



AN EXCITING
CAREER AHEAD.

AT SCHOOL

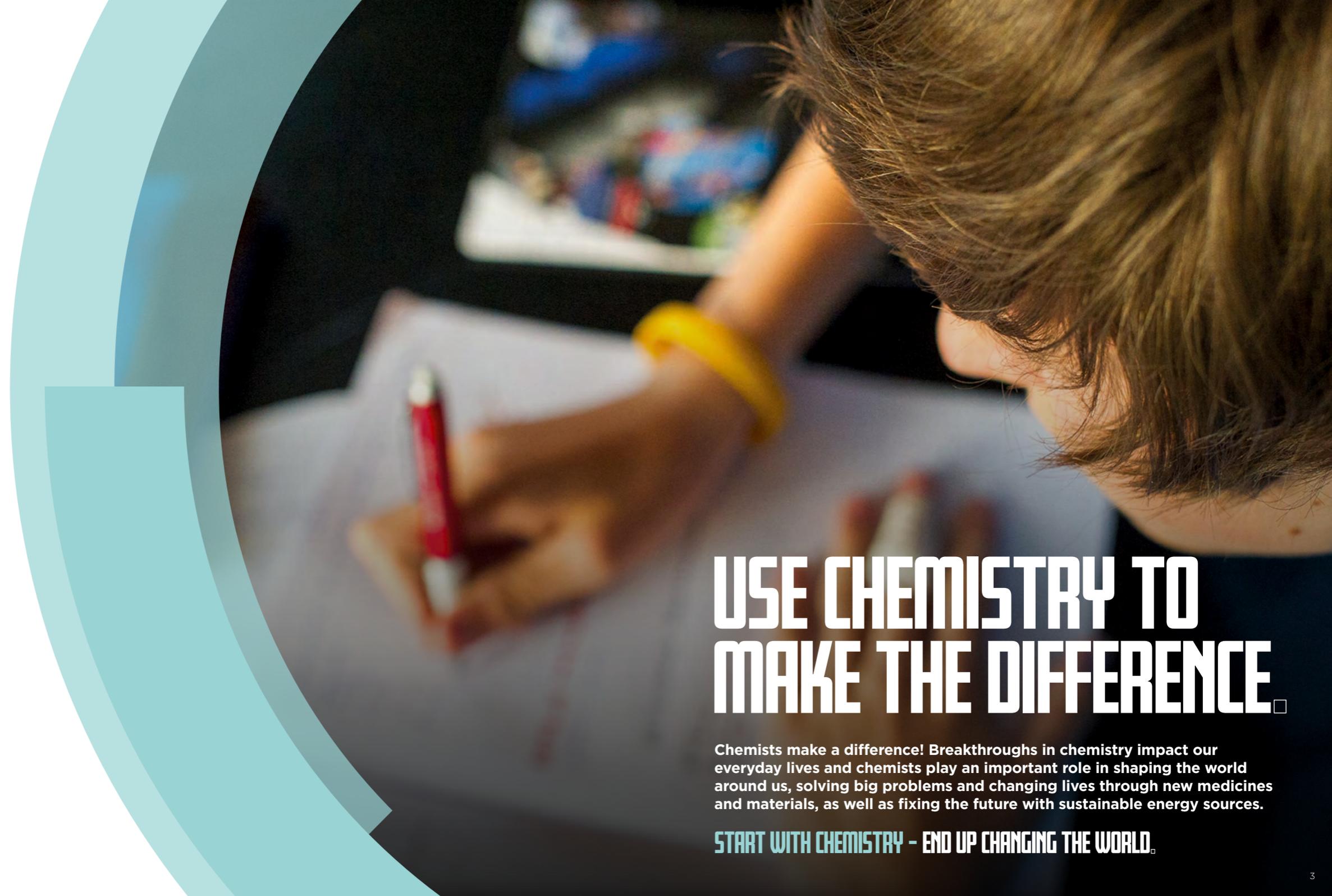
CHEMISTRY.
MAKING THE
DIFFERENCE.

WHAT IS CHEMISTRY?

From the moment you're born you're 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're 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
- biological sciences – such as biochemistry, molecular biology and pharmacology



USE CHEMISTRY TO MAKE THE 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 changing lives through new medicines and materials, as well as fixing the future with sustainable energy sources.

START WITH CHEMISTRY – END UP CHANGING THE WORLD.

WHY STUDY CHEMISTRY?

Chemistry-based jobs are interesting and rewarding with many opportunities available in research, education, field work and other industries you might not have thought of.

Lots of trained chemists work outside traditional chemistry careers because chemistry is all around us, and the skills you develop from a chemistry qualification can be applied to many 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 or physical chemistry
- it can lead to a wide variety of careers
- you just love chemistry!

CHEMISTRY. DEVELOPING YOUR SKILLS.

Whatever your plans for the future, having a chemistry qualification could really help. It will increase your scientific knowledge. It will help you understand why and how things happen. It will give you practical hands-on experience. You'll also gain important skills that are sought after by all kinds of 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 and solving the chemical, biological and engineering challenges in these sectors. There will be a demand for people who can design and develop products for a better future. 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, logical thinking, data handling and analysis, team working, report writing and laboratory techniques. These skills can open the door to a huge range of job opportunities.

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

If you'd prefer to learn outside of the classroom, develop your skills and gain on-the-job experience, a work-based qualification is a great way to get started in chemistry.

Find out about work-based chemistry qualifications and apprenticeships. rsc.li/future-in-chemistry

MARGOT WENZEL

RESEARCH INNOVATIONS MANAGER,
POLYMATERIA

“What I love about my job is that I get to apply chemistry to real-life problems, in this case fighting in the war on plastics.”

Some days I'm going to spend my day in front of a computer working on reports and meetings or reading the latest scientific articles. Other days I'm going to go to the lab, analyse the properties of plastic we've added new molecules to, or even picking up and developing new molecules that we could add to the plastic for future prototypes.”



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 2018/19 *What Do Graduates Do?* report showed that the highest starting salaries for chemistry graduates six months after graduation was £27,500. This compares to the UK average starting salary of £22,399.

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

The Royal Society of Chemistry's 2019 *Pay & Reward Survey* showed a median salary of £45,500 for member-respondents*. Members with PhDs showed higher earning potential during their career over other qualifications.

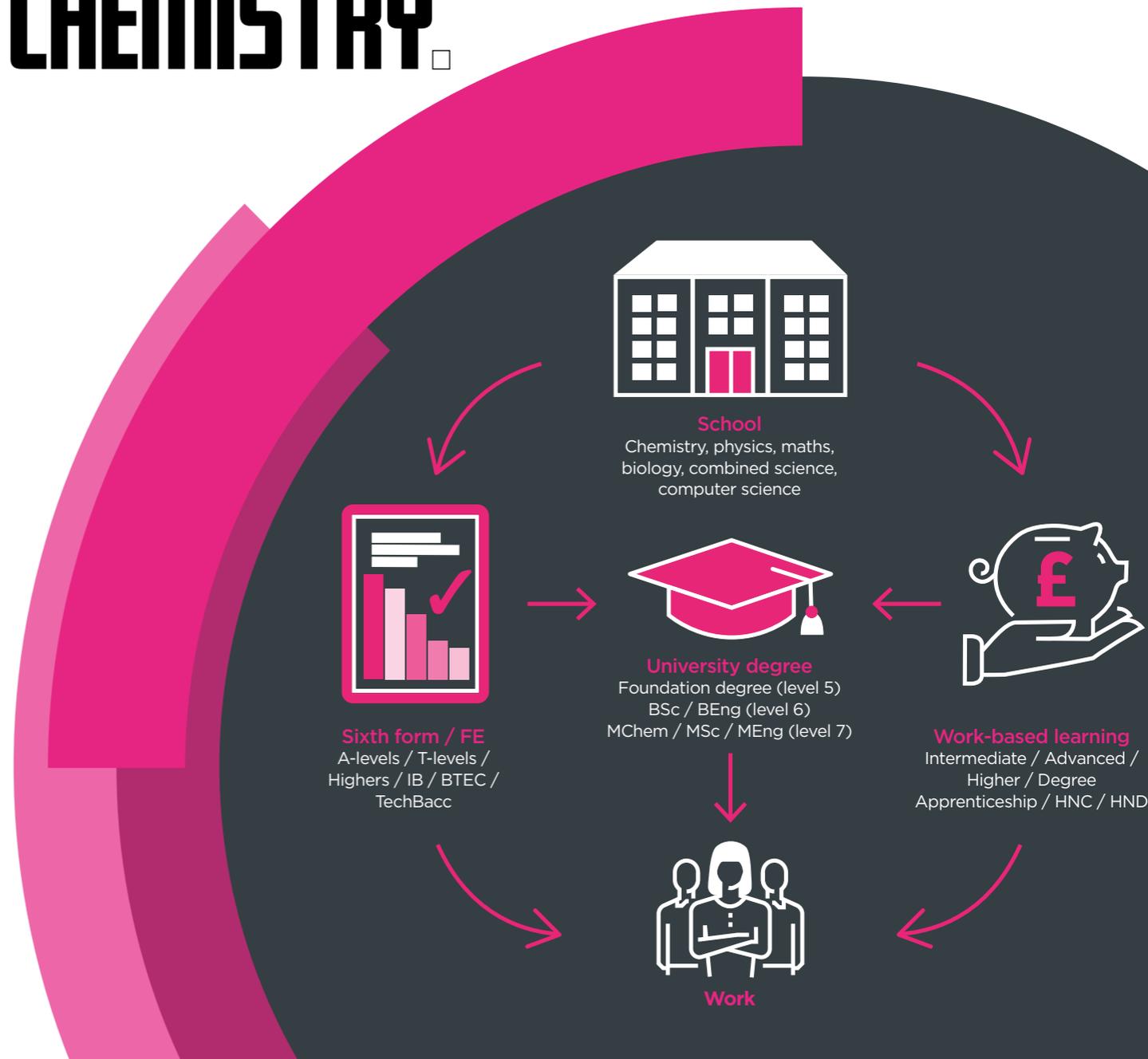
USEFUL WEBSITES.

Chemistry World Jobs
jobs.chemistryworld.com

What do graduates do?
[luminare.prospects.ac.uk/
what-do-graduates-do](http://luminare.prospects.ac.uk/what-do-graduates-do)

* Results based on 6,194 members of the Royal Society of Chemistry who responded to the 2019 survey with profiles representative of current membership.

GETTING INTO CHEMISTRY.



CHEMISTRY. SHAPING YOUR FUTURE.

OPTIONS AT SCHOOL - WHAT DO I NEED TO DO NEXT?

To give you the best options for a future in chemistry, study as much science and maths as you can while at school. Discuss your options with your teachers and see what's right for you:

- ask what science courses are available at your school
- ask what the different courses involve.

You can also start thinking about your future in chemistry by asking the careers adviser at your school for advice and answers to any of your careers questions, or by visiting rsc.li/future

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 top tips for finding work experience on *A Future in Chemistry*. rsc.li/work-experience

WHAT SCIENCE COURSES ARE THERE?

This depends on where you are: GCSEs are offered in England, Wales and Northern Ireland but in Scotland you will take National Qualifications.

All the qualifications can be studied with different levels of content. The more science you study the more options you'll have in the future.

You might want to choose a second or third science alongside chemistry. 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 can help you keep your options open.

OPTIONS AFTER YEAR 11.

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

After getting a good foundation in the sciences and maths during your GCSEs or National Qualifications, the first step towards your next stage 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 always help. A maths qualification is a requirement for some chemistry degrees. The different options can be confusing but each offers a different way to learn. Use the list below and overleaf to see which one is right for you.

- Work-based learning
- A-levels / T-levels
- Highers / International Baccalaureate

THE BENEFITS OF WORK-BASED QUALIFICATIONS.

Work-based qualifications are designed with the help of employers, meaning you'll develop the skills and knowledge that employers look for.

Your qualification and work experience will also help you stand out in the eyes of future employers. Work-based qualifications have no age restrictions. Entry requirements vary so having the right subjects or grades isn't always an issue. If you have a learning disability the entry requirements can usually be adapted – speak 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 an 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 don't pay fees towards their qualification as you would with a university degree. They're also paid at least the minimum wage for apprentices (£4.15 p/h from April 2020), although science-related roles are usually paid more.

HIGHER NATIONAL CERTIFICATES (HNCS) AND HIGHER NATIONAL DIPLOMAS (HNDs).

Work-related qualifications designed alongside industry partners 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 offered by universities and other higher education establishments available in areas such as applied chemistry, analytical chemistry, forensic science and pharmaceutical science. They take two years to complete, 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](https://www.rsc.li/earn-while-you-learn)

HIGHER EDUCATION OPTIONS.

A-LEVELS / HIGHERS / INTERNATIONAL BACCALAUREATE.

If you like studying and are happy to continue learning in the classroom, then these are some of the qualifications to consider. Which one you take may depend on where you live and what is available to you locally:

- A-levels – offered in England, Northern Ireland and Wales
- Scottish Highers followed by Advanced Highers
- International Baccalaureate Diploma
- Science T-levels are currently in development and are expected to be available by 2021

PICKING OPTIONS FOR UNIVERSITY ENTRANCE REQUIREMENTS.

Chemistry is often referred to as the central science, linking with all the other sciences and underpinning branches of technology. If you're thinking about university, what subjects you choose to study before applying will impact what courses you're eligible for. See overleaf for the preferred A-levels, or equivalent qualifications, in order of importance, for a range of subjects.



PREFERRED A-LEVEL SUBJECTS FOR UNIVERSITY COURSES.

You can see why chemistry is a good choice even if you're unsure of the specific course you want to study at university.

	Course	Preferred A-levels		
Chemical sciences	Analytical chemistry Applied chemistry Biochemistry Chemistry Forensic and environmental chemistry Green chemistry Materials chemistry Medicinal chemistry Nanotechnology / science Natural sciences Pharmaceutical chemistry Computational chemistry and modelling (MSc level)	Chemistry	Maths	Physics
Medicine	Dentistry Medicine Optometry Veterinary science	Chemistry	Biology	Maths
Earth science	Environmental / earth science Geology Meteorology and climate science	Physics	Chemistry	Maths
Food science	Agricultural science Food and nutrition	Biology	Chemistry / physics	Maths
Biological sciences	Biology Ecology Environmental science Evolution Forensic biology Genetics Molecular and cellular biology Plant science	Biology	Chemistry	Maths / physics
Medical sciences	Biomedical / healthcare science Pharmacy Pharmacology	Chemistry	Biology	Physics / maths
Health	Anatomical sciences Immunology and microbiology	Chemistry	Biology	Physics / maths
Physics	Chemical physics	Physics	Chemistry	Maths
Chemical engineering	Chemical engineering	Maths	Physics	Chemistry

STUDYING AT UNIVERSITY

There are a huge number of chemistry and related science courses available, but before you decide to study any subject, you should find out what the course will involve. Course content and length will vary at each university and you need to make sure you pick the right fit for you. You can do this by reading different university websites for course information, visiting universities on open days, contacting admissions tutors or speaking to someone already doing a similar course. You can also ask a teacher or careers adviser. This will help you make a more 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
- often allow students to specialise in a particular field of chemistry in the final years of the programme.

There is no single 'best' course and it's important that you choose the right university and course for you.

If you're planning to specialise early, do as much research as possible and make sure you're really interested in the area and the career paths that the subject leads to.

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) has a comprehensive database of courses available and their entry requirements.

A different points system is used in the Republic of Ireland. Details are provided on the Central Applications Office website (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 isn't always an entry requirement. You may need to take a course in maths once you reach university, and most universities will provide additional maths support during your degree.

ACCREDITED COURSES

If you're 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's accredited, you can be confident that you're getting a high quality education that will provide you with the right skills for future employment. You can view a list of our accredited courses online.

rsc.li/accredited-courses

CHOOSING A UNIVERSITY.

Once you've drawn up a shortlist of courses, make sure you try to visit the universities to get a feel for what living and studying there will be like. While there are plenty of online resources, attending open days is the only way to experience the campus atmosphere, see the facilities and discuss the courses in detail with staff and current students. Remember: you'll be there for three or four years so it's important to make the choice that's best for you.

It's also possible for you to study in other countries. This can be a rewarding experience, but do your research first. There's a lot of useful material online that can help you make the right choice. International students can also study in the UK and there's information on our website for students wanting to study chemistry.

Of course, no one university 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.

[rsc.li/going-university](https://www.rsc.li/going-university)

STUDENT FINANCE.

The costs will vary and depend on where you live and study. For more information on tuition fees, accommodation costs and student finance, visit our website [rsc.li/student-finance](https://www.rsc.li/student-finance)

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



CHEMIST PROFILES

CELINE MOREIRA ANALYTICAL TECHNICIAN, POLYMATERIA

"I did a degree in university in biological resources which focuses on the chemistry of raw materials. I chose to study chemistry because it's a very complex subject and it's a subject that always makes you think, and it challenges you and I love a challenge.

My skills are mainly when it comes to material sciences, understanding the way a molecule functions and how the plastic is formed. We're always looking for ways to upgrade and to improve our technology, through innovation, through brainstorming and what I love about it is every day there's something new to learn."



MARIAM KHALFEY DEVELOPMENT CHEMIST, DOMINO PRINTING SCIENCES

"I found the only thing that kept me excited and really motivated to go into work was working with chemistry and in a lab.

As a chemist I work on the ink side of things, so this means that I go to the lab and I make ink formulations. Getting the right formulation is essential. We need to make sure that our inks have the best colour that it can get, that it flows as we expect and of course we need it to dry properly. I like my job because I get to do different things. I could be in the lab one day; I could be writing technical reports the next day; or I could be using my other time to develop my programming skills."



CHARLES RENNEY PATENT ATTORNEY, ABEL & IMRAY

"I studied chemistry at university, and this is what ultimately led me on to a career as a patent attorney as it was able to provide me with some exposure to research but outside the lab.

Abel & Imray helps get legal protection for new inventions for companies and inventors. A patent will allow them to get protection for their product and prevent others from making and selling that product for a short period of time. One day I may be out meeting an inventor to discuss their new inventions. Another day I may be at the European patent office defending a client's patent.

The thing that motivates me in my job, is that as a patent attorney you have a real impact on bringing new inventions to market which can change people's lives and wellbeing."



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