

SCIENCE

SPOTLIGHT

Issue Six
Winter 2016

- Generating more interest in STEM
- Being a Subject Specialist
- Putting the 21st Century Science into GCSEs
- Q & A: meet the Chairs
- Research notes
- Celebrating 10 years of Cluster Groups

OCR A Level Sciences

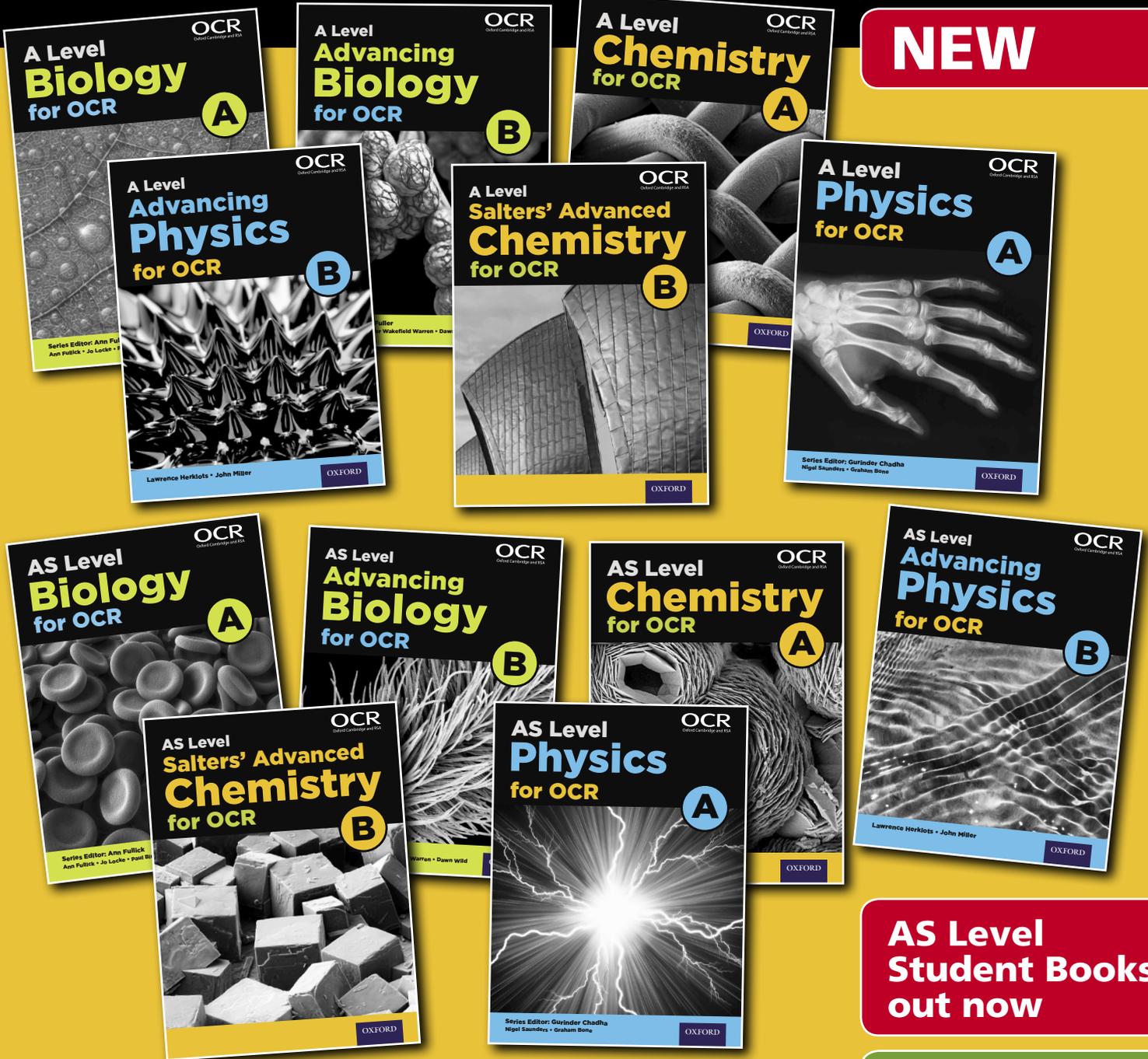
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INTRODUCTION

Welcome to the Winter 2016 issue of Science Spotlight.

In this issue, we have items from Michelle Spiller (our Physics Subject Specialist) and our two Science Chairs (Naomi Rowe and Karen Mottram; both ex-science teachers) telling you more about what they do at OCR. Rashpal Chana introduces our STEM project and Alistair Moore (University of York Science Education Group) gives a personal perspective on the work done to create OCR's updated GCSE (9-1) Twenty First Century Science suite for first teaching from September 2016. Alistair's account shows the level of detail taken to try and ensure that the science in our new qualifications is

as scientifically accurate and as engaging as possible. Our regular research update slot summarises progress in our ongoing study of how changes to GCSE and AS/A Level practical assessment are impacting on the learning experience in schools and colleges.

As always, if you have an idea for a future article please email us at sciencespotlight@ocr.org.uk

Good luck for the New Year and we look forward to helping to support you deliver our qualifications throughout 2016.



*Steve Evans
Head of GQ Reform*

UPDATE

STEVE EVANS, HEAD OF GQ REFORM

AS/A LEVEL SCIENCES

These are now being taught in schools and colleges and Monitoring Visits for the Practical Endorsement (ocr.org.uk/supportingteacherswithpracticalendorsement) start from January 2016. We have received lots of amazing feedback from teachers and students on how the new approach to practical assessment is being seen as much more positive than the previous controlled assessment.

Go to ocr.org.uk/practicalscienceassessment for a report on Neil Wade's recent trip to the International Association for Educational Assessment 41st annual conference in Kansas to present on OCR's approach to the Practical Endorsement.

Frances Wilson's research update in this issue also summarises our ongoing work looking at how the new assessments are impacting on practical work in schools and colleges.

We continue to work with DfE and Ofqual around requirements for the new AS/A Level Geology qualifications for first teaching from September 2017; draft content is available on the DfE website.

GCSE SCIENCES

The process of accreditation of new qualifications is very complex and slow. We, and all the awarding organisations, have been working closely with Ofqual to ensure that the new GCSEs can be available in final form for centres.

Our current expectations are that qualifications should be accredited in the new year (most probably around February 2016 at the earliest). We appreciate it is very frustrating to have any uncertainty around these assessments and that you need as much time to prepare for September 2016 as possible.

We understand that teachers are very keen to know what will happen around the Entry Level Science consultation considering all the changes at GCSE, Ofqual is due to run a qualification early in 2016 which will lay out their proposals, please do respond if you have the time.

Visit gov.uk/ofqual for more information.

SUPPORTING YOU WITH HIGH-QUALITY RESOURCES

Our aim is to help you at every stage of the introduction of a new specification and we're working hard to provide a practical package of support in close consultation with teachers and other experts.

For a start, we'll provide a range of high-quality creative resources. Tailored to the needs of each subject, their focus is on supporting creative teaching approaches and progression for all students. These include delivery guides, topic exploration packs, lesson elements and transition guides.

We see our resources as a body of knowledge that will grow throughout the lifetime of the specifications. They are built on the best practice we've identified from our ongoing discussions with the teaching community.

We are also developing exciting new digital tools to help you explore and interact with our resources. The Scheme of Work Builder will allow you to construct personalised schemes of work and you'll be able to add in the specification content, our wide range of resources and teaching suggestions, as well as your own content and materials.

Here's how we can support you as you teach OCR qualifications:

ExamCreator – Enabling you to build, mark and assess tests from OCR exam questions and produce a complete mock GCSE or A Level exam. Find out more at ocr.org.uk/examcreator

Active Results – Our free online results analysis service helps you review the performance of individual students or your whole cohort. For more details, please refer to ocr.org.uk/activeresults

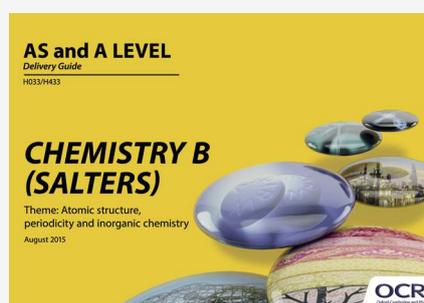
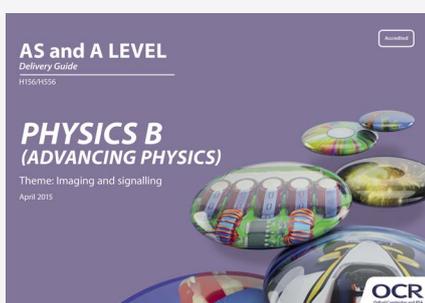
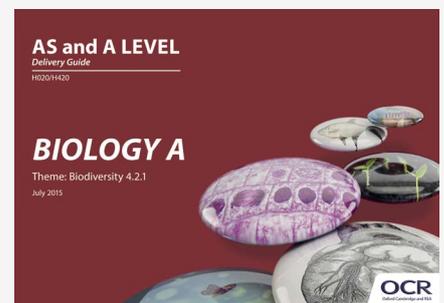
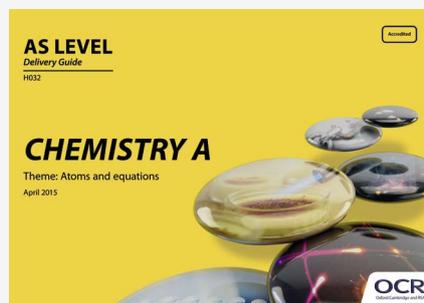
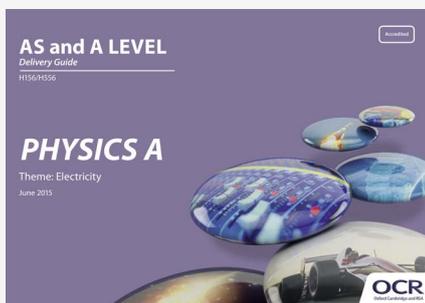
Skills Guides – These guides cover topics that could be relevant to a range of qualifications, for example communication, legislation and research. Download the guides at ocr.org.uk/skillsguides

Subject Specialist Support – Our Subject Specialists provide you with access to specifications, high-quality teaching resources and assessment materials available at ocr.org.uk/gcsescience

Extended Project Qualification – An EPQ can provide your students with the skills that universities look for, to help them stand out from the crowd. Take a look at our EPQ at ocr.org.uk/extendedproject

CPD Training – To learn more about delivering our qualifications, come to one of our training events, all bookable through cpdhub.ocr.org.uk

If you feel that you would like to help develop these, please contact OCR Subject Specialists at science@ocr.org.uk



WANT TO GENERATE MORE INTEREST IN STEM?

RASHPAL CHANA, SUBJECT SPECIALIST – STEM

OUR STEM PROJECT COULD BE YOUR SOLUTION

There's no doubt that the UK needs STEM skills (see article by Professor Sir John Holman in issue 5). At OCR, we believe there are even more opportunities to create closer links between education and careers, and to engage students in exciting projects that help them recognise the prospects that STEM can offer, whatever route they follow.

The OCR STEM project is not a qualification, but a programme of study designed to:

- promote greater awareness of STEM careers and progression pathways in students
- provide a structured transition from Key Stage 3 to Key Stage 4
- deploy a project-based learning approach to both engage students and encourage independent learning
- support the full ability range with a mixture of structured and open-ended activities
- develop 'soft' skills that are valued by employers and FE/HE alike
- map all content to our STEM qualifications enabling easy integration into GCSE and vocational schemes of work
- support the introduction of the new GCSE Science qualifications from September 2016, (and in particular support those who are starting delivery in year 9 from September 2015)
- signpost relevant high-quality third-party resources from a range of sources including businesses, universities and the National STEM Centre.

SEVEN REASONS TO CHOOSE OUR STEM PROJECT

Set around real-world challenges, this project-based learning approach will engage, excite and encourage students in STEM subjects. As the students progress through the projects, they'll be empowered to:

- develop as inquisitive and independent students
- understand and use research skills

- be inspired by new areas and/or methods of study
- identify how different subjects and topics can be used to investigate a problem
- identify how different subjects and topics can be used to generate and evaluate potential solutions
- use their learning experiences to support their personal aspirations for further study and career development
- develop e-confident students and apply appropriate technologies in their studies.

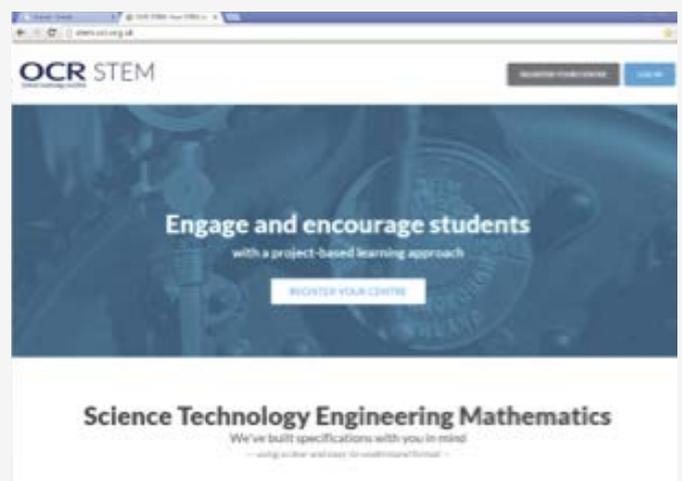
The OCR STEM project supports the experiential learning process and provides the opportunity for students to plan and review their learning.

TRY OUR STEM PROJECT WITH YOUR STUDENTS

For access to the exciting challenges it provides for students from year 9 and above, you will need to register your centre. Once registered, you will receive a username and password via email.

There's a step-by-step guide on how to use the resource, how to register your students, how students upload their work, and a summary of all the projects. You can view any work uploaded by students providing they have access to the internet.

Visit our dedicated STEM portal at stem.ocr.org.uk



THERE ARE 12 CAREFULLY DESIGNED PROJECTS

There will be 12 projects (modules), designed specifically for use with year 9 students. Five of these are freely available now. Each project will take between 10-12 hours of delivery time. You can start with whichever module you like, and choose whichever activities you want within each module. There's further guidance on this in the 'Delivery Methods' section.

As students complete each activity, they'll cover some of the topics in the new GCSE Science specifications (also GCSE Maths and D & T - Food Technology). This resource will therefore allow you to deliver the whole of year 9, at the same time covering much of the content in the specifications within the STEM subjects at GCSE level. Students will also develop the "soft skills" that employers are looking for and it will generate an interest in STEM careers.

All the teaching resources are provided by us or signposted from other tried and tested sources.

Initially, you may want to deliver the activities yourself with weaker students, while letting others work on their own.

As students develop independent learning and problem solving skills, they can be given small activities to work on individually or in small groups. Eventually, once a pupil has completed two or three modules, they should be able to tackle future projects on their own.

The modules start off with a scenario, and students carry out activities linked to the scenario.

SWEET STUFF

In the Sugar Beet Project, you can either do this straight from the website or use the PowerPoint presentation. Students follow how engineers and scientists extract the sugar from the sugar beet and produce table sugar. Then they do the experiment themselves in class. Students carry out a 'blind taste test' on different brands of cola and compare their results with the market share; this is real science at work in the business market.



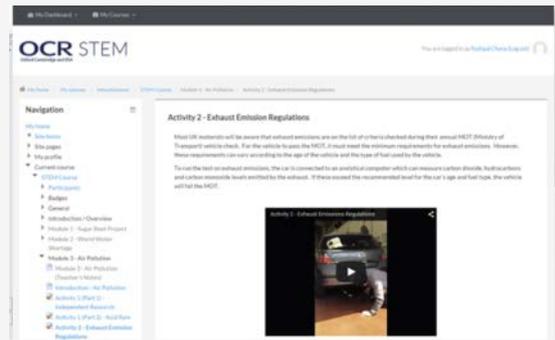
GO WITH THE FLOW

In the World Water Shortage module, students investigate 'Why you float in the Dead Sea' and this is linked to mixing sea water with fresh water. This is investigated further in 'Why do we grit roads'. All through the projects, activities are related to real-life situations which involve STEM.



FUMING

In the Air Pollution module, students can watch car exhaust fumes being analysed during an MOT test. The print outs are then used to plot graphs.



TASTY TOPICS

Students have to carry out investigations that will allow them to make a meal that's nutritious, tasty, cheap and quick to prepare in the School Meals module. They carry out food tests, record gas/electric meter readings and calculate energy

costs, investigate materials for cooking pots, do a Dragons' Den involving food tasting, finishing with developing a weekly menu that allows them to win the catering contract.

EXPERIMENTS ON A PLATE

2. Take 4 sterile test tubes. Label the first tube 1(20%), 2nd tube 2(10%), 3rd tube 2(5%), 4th tube 1(2.5%) and 5th tube 0.25% and 6th tube 0%.

3. Place 2cm³ of the gastric extract in test number 1. Put this aside.

4. Place 2cm³ of saline solution into tubes 2-4. Put number 4 tube aside.

5. Into the 2nd test tube add 2cm³ of the gastric extract and mix. Remove 2cm³ from this tube and place into the 3rd tube into and remove 2cm³ and pour into the 4th tube again mix and remove 2cm³ and place into the 5th tube. Finally remove 2cm³ from the 5th tube and discard. You have prepared a dilution series.

6. Prepare a 0.1% solution of 2cm³ of Carbochrome using saline solution. Inoculate 4 petri dishes using a sterile 'L' shaped glass rod. (To use the rod, dip it into the culture and then hold over a flame, shake the culture to collect the bacteria from the flame and let the ethanol burn off, allow to cool before using.) Label the petri dishes respectively with the concentration of gastric extract in the test tubes above.

7. Sterilise a cork borer (bored from Gower) by dipping in ethanol and then flaming the ethanol in a flame (similar to doing) 2. Cut a small hole in the middle of the agar using the sterile cork borer. Discard the agar and using a sterile pipette fill the hole with a few drops of the gastric dilution series, starting with the 1% and moving up to 0.25%.

8. After incubation, you could use the discs of filter paper soaked in the gastric extract and place each disc in the middle of the petri dish.

9. Replate petri dish 100 and leave for a minimum of 24 hours.

The Drug Development module involves carrying out experiments similar to those carried out in hospital laboratories. Students make serial dilutions, inoculate agar plates and work out what a saline solution is made up of. As each activity is carried out, students record on an 'Achievement Grid' which part of the specifications they've covered. You can also record grades/marks if you wish.

By the end of year 9, most of the GCSE specifications will have been covered, including the practical skills required.

At OCR, we provide a wide range of STEM qualifications that can be delivered through a project approach that suits the needs of all students and enables young people to develop the necessary skills and knowledge in school to succeed at university or in employment.

BEING A SUBJECT SPECIALIST

MICHELLE SPILLER, SUBJECT SPECIALIST (PHYSICS)

When I was first asked to put my job as a Subject Specialist into words, I knew right away it wasn't going to be an easy task because:

A - I'm a scientist, physicist even, and numbers make me much more comfortable than words. Writing lengthy prose is not my strong point.

B - My job changes each day; it's varied, interesting and pretty awesome.

So I'll start by giving you my background. On September 1 2014, I started my job as Physics Subject Specialist at OCR. Before this I was a teacher – for six years I taught in your average 11-18 comprehensive schools and I loved being in the classroom.



Your subject is our passion!

WHAT DOES MY JOB ENTAIL NOW?

The biggest parts over the past year have been:

- Customer queries: Whether they come in by email or a phone call, a key aspect of my day-to-day job is responding to teachers and giving them the answers to queries on every aspect of the qualifications both current and new.
- GCSE reform:
 - Working on the 21st Century Physics and Combined Physics specifications with the York group
 - SAMs – working with developers to create assessment material that's accessible for all and will give students a fair and valuable examination experience
 - Resources for the new GCSE in 21st Century Physics and Combined Science – working with developers to create lesson elements, transition guides, topic exploration packs, delivery guides, end of topic tests etc to support teachers in the teaching of the new specifications.
- STEM: To support schools in engaging their students in STEM careers and also to help bridge the transition between Key Stage 3 and 4, we've created our OCR STEM projects. These are mapped to the new GCSEs but taught through different careers in STEM. I collaborated with an engineering company to create a project based on building a hydropower dam. It was a big job but I'm proud of the resources that have come from it.
- Research: Making sure that everything we produce, in particular our assessment materials, is accessible to all taking it and giving students the best opportunity to achieve is of upmost importance. In collaboration with our research team we work hard, doing comparative studies across all exam boards to make sure that our assessment materials are fit for purpose.
- Support: Whether at centre visits, cluster group meetings, CPD training, expo events and many more, my favourite part of this job is the travelling around and talking to you. Getting back into schools and being able to support teachers in the delivery of current and new qualifications is amazing. Our qualifications have been created with teachers for teachers so your feedback is always vital to us, and the more we can do to help you in making sure your students get the best in their science education the better. So thank you to all the schools who've invited me in so far and hello to all the teachers I've yet to meet.
- Coursework consultancy: This service lets schools have their coursework marking checked before moderation, which allows you to align your marking better with the principal moderator's guidance. Three pieces of marked, photocopied coursework for each unit can be sent to me and I'll send them off to the principal moderator who will write a report about your marking.
- Working with publishing partners: Reviewing textbooks created for our specifications and making sure they align with the specification and the 21st century ethos.
- Engaging with physics organisations: The Institute of Physics, Institute of Engineering and Technology, and the Association for Science Education, to name a few, all have masses of knowledge and expertise in the education world. Working alongside them means we can keep up to date on the latest ideas and best practice and use this in our GCSE development.

So that's my job, well some of it anyway. Each Subject Specialist's job is slightly different; each of us has moulded our role slightly. Having said that, our core focus is the same. We're here to support and create – support teachers and students in the education of science by creating materials that we, as former teachers, can be proud of. We're here to help.

PUTTING THE 21ST CENTURY SCIENCE INTO GCSEs

ALISTAIR MOORE, PROJECT MANAGER FOR TWENTY FIRST CENTURY SCIENCE AT THE UNIVERSITY OF YORK SCIENCE EDUCATION GROUP

What should we be teaching about genes at school, 10 years after the completion of the human genome project?

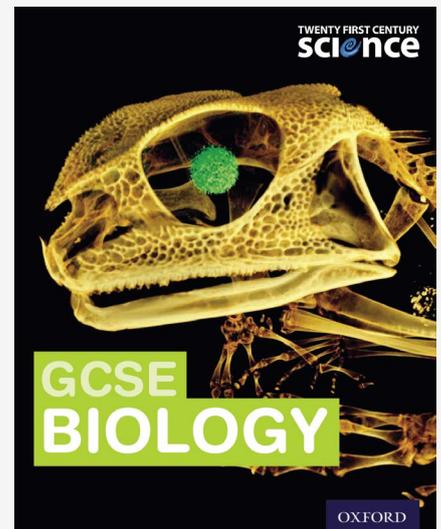
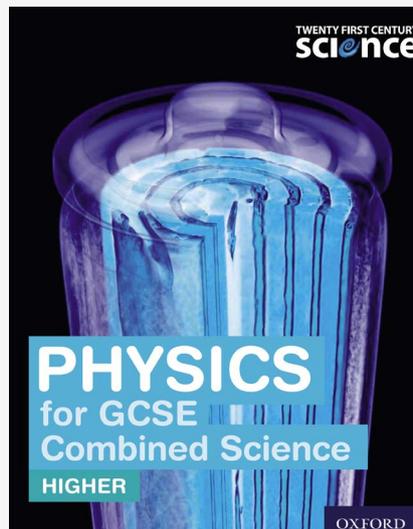
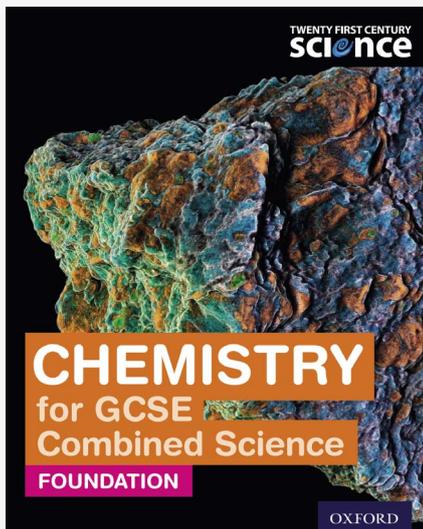
What can a modern scientist learn from fossilised bones? And are plant diseases a ticking time-bomb for human food security? These were just some of the questions considered when re-writing OCR's GCSE (9-1) Twenty First Century Science Biology qualification for 2016.

Every school science course has to be updated from time to time. They must keep up with policy shifts and revisions to the National Curriculum, as well as implement new ideas about the best approaches to teaching and assessment. But there's also the need to keep pace with science itself. In keeping with its name, Twenty First Century Science has always embraced the latest ideas and issues

in science, attempting to translate them into an engaging course for GCSE students.

The course is developed as a partnership between OCR and curriculum developers at the University of York Science Education Group (UYSEG).

We use evidence from science education research to inform what we do, but when it came to writing about new ideas in genomics, computer modelling and plant diseases, it was time to call in some science specialists.



The third edition of Twenty First Century Science will be launched in 2016. Working with specialists behind the scenes at the Natural History Museum led to some beautiful and intriguing Micro-CT imagery for the covers of the new textbooks.

SECRETS OF THE GENOME

When I was at school we learned about Mendel and his peas; the monk who worked out how features controlled by single genes were inherited. We spent a lot of time practising Punnett squares. I left school knowing that genes were incredibly important, controlling the characteristics of organisms by coding for the synthesis of proteins.

Surprisingly, scientists now think genes are only about 1.5% of our DNA. So what does the rest of the genome (which I was taught to think of as “junk DNA”) actually do?

The science of genetics has become the science of genomics, and scientists are beginning to understand the functions and

importance of the remaining 98.5% of our DNA. Scientists now think most characteristics depend on the information stored in multiple genes and non-protein-coding regions of the genome.

Working with scientists from the *Wellcome Genome Campus* in Cambridge, we've updated *Twenty First Century Science* to reflect the latest ideas about genes and the genome, to adopt and explain the modern terminology used by scientists in the field, and to illustrate the benefits of genomics research.

For a wealth of resources for teaching ideas about genomes, visit www.yourgenome.org developed by specialists from the Wellcome Genome Campus.



The Human Genome Project took ten years and a massive international collaboration to produce the first sequence of the human genome. A decade later, a single lab like this one at the Wellcome Genome Campus can sequence a human genome in a matter of days.

PHOTOGRAPH TAKEN BY
ALISTAIR MOORE, OCTOBER 2014

THE DIGITAL DINOSAUR

For many years, school science students have learned that “fossils provide evidence for evolution.” But what does this really mean for a 21st century scientist? How do we know what we know about creatures that died millions of years ago, and how is modern technology helping us to explain how they lived?

Specialists at the *Natural History Museum* have given us an insight into how modern scientists investigate fossils, for a case study in the new Twenty First Century Science biology textbook.

Following their recent acquisition of the most complete Stegosaurus fossil ever found, every bone was scanned using micro-CT technology. The scans were used to create a 3D computer model of the Stegosaurus, and computers used to add musculature and run thousands of iterative models of how the creature may have walked.

The scans can be shared with scientists around the world and the bones studied without damaging the originals.

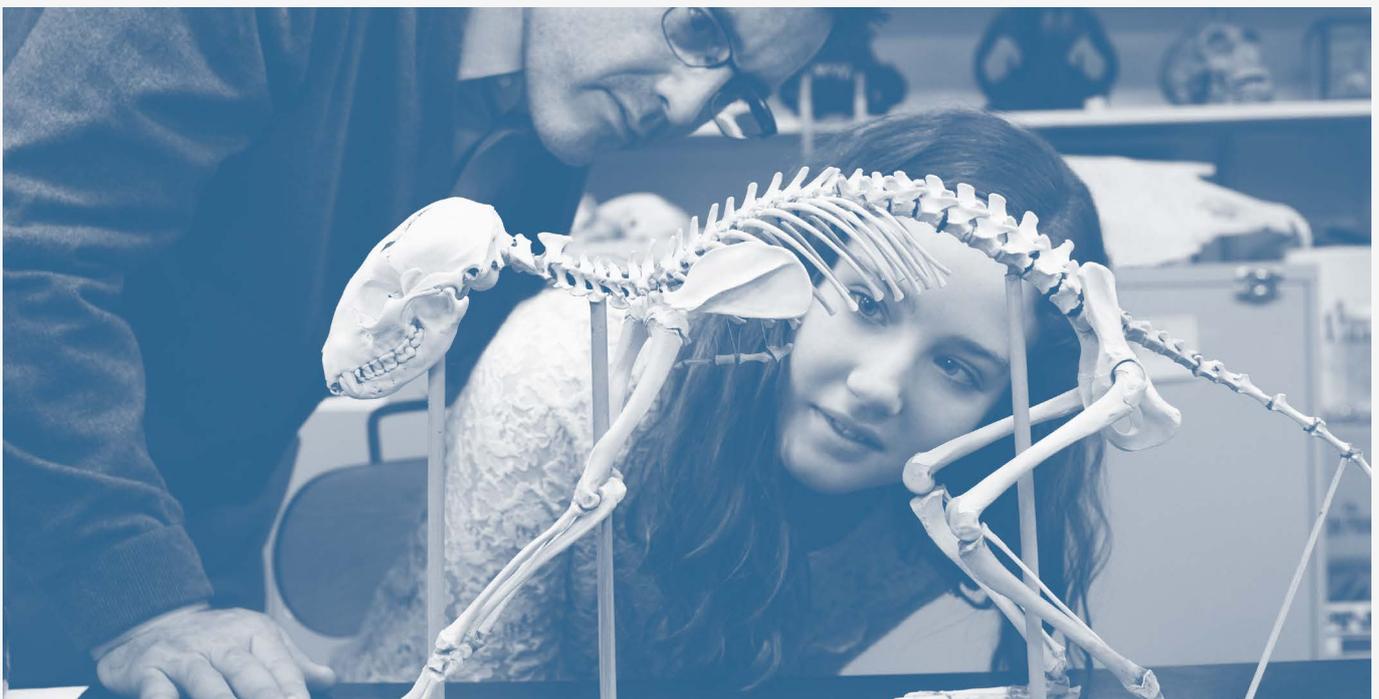
The museum’s Dr Charlotte Brassey pointed out that fewer than ten Stegosaurus fossils have ever been found, so everything we know about the genus is based on these few individuals. With modelling and sampling part of the new *Working Scientifically* requirements for 2016, the Stegosaurus provides an interesting context in which to discuss ideas about how scientists develop explanations and how much confidence we can have in them.

For more information on studying the Stegosaurus, check out the Natural History Museum’s web pages at www.nhm.ac.uk/visit/galleries-and-museum-map/earth-hall-and-stegosaurus



The skull of the Natural History Museum’s new Stegosaurus was unearthed in pieces. The pieces were scanned and a 3D computer model built for study.

PHOTOGRAPH TAKEN BY
ALISTAIR MOORE, FEBRUARY 2015



PLANTS VS. PATHOGENS

Plant disease is a new addition to the KS4 National Curriculum for 2016. We've been working with specialists at **Fera Science** (formerly the **Food and Environment Research Agency**) and the **British Society for Plant Pathology (BSPP)** to incorporate modern perspectives on plant disease into the new biology specification, textbook and teaching resources.

Touring the labs at **Fera**, classical disease identification techniques such as microscopy, staining, isolation and reinfection were still very much in use; but more modern techniques such as gene technology and monoclonal antibodies (both featured in the new GCSE Biology curriculum from 2016) are now playing a big part. Importantly, these new techniques are portable, enabling identification of plant pathogens in the field and – crucially – at UK border entry points for imported plant material.

Every staple food in the world comes from crops that are susceptible to disease, so understanding plant diseases and how to stop their spread is vital to ongoing human food security.

Updating GCSE Biology for 2016 has been a chance to update the science and link to new and engaging real-world contexts. Scientists who are specialists in their fields have played a big part in helping us to ensure the Twenty First Century Science course lives up to its name.

There's more information about plant diseases on the Fera website at www.fera.co.uk and on the BSPP website at www.bspp.org.uk/outreach/article.php?id=100



Specialists at Fera help to identify and reduce the spread of plant diseases in the UK and around the world. The new Twenty First Century Science resources include a case study of their work with maize lethal necrosis disease in Kenya.

PHOTOGRAPH FROM DR JULIAN SMITH
AT FERA, USED WITH PERMISSION

TRANSFORM LEARNING

POSITIVE ABOUT PRACTICAL

Science is about much more than just theory. It's about exciting techniques, method, investigation and experimentation. It's about taking your knowledge and testing it in the real world. It's about spotting flaws, problems and anomalies – and trying to understand where they came from. It's about being open-minded, self-critical and imaginative.

Practical assessment helps students be all these things. And, perhaps most excitingly, it helps turn book-based science learners into fully-fledged scientific thinkers.

ocr.org.uk/positiveaboutpractical



Q&A

MEET THE CHAIRS - INTRODUCING...

COULD YOU TELL US A LITTLE ABOUT YOURSELVES?

NAOMI

I have been with OCR since 2012 working as a Qualification Team Manager for the GCSE and GCE Science team prior to taking up my current role in 2014. I previously worked for the National Foundation for Educational Research (NFER) as a Research Manager working on Key Stage 3 Science National Curriculum tests, the international surveys of Trends in Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA), as well as leading on a variety of STEM-related projects. Prior to working at NFER I was a secondary science teacher for nearly five years.

I have a degree in Biochemistry with Management Studies, a PGCE in Secondary Science, and a Master's in Education.

My spare time is spent with my husband and five-year old daughter. My daughter started school in September and so we're just at the start of her education and I'm learning lots about the Early Years Foundation Stage (EYFS) and the progression to Key Stage 1. I also enjoy baking but I am definitely not in the league of Bake Off!

KAREN

I actually started working here when Cambridge Assessment was still UCLES. I moved here from Physics teaching nearly 20 years ago to become a Physics and Chemistry Subject Officer. I had a few years working for our international sister company in the Maths and Design and Technology sector then left to start a family. I kept my hand in though as a Science Deputy Chair and fitted these commitments around building and renovating property. I returned to OCR five years ago as Chair for Mathematics but had the opportunity to move back to Physics last year, which I jumped at.

I have a degree in Aeronautical Engineering and Design and also a PGCE in Secondary Maths and Physics.

When not at work I spend a lot of time running my two boys to various sports teams and therefore many a chilly weekend morning on the touchline.

My husband and I are quite practical so we also do a lot of renovating of property where I find the interior design qualification I achieved, when not working full time, very useful.

WHAT IS YOUR ROLE IN THE EXAMINATION PROCESS FOR CURRENT QUALIFICATIONS?

NAOMI

I have responsibility for monitoring and maintaining standards for a portfolio of Education and Learning subjects including AS and A Level Chemistry A, AS and A Level Chemistry B, GCSE Twenty First Century Sciences, Biology, Chemistry and Physics, GCSE Additional Applied Science, and GCSE Environmental and Land Based Science. I am also responsible for the vocational qualifications of Cambridge Nationals in Science and Cambridge Nationals in Science in the Workplace.

KAREN

I have responsibility for monitoring and maintaining standards for AS and A Level Physics (specifications A and B); AS and A Level Electronics and GCSE Gateway Science suite. I also look after L2 and L3 Retail Knowledge and Retail Skills qualifications (even though I do not like shopping!).

WHAT ARE THE BEST PARTS OF THE JOB?

Influencing how science is taught in the classroom. Being involved in the planning and development of new and existing qualifications – the products that actually end up on teachers' desks. And, with current assessments, getting the chance to work with a lot of clever and dedicated professionals.

WHAT IS YOUR ROLE IN QUALIFICATIONS THAT ARE CURRENTLY BEING REFORMED?

Whilst Subject Specialists develop the reform projects (e.g. specifications and specimen assessment materials) we act in an advisory position. We develop the assessment strategy, which is essentially a blueprint for the qualification. Once a new qualification has been accredited, we then need to review the assessment strategy once a year to ensure that it follows Ofqual's regulatory requirements.

WHAT IS YOUR DAY-TO-DAY JOB LIKE?

There is not a typical day-to-day job. Our job differs depending on the time of the year. In June we are typically involved in the marking process (although we do not mark papers ourselves). July is spent awarding (or setting the grade boundaries) for all our examinations. In the autumn we have numerous question paper meetings signing off our future science assessments. We act as a decision hub for the rest of the business and also are responsible for training our senior examiners.

WHAT DO YOU THINK TEACHERS SHOULD DO WHEN CHOOSING A NEW SPECIFICATION?

Remember that all boards are regulated in the same way – choose the specification with your heart. Pay careful consideration to the assessment models and pick the qualification that is best for your cohort – which model fits my students? Also remember that many of the exam boards offer alternative specifications with a different style. Do investigate these before making your choice.

WHAT ARE YOUR BIGGEST CHALLENGES YOU HAVE FACED RECENTLY?

With our current qualifications, quality assuring many pieces of assessment material is a yearly challenge and then making sure they also discriminate well which is necessary to give students appropriate grades. With reform qualifications, migrating the current system based on grades A-G to the new 9-1 system has been an interesting project.

WHAT WOULD YOU LIKE TO CHANGE IN EDUCATION?

I have a particular bugbear about appropriate homework; Sunday is particularly traumatic in our house! As an ex-teacher I know it is important to occasionally consolidate learning outside the classroom, but do we really need two lots every night and a sly project for the weekend?!

WHAT DO YOU THINK ARE THE BIGGEST MISCONCEPTIONS ABOUT YOUR JOB?

People think that we can communicate to centres. As we see live materials, we are not allowed to be centre-facing. All questions should be addressed to the Subject Specialists. We also don't mark!

IF YOU HAD A MAGIC WAND, WHAT WOULD YOU DO WITH IT?

We would like stability within qualifications. Enabling a specification to run for an effective period of time before it is completely reformed.

WHAT EXTRA ADVICE WOULD YOU GIVE TO TEACHERS?

Become more involved in the qualification process. There are two main ways to do this:

1. Become an examiner. This will ensure that teachers will become familiar with the examination process.
2. Become involved in question paper setting.

RESEARCH NOTES

DR FRANCES WILSON, PRINCIPAL RESEARCHER, OCR

WE ASKED WHAT YOU THOUGHT...

In the last issue of Science Spotlight, I invited you to participate in the first phase of a long-term study to investigate the impact of changes to the assessment of practical work at GCSE and A Level, by surveying teachers' views before and after the reforms are implemented.

The study focuses on four key areas:

- purpose of practical science
- types and quantity of practical science activities
- challenges associated with practical science
- impact of assessment on practical science activities.

HERE'S WHAT YOU TOLD US

In total, 522 teachers completed the survey, from a wide range of different types of schools and colleges. Some interesting differences between GCSE and A Level, and between science subjects also emerged, indicating that practical work may be used differently at different levels of study, and across biology, chemistry and physics.

We asked teachers to choose the four most important reasons for doing practical work at A Level, and split responses according to the subject that each respondent reported teaching at A Level.

Overall at A Level, the development of manipulative skills and techniques was the most frequently chosen reason, in contrast to GCSE, where manipulative skills and techniques were only the sixth most frequently chosen reason, indicating that learning more advanced techniques is an important part of an A Level course.

However, across both GCSE and A Level, chemistry teachers were more likely to choose manipulative skills and techniques than A Level biology or physics teachers, suggesting that this is particularly important for chemistry.

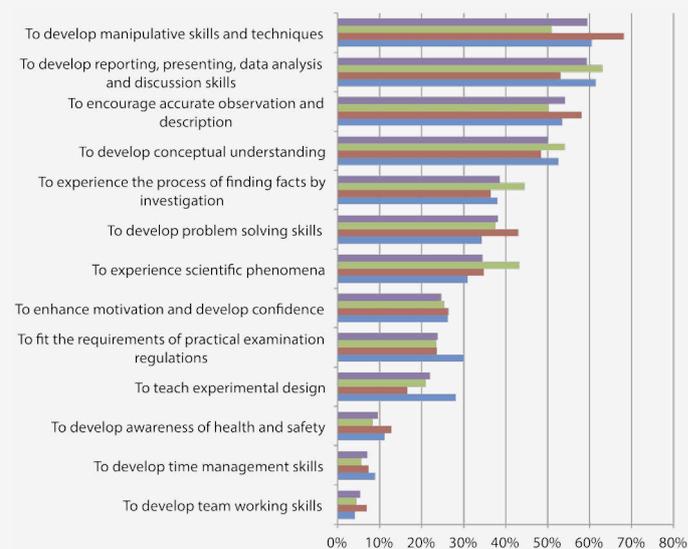
Experiencing scientific phenomena was more important in physics than for biology and chemistry, as was experiencing the process of finding facts by investigation. This might reflect the different types of practical activity undertaken across subjects.

THERE'S STILL TIME TO SHARE YOUR THOUGHTS

Although it is, of course, too early to say anything about the impact of the reforms, many teachers commented that they were optimistic about the changes to assessment, but had concerns about a reduction in funding for practical work as a result of budget cuts for schools. In future issues of Science Spotlight, we'll share further findings from this project, and would love to hear more about your thoughts on practical work across biology, chemistry and physics.

MOST IMPORTANT REASONS FOR DOING PRACTICAL WORK

- A Level Overall
- A Level Physics
- A Level Chemistry
- A Level Biology



CELEBRATING 10 YEARS OF CLUSTER GROUPS

Have you ever thought “I wish there was a better way to do this” or “I wonder if there’s a guide on how to deliver this experiment” – *This is exactly where cluster groups can help.*

THE BEST WAY TO BOND WITH OTHER TEACHERS

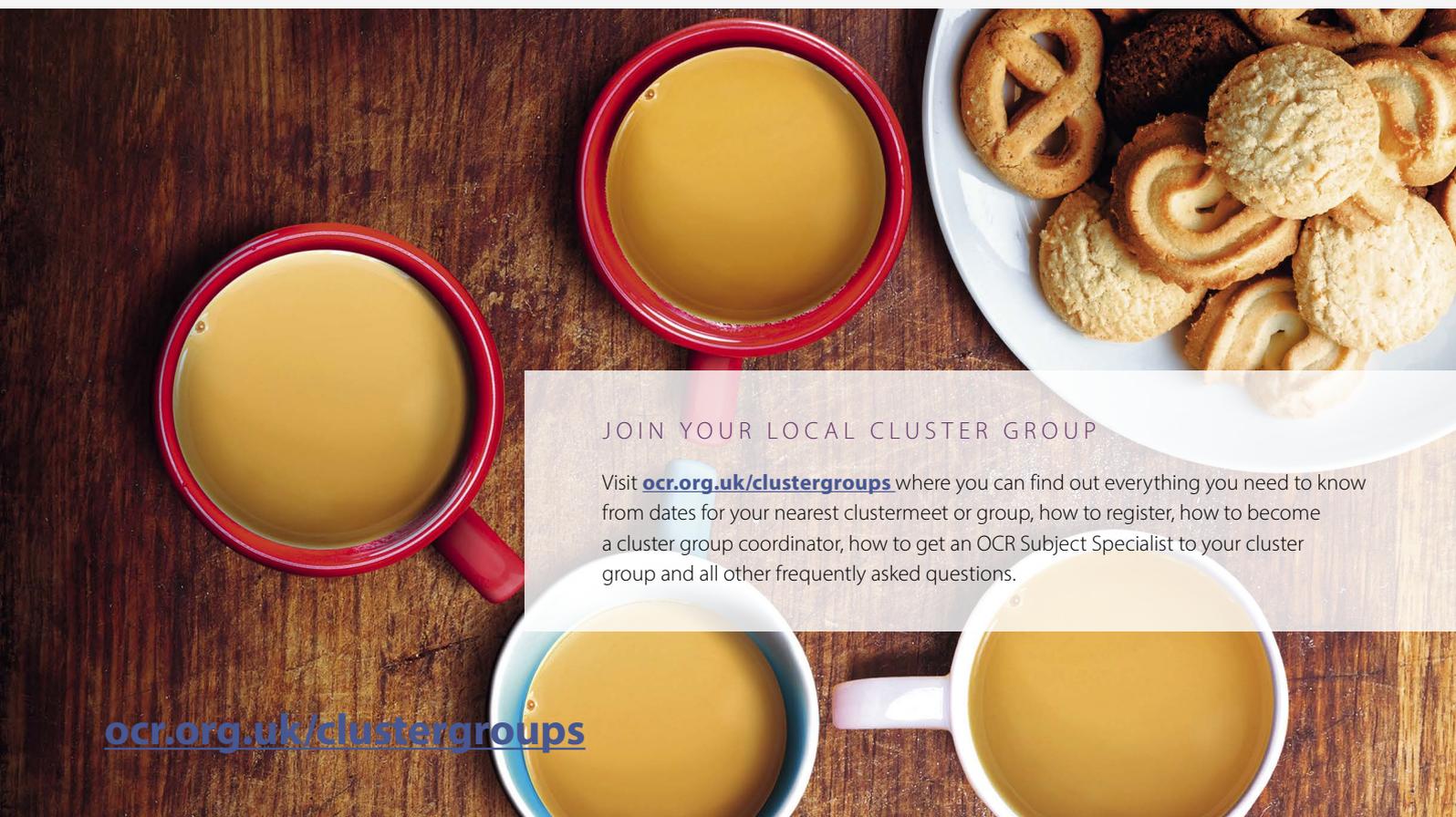
At OCR, we’ve been championing cluster groups for ten years! We believe these mutually supportive groups can facilitate knowledge sharing and build supportive teacher communities.

Cluster groups provide the opportunity for teachers, at every level and in the same geographic area, to meet together and share knowledge, resources and expertise on our GCSE Science Twenty First Century and Gateway specifications.

Managed at the local level by cluster coordinators, cluster groups rely on the wisdom of crowds or collective knowledge. If a school has a question that they can’t answer internally, it’s very likely that someone from their cluster can.

When invited, our Science Subject Specialists visit once a year to answer any specific enquiries such as how to mark six mark questions, how to deliver controlled assessments and changes to specifications. At a cluster group you can:

- find solutions with science teachers in your geographic area
- share experience
- share best practice.



JOIN YOUR LOCAL CLUSTER GROUP

Visit ocr.org.uk/clustergroups where you can find out everything you need to know from dates for your nearest clustermeet or group, how to register, how to become a cluster group coordinator, how to get an OCR Subject Specialist to your cluster group and all other frequently asked questions.

WE'RE HERE TO SUPPORT SCIENCE

We're passionate about education. We believe in its power to transform and, as a forward-thinking provider of Science qualifications, we aim to play our part by making the learning process more accessible, inspiring and enriching for teachers and students.

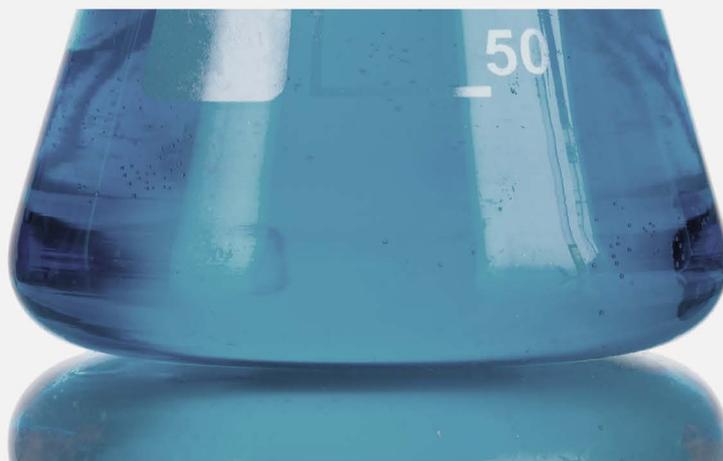
Whether you prefer a content-led or context-led approach, we provide everything you need to teach our qualifications including CPD training, teacher network events, free teaching and learning resources and dedicated Science Subject Specialist support.

With all this support, you can focus on delivering exciting and engaging Science lessons to your students.

ocr.org.uk/science



Teacher networks
CPD TRAINING
SCHEME OF WORK BUILDER
Practical Tracker
EXAMCREATOR
DELIVERY GUIDES
Context-led and content-led
BIOLOGY, CHEMISTRY, PHYSICS
TRANSITION GUIDES
CLUSTER GROUPS
GATEWAY, 21ST CENTURY



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