

A FUTURE IN CHEMISTRY

After School

rsc.li/future-in-chemistry



A career in chemistry – exciting jobs that make a difference

What is chemistry?

From the moment you are born you are surrounded by chemistry – the air you breathe, the food you eat and the clothes you wear – they're all chemistry. Chemistry is the study of substances; what they are made of, how they interact with each other and the role they play in living things.

From research in space, to the depths of the oceans, chemistry helps you understand the world around you.

Chemistry also forms the basis of other related subjects such as:

- environmental chemistry, understanding and solving challenges such as climate change, pollution or waste management on a molecular level;
- materials chemistry, looking at the chemical structure of materials and using this knowledge to develop the materials of the future;
- chemical engineering, producing chemical products on an industrial scale; and
- biological sciences, such as biochemistry, molecular biology and pharmacology.

Use chemistry to make a difference

Chemists make a difference. Breakthroughs in chemistry impact our everyday lives and chemists play an important role in shaping the world around us, solving big problems and creating the future through new medicines, materials and energy sources.

So whatever you're into – get into chemistry.



Why study chemistry?

A chemistry qualification opens the door to a wide range of careers options, both in and out of the lab. There are many interesting and rewarding science-based jobs available – these can be in research, outdoors or in other industries you might not have thought of.

Lots of trained chemists also work outside traditional chemistry careers because the skills you develop from a chemistry qualification can be used in many other areas.

Reasons to study chemistry:

- It helps you to be analytical and logical.
- You can apply chemistry to lots of different subjects, so it gives you a great foundation.
- It's a core subject that enables you to cross over to the other core sciences or venture into biochemistry, geochemistry, chemical engineering and physical chemistry.
- It will look impressive on your CV.
- It can lead to a wide variety of careers.
- You just love chemistry!

A career in chemistry – what's in it for you?

Whatever your plans for the future, having a chemistry qualification could really help. It will increase your scientific knowledge, help you understand why and how things happen and give you practical hands on experience. You'll also gain important skills that are generally sought after by employers.



Chemistry is central to many of the major industrial sectors and employers, such as pharmaceuticals, healthcare, biotechnology, agri-food and the green economy.

In the future people will be needed who are good at explaining how things work, are curious and can understand and solve the chemical, biological and engineering challenges in these sectors. People who can design and develop products for a better future, and make sure things are done correctly and meet high standards will be in need. A qualification in chemistry gives you these skills and will be a valuable asset.

Chemical science graduates possess an excellent range of skills including problem solving, thinking logically, data handling and analysis, team working, report writing and laboratory techniques. These skills can open the door to a huge range of job opportunities. However, it is making sure that you stand out from the crowd by developing your skills that will ensure you get the job you want.

You can gain these skills, as well as on the job experience, by doing a work-based qualification.

If you're interested in seeing where previous chemical science graduates have found employment you might like to read *What do graduates do?* prospects.ac.uk/careers-advice/what-can-i-do-with-my-degree/chemistry

Find out about work-based chemistry qualifications and apprenticeships.

rsc.li/future-in-chemistry



Niamh O'Reilly
AG Global Open Innovations
Manager, Henkel, Dublin

"I went to Maynooth to study science and decided to go down the chemistry path as I loved the practical and discovery side of it. Now at Henkel, I get to use these skills to solve real-life problems for customers all over the world, every day."

I could be working on anything, from electronic devices or automotive projects, to wind energy. I get great pleasure out of meeting our customers and hearing how my work helped"

Employability and earning

Independent research shows that chemistry graduates have a high employment rate. If you want to find out more about salaries in a particular career area, current job advertisements are a good source of information. Career websites and magazines focusing on topics relevant to your area of interest are good places to start. Remember that salaries depend on a large number of factors, including: qualifications required; location; experience; size and type of the organisation.

The 2018 '*What do graduates do?*' report showed that starting salaries for chemistry graduates six months after graduation ranged between £17,200 - £27,500. This compares to the UK average of £21,000 for graduates from all subjects.

Over 70% of chemistry students entered a professional or managerial role after graduation with double the UK average going into further study.

The Royal Society of Chemistry's '2017 Pay & Reward Survey' showed a median salary of £45,000 for member-respondents*. Members with PhDs showed higher earning potential during their career over other qualifications.

Future outlook

An expert group on future skills predicts major growth in bio-pharma manufacturing and a strong need for people that understand the chemical, biological and engineering challenges associated with working in the sector. Other areas to watch include the medical devices and food science sectors.

Useful websites

Chemistry World Jobs jobs.chemistryworld.com

What do graduates do?

luminate.prospects.ac.uk/what-do-graduates-do

*Results based on 6,967 members of the Royal Society of Chemistry who responded to the 2017 survey with profiles representative of current membership.

Getting into chemistry

What do I need to do next?

Study as much science and maths as you can at school to get you off to a great start. Discuss your options with your teachers and see what's right for you.

- Find out what science courses are available at your school.
- Ask your teachers what the different courses involve.
- Ask careers advisers at your school for advice and answers to any of your careers questions.

Chemistry, biology, physics and maths are some of the subjects that appear most often in university entry requirements for a variety of courses. So if you're undecided about your future plans then studying chemistry and other sciences can help you to keep your options open.

Remember, if you decide not to continue with chemistry in the future, having a good knowledge of science and maths is useful for a wide range of careers, even outside of science.

Work experience

If you're interested in working in chemistry, why not try and get work experience during the school /college holidays?

See our tops tips for finding work experience on A Future in Chemistry.

rsc.li/work-experience



Options after school

The two most common routes into a career in chemistry are studying it at university and work-based learning, such as an apprenticeship.

The first step is to choose a qualification in either chemistry or another subject with a lot of chemistry content. Maths is a good subject to study alongside chemistry at any level, as a good understanding of maths will help the study of chemistry and is a requirement for some chemistry degrees.

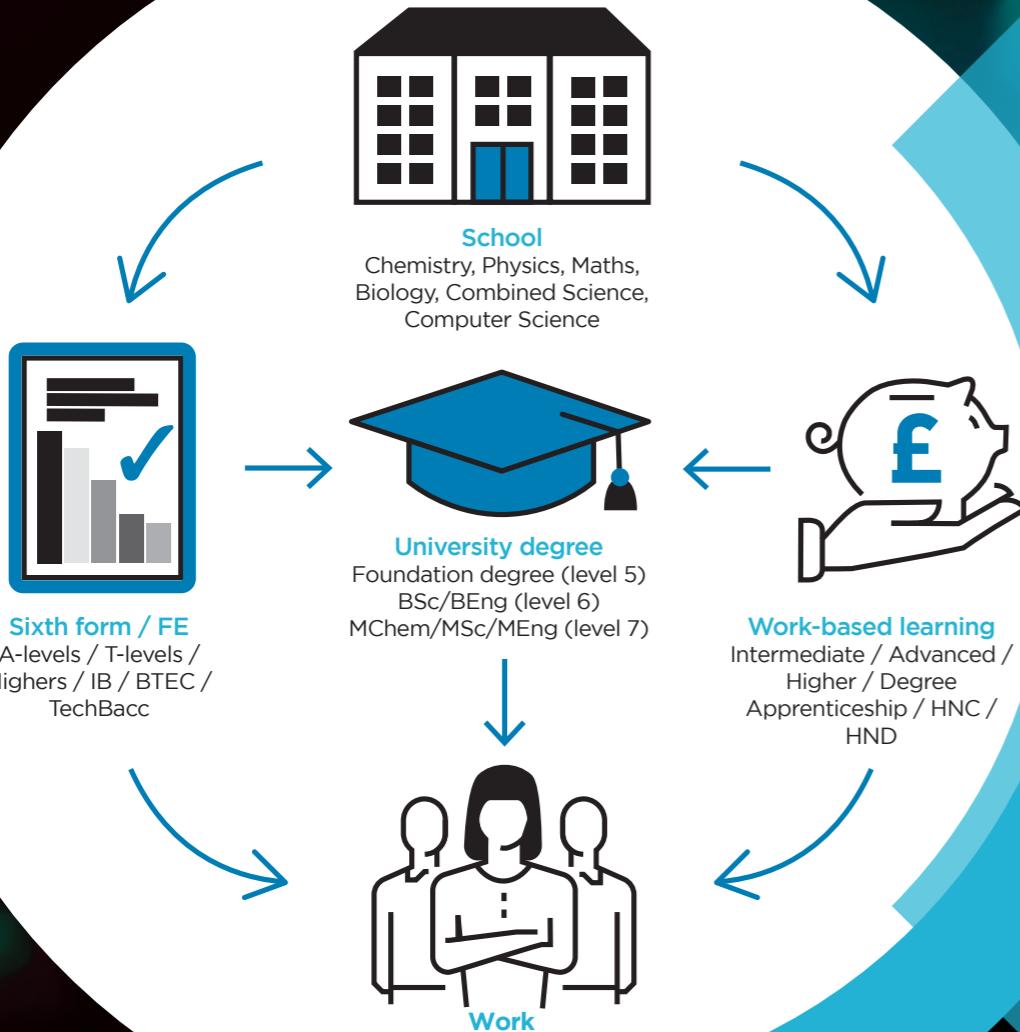
All of the different options can be confusing, but they each offer you a different way to learn. Some options are also suitable if you are thinking about retraining for a career in chemistry, or if you did not choose the right subjects or get the grades you needed.



Sujata Kundu
PhD Student

"I spent time researching artificial photosynthesis, developing a material that will capture as much of the energy in sunlight as possible."

Getting into chemistry



Studying at university

There are a huge number of chemistry and related science courses available. Before you decide to study any subject, you should find out what the course will involve as the length and content of each course will vary. Make sure that you understand what is involved with each course before you apply. You can do this by reading different university websites for course information, contacting admissions tutors and speaking to someone already doing a similar course. You can also ask a teacher or careers adviser.

You can then make an informed decision about which courses to apply for.

Chemistry degrees:

- take three to four years to complete;
- offer in-depth training in both theoretical and practical chemistry; and
- often allow students to specialise in a particular field of chemistry in the final years of the programme.

What are the entry requirements for doing a chemistry degree?

These vary between universities and some courses are more competitive than others so require higher grades. The UCAS website ([ucas.com](https://www.ucas.com)) has a comprehensive database of courses available and their entry requirements. A different points system is used in the Republic of Ireland and details are provided on the Central Applications Office website ([cao.ie](https://www.cao.ie)).

Do I need maths to study chemistry at university?

Maths is an extremely important part of nearly all chemistry degree courses. However, an A-level (or equivalent) in maths is not always an entry requirement. You may be required to do a course in maths once you reach university, and most universities will provide additional maths support during your degree.

Which degree?

There is no one 'best' course. It is important that you choose the right university and course for you.

Choosing a course is only part of the challenge; the university also has to be right for you. Once you have drawn up a short list of courses and universities, make sure that you try to visit them all on open days to get a feel for what living and studying there will be like. There are plenty of online resources for researching universities but you should visit, go to open days, see the facilities and discuss the course in more detail. Remember you'll be there for three or four years so it's important to make the choice that's best for you.

If you are planning to specialise early make sure that you are really interested in the area and the career paths that the subject leads to.

Accredited courses

If you are looking for a degree programme with a lot of chemistry content, check which courses are accredited by the Royal Society of Chemistry. By choosing a degree that is accredited, you can be confident that you are getting a high quality education that will provide you with the right skills for future employment.

rsc.li/accredited-courses

Choosing a university



This depends on what your preferences are in terms of level, location and course content. There are opportunities for study at degree level all over the world, and also many institutions closer to home, that offer chemistry and closely related courses.

It is also possible for you to study in other countries. This can be a rewarding experience, but is not recommended without thorough research.

International students can also study in the UK and although it may be more difficult to visit for an open day, there is a lot of information available online and on our website that can help you make the right choice.

There is not one university that suits everyone. Some things you should consider when choosing a university are:

- the courses available and entry requirements
- the location
- whether it's a campus or city university
- the accommodation options and costs
- the number of students at the university and on the course.

For help choosing a degree visit our website.

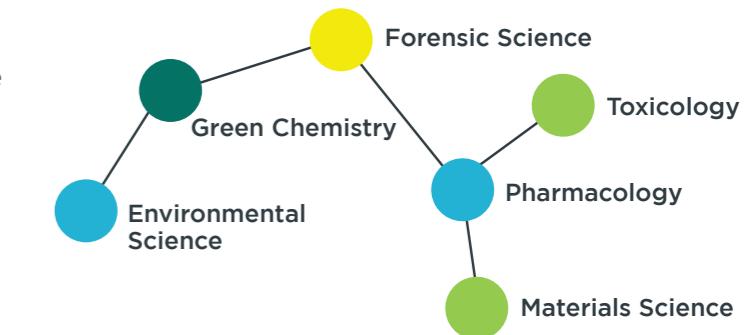
rsc.li/going-university

Related subjects – what alternative degrees involving chemistry are available?

Courses which include a significant amount of chemistry include biochemistry, chemical engineering and pharmaceutical science. These require good knowledge and understanding of the chemical principles that underpin them. Some courses allow you to specialise in a particular field of chemistry, for example medicinal chemistry, analytical chemistry and nanotechnology. If you're considering these courses you need to be certain that you are interested in the area you choose – you may be narrowing the options that will be available to you after university. Research into the subject is vital, especially if you haven't studied it at school or college.

If you like the idea of specialising but you're not certain it's right for you, then you may want to choose a more general chemistry degree that allows you to specialise in the final years of the course. By the time you need to make the decision to specialise you will have a better understanding of what is involved and which aspects of your course you most enjoy.

Other subjects which are similar to chemistry or have high levels of chemistry content which you might want to explore include:



Student finance

The costs will vary and depend on where you live and study. For more information on tuition fees, accommodation costs and students finance visit our website.

rsc.li/student-finance

There is nothing to stop you having a paid job while you study at university (unless studying at Oxford or Cambridge). The NUS says that 'the majority of students work part-time during term time', but make sure it doesn't adversely affect your studies. Most universities recommend students undertake no more than 15 hours paid work a week.



Alternative routes to university – what if I don't have the necessary qualifications?

Some universities offer a foundation year (access course) as part of their chemistry course. These are designed for students who have shown the ability, but do not have the necessary grades or subjects for direct entry onto a degree course. They cover a range of topics, including laboratory work, a project, maths and elements of other science subjects. After completing the foundation year you should be eligible to progress onto the university's degree course.

For more information on different routes into university, talk to university admissions tutors or visit the UCAS website ([ucas.com](https://www.ucas.com)).

What are the benefits of work-based qualifications?

Work-based qualifications are designed with the help of employers, meaning you will develop the skills and knowledge that employers look for. Your qualification and work experience will also help you stand out to future employers. Work-based qualifications also have no age restrictions, offer a flexible training option and the entry requirements vary so having the right subjects or grades isn't always an issue. If you have a learning disability then the entry requirements can be adapted so it's worth speaking to a training provider, teacher or careers adviser to find out more.

These qualifications are suited to students who can manage work and study and want to earn while they learn.

Apprenticeships

- a nationally recognised qualification such as a Advanced Level Apprenticeship which you can take after GCSEs or equivalent. Higher Apprenticeships (England and Wales) are for those with A-levels or equivalent. Apprentices do not pay any fees related to their qualification unlike a university degree. Apprentices also are paid at least the minimum wage for apprentices (£3.90 p/h from April 2019) although science-related roles are usually paid more.



Higher National Certificates (HNCs) and Higher National Diplomas (HNDs)

- work-related qualifications designed with industry to ensure students gain the skills and knowledge employers want. Chemistry-related courses include analytical science, applied science and chemical science for industry.

Foundation degrees

- work-based qualifications available in areas such as applied chemistry, analytical chemistry, forensic science and pharmaceutical science. They take two years to complete full-time, some can be studied part-time and they can be used to enter undergraduate study.

For more information about your different options, how to apply for them and what you could be doing as an apprentice in chemistry visit rsc.li/earn-while-you-learn

Chemist profiles



Rebekka Willcocks
Higher Apprentice, Eight19



James Lymer
Chemical Exposure Specialist,
Environment Agency



Xameerah Malik
Senior Committee Specialist,
House of Commons



Sallie Robins
Freelance Science Publicist

Skills to help you earn while you learn

"I am studying for a Foundation Degree in Chemical Science at Manchester Metropolitan University. I test the solar panels that are being developed and then seek to make improvements. For example, I came up with an idea that could remove particles from solar panels. I designed it, tested it and now all solar panels we produce are treated like this.

Apprenticeships are a powerful option so are definitely worth considering if you prefer to be working whilst learning. University and work are not exclusive to each other. It is possible to get the best of both worlds and that is exactly what I am doing now. Earning a wage whilst I am doing so is also a really good thing!"

rsc.li/higher-apprentice

Skills valued around the world

"I was attracted into my current role because I have had a long term interest in environmental matters, the role routinely requires me to use a large amount of chemistry knowledge and there is always something new to learn. I also wanted to work with a broad range of stakeholders and apply my chemistry knowledge to multidisciplinary problem. There weren't many local job opportunities where I grew up and I thought a chemistry degree would give me more national employability.

I would recommend working in environmental chemistry. Although the financial benefits may not be as great as in other professions, it is multidisciplinary and there is variety in the job which I think is a big advantage."

rsc.li/environmental-chemist

Skills to help build a better future

"I wanted to use my scientific background to inform and influence decision-making in a high profile policy environment. I provide specialist advice on science and science policy to a committee of MPs from different political parties or groups.

Drafting reports is the most exciting part of my job as it involves analysing evidence, discussions with committee members and creative thinking about recommendations. These reports are published and can get a lot of public and media attention. I also love working for the House of Commons and learning more about how it works as an insider, as well as the direct contact with MPs, scientists, civil servants and other interesting people."

rsc.li/senior-specialist

Skills to connect the public with science

"My role involves getting great coverage of a story, and creating an angle or idea that turns out to be really popular with the media. It is very satisfying when an event you have organised is successful, with all participants thoroughly enjoying it."

For the latest information check out the Royal Society of Chemistry's chemistry careers website, A Future in Chemistry.
rsc.org/careers/future

Royal Society of Chemistry
www.rsc.org

Registered charity number: 207890
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