

# UK Chemistry Olympiad

## A Guide to Round Two

After students have completed their Round One papers in January, the highest-scoring scripts are moderated by the Olympiad Working Group (OWG) and around thirty students will be invited to progress to Round Two, which takes place as a residential event over three nights.

This is a brief guide to the structure of Round Two, to help you prepare your students for the experience and to shed light on the selection process.

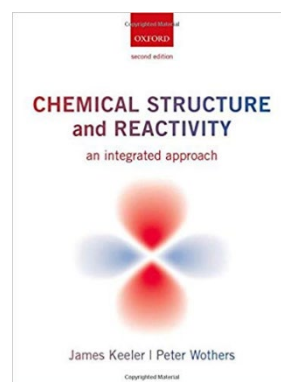
**Please note, this is only a guide to what typically happens and the OWG will amend the event when necessary.**

### Preparing for Round Two

When students are invited to Round Two, they will be sent a copy of *Chemical Structure and Reactivity* (Keeler and Wothers, ISBN: 9780199604135) and given specific chapters to read before arriving.

The nature of the reading will be determined by the preparatory problems set for the forthcoming International Chemistry Olympiad (IChO). These are published on the web by the host country each year, in late January.

Round Two itself takes place over the course of four days and three nights (made up of two full- and two half-days) and is hosted by a leading UK university. Please note, only domestic travel expenses will be reimbursed. Students should be mindful of using public transport, where possible.



### Day One: Meet and Greet

Students arrive late on Thursday afternoon and can check into their accommodation. Students will be based in university accommodation for the duration of the competition.

The event begins with a 'meet and greet', giving an opportunity for students to meet their fellow competitors and members of the OWG. We present certificates to the students, recognising their exceptional performances in Round One.

There is a seated three-course dinner in the evening, providing another opportunity for students to get to know each other. There is no dress code but students may wish to dress 'smart casual'.

After dinner, we sometimes have a short lecture from a guest speaker (not to do with the content of Round Two). After this, we explain the schedule for the next day and students are then free for the evening.

### Day Two: Demonstrations and Practical Exam

After breakfast on Friday, students are escorted to the Chemistry Department. In the morning, they follow a carousel of demonstrations in the undergraduate teaching laboratories, looking at specific techniques that they will be required to use to complete the practical examination, some of which may be new to them.

Demonstrations differ from year to year but could include:

- Volumetric analysis (including redox titrations and back titrations)
- Observational tests for compounds and ions

- TLC techniques
- Organic synthesis
- Purification of a solid by recrystallisation
- Biphasic workups
- Reflux and distillation

After a sandwich lunch, Friday afternoon is dedicated to the practical examination, typically lasting four hours. The examination is a series of three or four experiments, which assess the students' ability to carry-out a variety of different practical activities, simultaneously. In contrast to school practicals, the vast majority of marks are awarded for *how* they have done the practical, rather than resultant calculations. For example, examiners will look at the percentage yield and purity of any organic product formed. Similarly, in titrations we do not give marks for concordant results, only for their reported value being close to the true value.

During the examination, the OWG will only intervene if there are issues of safety or a student does not know where something is. They will not intervene if a student is making a mistake in how they are conducting their experiment.

Following the practical examination, the students are escorted back to their accommodation. They have dinner in the cafeteria in the evening and sometimes, there is a fun quiz organised. Students are then free for the evening.

### **Day Three: Lectures and Theory Exam**

After breakfast on Saturday, students are escorted to the campus / department where the competition is hosted.

Saturday begins with theoretical lectures (typically two one-hour lectures with a break in-between). These lectures are tailored to topics identified for the forthcoming IChO and are delivered by members of the OWG. The topics covered are then assessed as part of the written examination, which students sit in the afternoon, following lunch. We do this to select students who are able to show that they can quickly assimilate and use information they have gathered, in a short training window.

We then have a sandwich lunch ahead of the theoretical exam in the afternoon.

The theoretical exam typically lasts four hours and has about eight questions. Many of the questions will be based on reading material given to students before Round Two, with some also based on the topics taught that morning.

Topics vary every year with the different international syllabus but typically include:

- Advanced organic synthesis
- Thermodynamics (the second law and temperature dependence of  $K$ )
- Complex equilibria
- Kinetics (steady-state approximation and integrated rate laws)
- Quantum mechanics (particle in a box)
- Solid state structures
- Electrochemistry
- NMR spectroscopy

After the practical exam, students are taken into town for a celebratory dinner at a restaurant. After which, they are escorted back to campus and then allowed to relax!

### **Day Four: Team Announcement and Departure**

On the Sunday morning, all students are assembled and the final team of four is announced. After this, the students are free to leave (around mid-morning).

## **About the Examinations**

The theoretical examination accounts for 60% of the marks for Round Two and the practical examination for the remaining 40%. This mirrors the weighting in the final IChO.

We give students pseudonyms to write on their Round Two papers to ensure the highest standards of fairness and impartiality. It is our policy that no student receives extra time for exams, even if this happens in their school exams, as this mirrors the policy at the IChO.

Round Two is substantially harder than Round One and while many students perform very well, it is our policy not to share examination scores.

**If you have any questions about Round Two, please contact [education@rsc.org](mailto:education@rsc.org).**