**Synopsis of Conference Speakers Talk**

**Key note address.**

**Prof David Read: - “What it means to be a chemistry teacher”**

As the ‘central science’, chemistry holds a unique position as a gateway to deeper understanding of many other disciplines ranging from the biological sciences to medicine, and geology to oceanography, among many others. At the same time, chemistry has a reputation as one of the most challenging subjects that students encounter at school, and many are deterred from studying it at higher levels as a result. Anecdotally, there is one factor which is cited time and time again as being a key influencer for those choosing to study chemistry at degree level; a good teacher. This talk will explore some of the facets of good chemistry teaching, drawing on evidence from research to highlight approaches which can help teachers to shed light on the mysteries of the discipline for the uninitiated.

**Afternoon Breakout Sessions**

**David Read and Stephen M. Barnes, University of Southampton, Highfield, Southampton, SO17 1BJ.**

**Essential knowledge for chemistry teachers: how would you define it?**

Chemistry is a broad subject made up of several sub-disciplines (e.g. the classic I, O and P classification), with strong links to other scientific disciplines. While this breadth and depth is typically part of our (i.e. teachers’) fascination with the subject, it can be overwhelming both to those teach and those who study chemistry. As well as holding extensive subject knowledge, teachers are also expected to have pedagogical knowledge, and pedagogical content knowledge, not to mention curricular knowledge, and knowledge of their students, their needs and how to get the best out of them, and knowledge of the school, its policies and how they should be applied. The list goes on and on…

When it comes to the subject matter itself, what really is essential knowledge for chemistry teachers? Most of us will probably say that we’ve forgotten most of what we studied during our degrees, but the reality is probably that your average chemistry teacher probably has a broader base of subject knowledge than your average university professor, who knows a vast amount about very little (note that this is written by a university professor!). Just how far does a teachers’ knowledge need to go? This session will look at some key areas of subject knowledge where misconceptions are prevalent, and will investigate the role that teachers’ subject knowledge can play in helping students to overcome them.

**Dr Hilary Jeffreys CSci CChem FRSC - Technical and Skills Manager**

**Dr Robert Bowles – RSC Careers Adviser** [www.rsc.org/careers](http://www.rsc.org/careers)

**“Apprenticeship training and T levels - an employer perspective”,**

1. Skills shortages - several quotes from recent studies, this will help to set the scene why apprenticeships and the new T levels can address some of the skills shortages
2. Advantages of apprenticeships to student, employer and college/ provider - good to show how it can have benefits
3. Different levels of apprenticeships up to degree level - just to summarise the different levels available
4. Structure of apprenticeships (designed by employers) - skills, knowledge, behaviours and potential professional registration - this will lead nicely into how the schools and FEs can support their students
5. How to prepare your students - capturing the key points that employers are looking for and linking in with the breakout sessions
6. T levels - background, employer involvement in S,K, B, the 15 routes
7. Structure of the T levels - useful diagram of the key parts
8. T levels timeline

How to help your students to apply for the Apprenticeships, including CV and interview tips from an employer perspective. Apprenticeships are an excellent opportunity for students to gain the skills needed for success in the future workforce and are available across a wide range of levels, right up to Masters level. The new apprenticeship standards, developed by employers, highlight the skills that young people require to succeed and help to overcome some of the skills shortages that employers experience, especially in STEM subjects. This interactive breakout session will help you to prepare your students to apply for the range of apprenticeships that are available. It will focus on what employers are looking for in applications, including skills, knowledge and behaviours. You will also get ideas on how to help students to write a winning CV, by identifying opportunities that allow the students to demonstrate their skills linked to a workplace setting. The session will provide you with information about different types of interviews and share ideas on how to prepare your students for them.

**Danièle Gibney** – **RSC Programme Manager, Curriculum, Qualifications and Assessment.**

**Towards an ‘ideal’ chemistry curriculum.**

The Royal Society of Chemistry has set up working groups that aim to develop guidelines for a coherent school chemistry curriculum. The purpose of these guidelines will be to offer support to curriculum developers at times of reform, and provide a basis for the society’s responses to consultations on curriculum matters. I will present some of the work so far from our working groups looking at the 11–16 and 16–19 age ranges, and inviting discussion and feedback on some of the proposals.

The Royal Society of Chemistry’s Curriculum and Assessment Working groups aim to develop a comprehensive view of an appropriate school chemistry curriculum. This work will enable us to engage meaningfully with consultations and other discussions relating to curriculum and qualification reform, as and when this occurs.

Two of the fundamental principles that underpin our thinking are that the curriculum should:

* be relevant to all learners, whether or not they will continue into chemistry-related careers
* present a coherent picture of chemistry as a field of human endeavour, through which understandings about the material world are developed and applied.

We are currently presenting our initial proposals across the 11–19 age range to a wider audience, to gain feedback and help us further shape this work. In the breakout sessions, I will invite discussion on some aspects of our draft curriculum, with a particular focus on the post-16 stage.

**Sandy Wilkinson**

**Creative ways to use new technologies in the teaching and learning of chemistry.**

**Zoe Schepp and Nicola Rogers**

**ChemBAM** [**https://chembam.com**](https://chembam.com)

ChemBAM is a new resource for teaching chemistry. We firmly believe that an insight into current academic research and industrial procedures can enhance enjoyment of chemistry for both pupils and educators. Our eventual aim is to cover the entire national curriculum with research-linked experiments and activities for all age groups. To date we have created 12 experiments on topics as diverse as corrosion, fuel cells, nanotechnology and polymers. These are pitched at GCSE-A-Level classes but can be tailored to other age groups. The website includes CLEAPSS-style safety cards, information for teachers and technicians and also worksheets, all of which can be downloaded for free. We have trialled many of these experiments in Birmingham schools and they have proved popular with both teachers and students.

**Dr Niki Kaiser - Chemistry Teacher and Research Lead at Notre Dame High School, Norwich**

**But what does that look like on a Tuesday (period 5)? Using research to inform Chemistry teaching.**

I recently explained to a colleague how research has helped me develop as a teacher.

“Interesting...but what does that look like when I’m teaching year 9 on a Tuesday afternoon?”

I described a couple of lessons I’d taught, and he immediately understood what I meant. He just needed concrete, subject-specific examples. Specialist subject knowledge is important to Science teachers (Kind, 2014), and “expert teachers” are able to prioritise this knowledge so they can respond appropriately to the demands of a lesson (Schempp, 2002). In other words, they know how and when to apply key evidence-based strategies on a Tuesday afternoon with 30 pupils in front of them, even if they hadn’t previously planned to do so.

I’ll give practical ideas for applying research-informed principles to the Chemistry classroom and summarise my research into Threshold Concepts (“portals” to new or transformed understanding). I’ll describe how I used misconceptions literature and pupil responses to pinpoint troublesome ideas.

Most importantly, I’ll explain how this shouldn’t significantly add to your workload, and how a deeper understanding of these areas helped me teach a particularly difficult period 5.

**Bob Worley**

**Microscale chemistry at A Level**

This year it is the turn of A level experiments with a microscale look at transition metal chemistry, identifying primary, secondary alcohols at room temperature, equilibrium, rate of reaction and using a flexible ion salt bridge. Bring a camera and safety specs! I will make propene and carry out hydrogenation before your very eyes!

**Damian Riddle** **-Senior Manager - Science, Pearson Edexcel**

**Reflections and Outcomes from the new A level Chemistry Specifications and Assessments**

This workshop will

* Examine data on student uptake and performance for the new AS and A levels in Chemistry and reflect on changes to patterns of entry, grade boundaries and the role of AS
* Take a look at the change of emphasis in assessment as a result of the move to linear exams including synopticity, extended writing and maths
* Consider the impact of CPAC on the teaching and assessment of practical skills