
> **EDUCATOR**



> "School gives a good scientific explanation of how climate change occurs and also talks about the impacts of climate change action... But I feel that there's a lack of focus on the urgency and importance of the issue."
>
> **YOUNG PERSON**

Older teens studying chemistry think their lessons should cover sustainability and climate change issues in more detail.



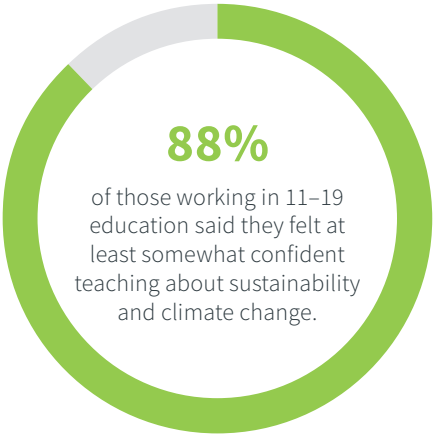


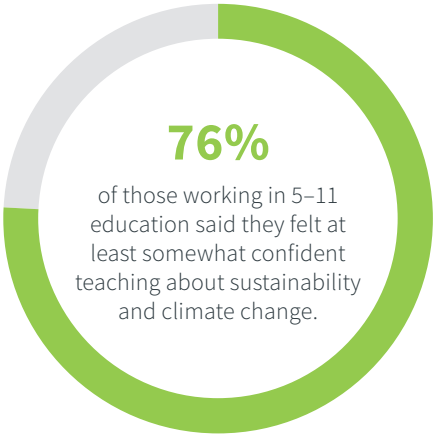
> **"I don't think climate change is talked about or as a matter of fact, taught enough in school at all... If we have no idea what's going on, then what are we as a generation meant to do?"**
>
> YOUNG PERSON

3 What are the biggest barriers to teaching about sustainability and climate change?

While most educators are confident teaching about climate change and sustainability, there are a number of barriers to addressing these topics. These include the way the curriculum is designed and a lack of time and resources for those working with younger age groups, and lack of subject knowledge and fear of controversy for those teaching ages 16 to 19 years.

Most educators are at least somewhat confident in teaching about sustainability and climate change.





At ages 5 to 11 years, the biggest barriers to teaching about climate change and sustainability are curriculum design and lack of time and resources.

57% said when teaching ages 5 to 11 years the curriculum is not well designed to support teaching on climate change and sustainability.

57% said they don't have enough time to teach content in a sustainability context.

35% said they don't have enough resources to teach these topics.

At ages to 11 to 14 years, the biggest barriers are too much duplication of content and curriculum design.

34% said when teaching ages 11 to 14 years there is too much duplication of content.

32% said the curriculum is not well designed to support teaching about sustainability and climate change.

> "I would argue it is not necessarily what you include in the curriculum [about climate change and sustainability], but how it is organised, contextualised and how topics are linked."
>
> **YOUNG PERSON**

At ages 14 to 16 years, the biggest barriers to teaching about climate change and sustainability are duplication of content and a lack of time and resources.

48% said when teaching ages 14 to 16 years there is too much duplication of content.

40% said there isn't enough time to teach content in a sustainability context.

38% said there aren't enough resources.

> "There is duplication [of sustainability content] between GCSE chemistry and GCSE biology and students will study both, so perhaps the emphasis could change to be more chemically based to make it more relevant."

SECONDARY EDUCATOR

At ages 16 to 19 years, the biggest barriers to teaching about climate change and sustainability are lack of subject knowledge and fear of others seeing these as controversial topics.

50% said when teaching ages 16 to 19 years they didn't have the subject knowledge to teach about climate change and sustainability.

40% said they worried about teaching about sustainability and climate change because others might see it as a controversial topic.

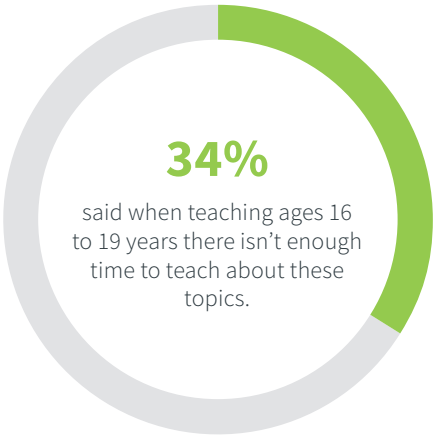
> "I am not sure of the exact latest science and data and don't want to get it wrong and not be able to give evidence."

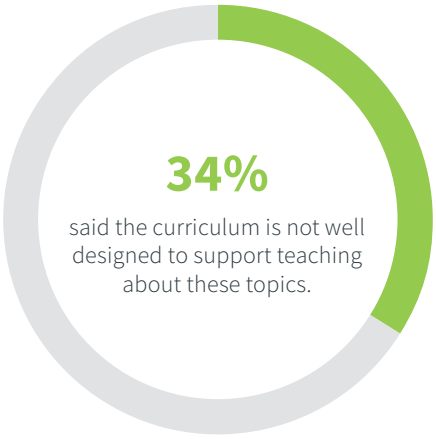
SECONDARY EDUCATOR

> "Climate change isn't an opinion, and fossil fuels shouldn't be looked at by comparing 'advantages and disadvantages."

EDUCATOR (11–19 EDUCATION)

Curriculum design and lack of time are also major barriers when teaching ages 16 to 19 years.

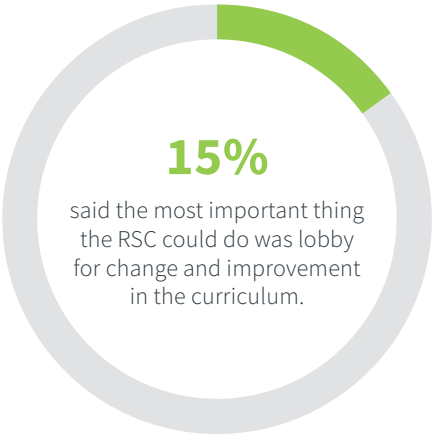




> **"At A Level [there is] just no time to cover anything that is not on spec and no interest if it does not contribute to [the] exam grade!"**
>
> EDUCATOR

Educators think the Royal Society of Chemistry has an important role to play in providing resources and advocating for improvements in the curriculum.

When asked in an open question to name anything they thought the RSC could do to improve teaching on sustainability:



> **"The existing RSC materials (The Chemistry of Climate Change) are excellent."**
>
> SECONDARY EDUCATOR

> **"[The RSC should] argue for changes in curriculum nationally that promote sustainability and climate change [understanding]."**
>
> SECONDARY EDUCATOR

4 What sustainability related knowledge and skills should be included in the chemistry curriculum?

Chemistry educators identified a range of sustainability topics that everybody should learn about, with carbon literacy, the lifecycle and impact of materials, the finite nature of resources and pollution being the most important.

Many also feel the 11–19 chemistry curriculum could be improved by reducing some content, for example related to fossil fuels, and adding more material on sustainability topics, such as pollution, green chemistry and recycling.

At primary level, educators said the focus should be on understanding our impact on the world around us and the importance of climate change, as well as science's role in tackling it.

Carbon literacy, the lifecycle and impact of materials, and the finite nature of resources are the most important sustainability topics for school leavers going on to pursue further study or a career in the chemical sciences.

42% of educators said this group should have knowledge or skills related to "Carbon literacy; the science and relative impact of how sectors and individual actions contribute to climate change."

39% of educators said this group should have knowledge or skills related to "Lifecycle and impact of materials and products; and the role of chemistry in developing new materials."

29% of educators said this group should have knowledge or skills related to "Finite nature of resources, element conservation, critical raw materials."

"Lots of my pupils are very anxious about [climate change] because of the way it is portrayed in the media. However they can be reassured and highly motivated when shown that science can provide solutions."

EDUCATOR (11–19 EDUCATION)

Carbon literacy, the finite nature of resources, pollution, and the lifecycle and impact of materials and products, are the most important sustainability topics for everybody to understand by the time they finish education, in order to be knowledgeable citizens.

47% said everybody should have knowledge or skills related to "Carbon literacy; the science and relative impact of how sectors and individual actions contribute to climate change."

36% said everybody should have knowledge or skills related to the "Finite nature of resources, element conservation, critical raw materials."

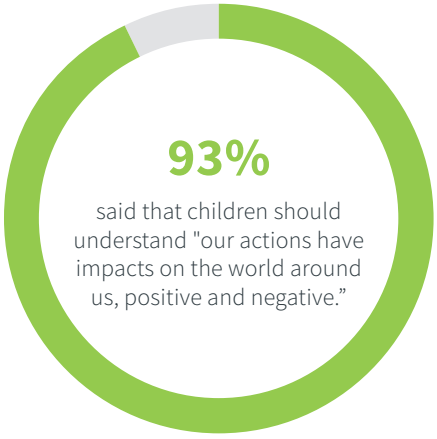
31% said everybody should have knowledge or skills related to "Pollution – air, soil and water".

30% said everybody should have knowledge or skills related to "Lifecycle and impact of materials and products; and the role of chemistry in developing new materials."

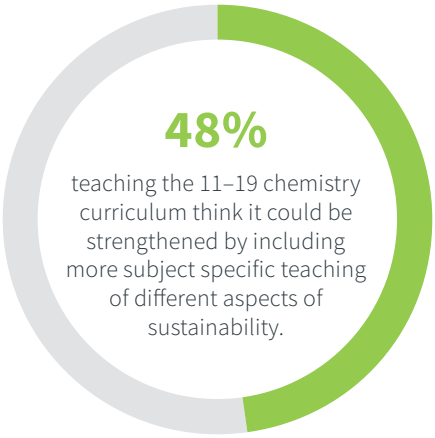
"The curriculum is so similar to the content I was taught 25 years ago and the world has changed so much."

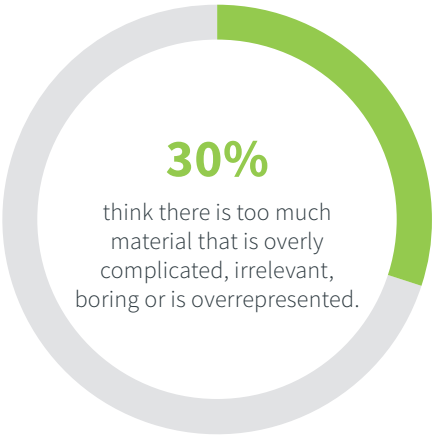
EDUCATOR (11–19 EDUCATION)

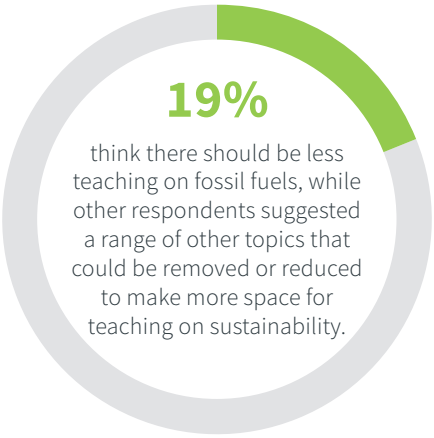
By the time children leave primary school, they should understand that our actions have an impact on the world around us, climate change is a global challenge and science can help find solutions.



Some educators suggested ways in which coverage of sustainability and climate change in the curriculum could be improved. For example...





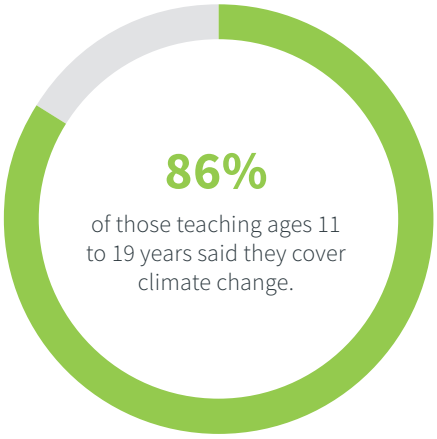


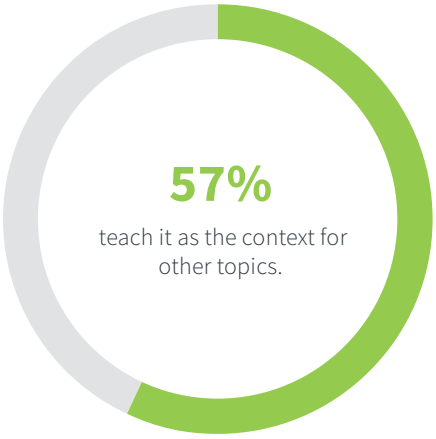
> **"There's a massive focus on crude oil, fractional distillation and cracking which, although it is based on important chemistry concepts, promotes an image of chemistry as not being a subject and industry that cares or wants to work on sustainability and climate change."**
>
> **SECONDARY EDUCATOR**

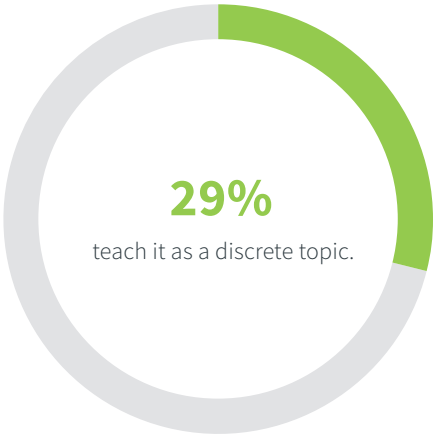
5 How should sustainability and climate change be taught?

Most of those teaching chemistry for ages 11 to 19 years cover climate change and sustainability, with the majority including this as context for other topics. Very few educators think that they should be taught as a stand-alone subject.

At ages 11–19 years, most chemistry educators cover climate change, with the majority covering it as the context for other topics.

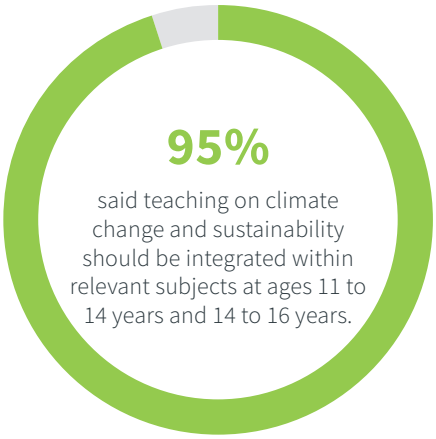


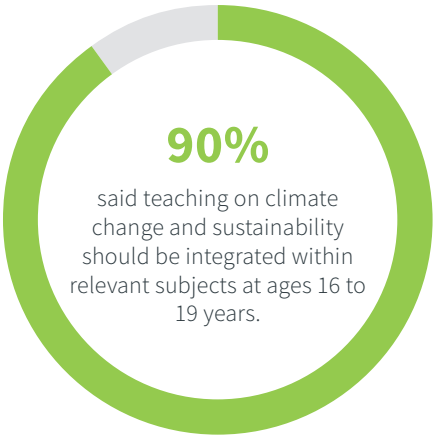


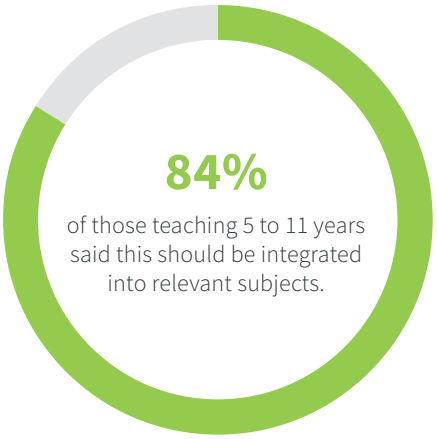


> **"We have such an enormous amount to fit in there is little space for anything else. But, for example, energy resources type topics could be redesigned to focus on sustainability."**
>
> **SECONDARY EDUCATOR**

The vast majority of chemistry educators think climate change and sustainability teaching should be integrated into relevant subjects, like science or geography.







6 Making young people aware of careers in sustainability and climate change

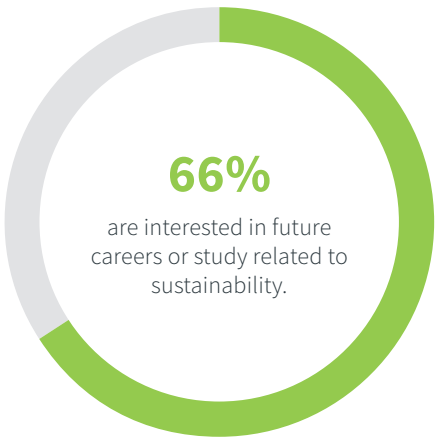
Sustainability and climate change offer a range of rewarding careers and the number of related jobs will increase as we transition to a green economy. Young people are interested in careers in these areas, but there is room to improve awareness of the options in the chemical sciences.

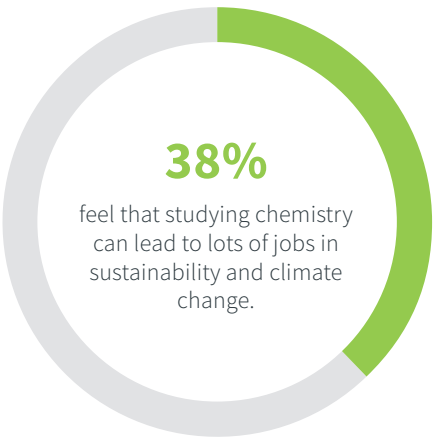
Studying chemistry can lead to a huge range of careers including in sustainability.

According to **recent research by the Royal Society of Chemistry,** there are already 275,000 chemistry using professionals in the UK, working in a diverse range of geographic regions and industry sectors, many of which are related to sustainability[10]. For example, energy supply, waste and recycling and the UK's world leading research organisations.

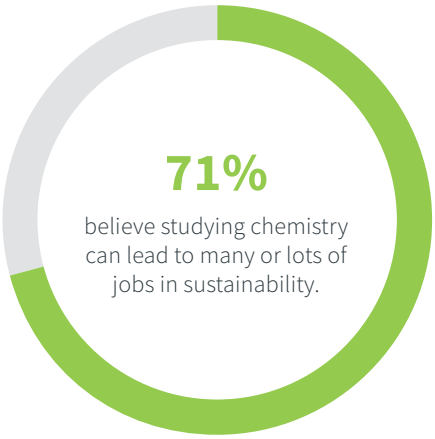
The chemical science community already makes substantial contributions to the green economy, from developing **more sustainable plastics**[11] and **better performing electric car batteries**[12], to **monitoring greenhouse gases**[13].

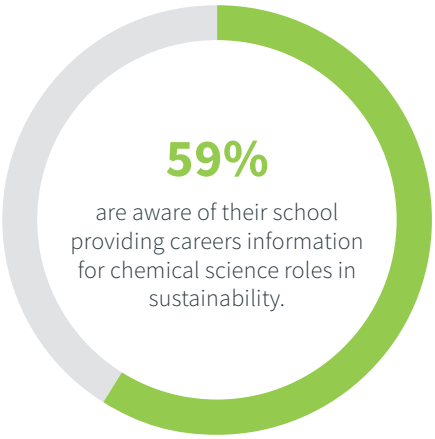
Young people are interested in work and study in sustainability and climate change.





The majority of young people are aware of sustainability careers in the chemical science.





The majority of educators are aware of career options for chemical scientists in sustainability, but a sizeable minority are not.

Appendix: Our chemistry curriculum framework

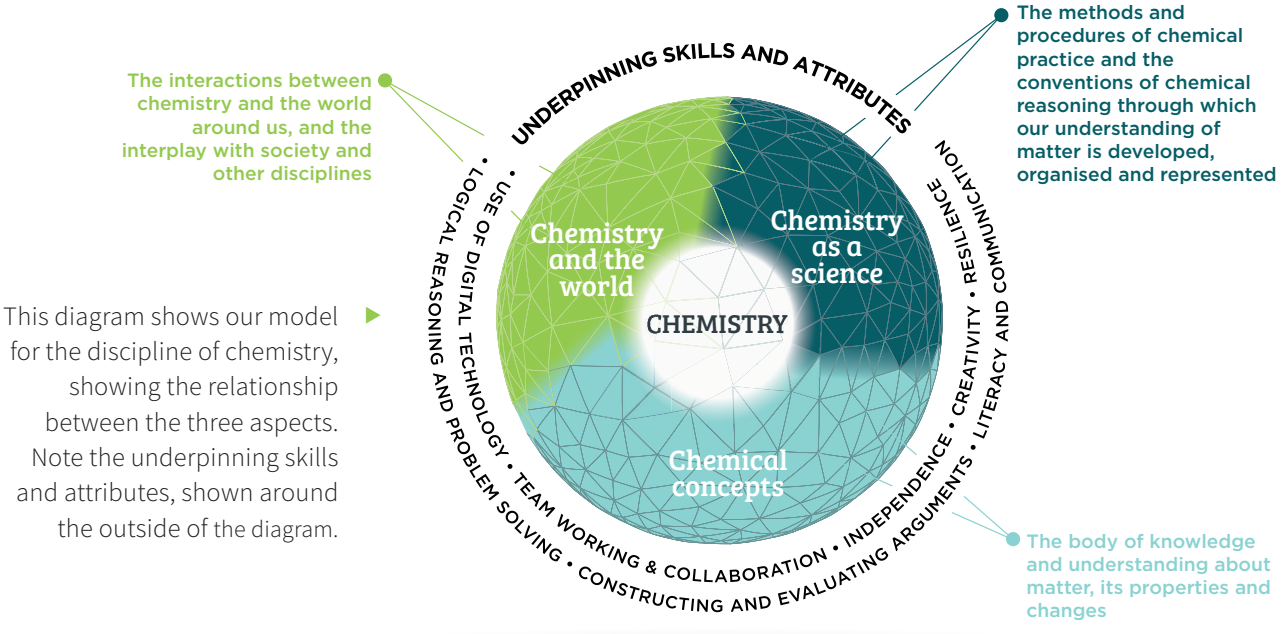
A complete view of chemistry

Developing an understanding of what chemistry is, and how we can use it, is central to a successful chemistry curriculum. We have thought deeply about what matters in, and about, chemistry and how our discipline is evolving.

The structure of our proposed framework is intended to be flexible enough that it can be applied to technical and academic pathways and be appropriate for any educational system in the UK and Ireland.

At the heart of the framework sits our model for the discipline*, shown in the diagram below. The approaches to reasoning and enquiry that are important in chemistry are covered in Chemistry as a science, whilst the fundamental understandings of the material world that we have developed so far are covered in Chemical concepts. Chemistry and the world focuses on how we use these practices and concepts and how they impact society and the world.

Whilst each of these aspects of chemistry is important in its own right, and therefore should be made explicit, chemistry as a discipline can only be understood through the relationship between them.



This diagram shows our model for the discipline of chemistry, showing the relationship between the three aspects. Note the underpinning skills and attributes, shown around the outside of the diagram.

* By discipline we mean an area of learning that has a particular object of research, but also specific range of practices used to further understanding in that field.

Underpinning skills and attributes

Beyond the subject-specific content, the curriculum should enable learners to develop a broader range of skills necessary for a future in science as well as a wide range of study and career options.

Learners should therefore have the opportunity to develop these skills within a chemistry context.

Overall we are looking for chemistry curriculum design to:

- Be more coherent and interconnected, moving away from disjointed topics.
- Make the fundamental principles of chemistry more explicit.
- Better integrate learning about the applications and impacts of chemistry, including using up-to-date examples of critical issues such as sustainability and climate changes.
- Have a better progression of learning through the educational stages.

References

1 Economic and Social Research Council (2013). 'What influences participation in science and mathematics?' A briefing paper from the Targeted Initiative on Science and Mathematics Education (TISME). London: ESRC/TISME; 2013. Available at: https://www.sciencecentres.org.uk/resources/academic-research/tisme-publications-including-what-influence-participation-science-and-mathematics-report/

2 Intergovernmental Panel on Climate Change press release, 9 August 2021. Available at: https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr

3 Ipsos MORI's Issues Index for August 2021. Available at: https://www.ipsos.com/ipsos-mori/en-uk/public-concern-about-climatechange-and-pollution-doubles-near-record-level

4 Marks, E. et al. (2021). Young People's Voices on Climate Anxiety, Government Betrayal and Moral Injury: A Global Phenomenon. The Lancet. Available at: http://dx.doi.org/10.2139/ssrn.3918955

5 UK Government press release, published 20 April 2021. Available at: https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035

6 UK Government press release, 12 November 2020. Available at: https://www.gov.uk/government/news/uk-government-launches-taskforce-to-support-drive-for-2-million-green-jobs-by-2030

7 Royal Society of Chemistry (2018). Science Horizons: Leading-edge science for sustainable prosperity over the next 10-15 years. Available at: https://www.rsc.org/globalassets/04-campaigning-outreach/campaigning/science-horizons/science-horizons-report.pdf

8 Environmental Audit Committee, 25 October 2021. https://publications.parliament.uk/pa/cm5802/cmselect/cmenvaud/75/7510.htm

9 The elements of a successful chemistry curriculum: The Royal Society of Chemistry's vision for 11–19 chemistry education. https://www.rsc.org/globalassets/22-new-perspectives/talent/chemistry-curriculum-framework/ chemistry-curriculum-brochure.pdf

10 Royal Society of Chemistry (2020). Chemistry's Contribution: Workforce trends and economic impact.

11 Häußler, M. et al. (2021). Nature. Closed-loop recycling of polyethylene-like materials. https://www.nature.com/articles/s41586-020-03149-9

12 The Times (2021). Battery developers team up to solve electric car puzzle. https://www.thetimes.co.uk/article/battery-developers-team-up-to-solve-electric-car-puzzle-8q85tx05b

13 Rigby, M. et al. (2019). Nature. Increase in CFC-11 emissions from eastern China based on atmospheric observations. https://www.nature.com/articles/s41586-019-1193-4

ROYAL SOCIETY OF CHEMISTRY

Thomas Graham House
Science Park, Milton Road
Cambridge CB4 0WF, UK
T +44 (0)1223 420066

Burlington House
Piccadilly, London
W1J 0BA, UK
T +44 (0)20 7437 8656

International offices
Beijing, China
Shanghai, China
Berlin, Germany
Bangalore, India
Tokyo, Japan
Philadelphia, USA
Washington, USA

www.rsc.org/new-perspectives

@RoyalSocietyofChemistry
@RoySocChem
@roysocchem
@wwwRSCorg
linkedin.com/company/roysocchem

Registered charity number: 207890
© Royal Society of Chemistry 2021