

# Top of the Bench regional heats

**2021/2022**

Support and guidance for Top of the Bench  
organisers

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## Top of the Bench

Top of the Bench is a national chemistry competition for students aged 14–16 to promote practical skills and teamwork in chemistry. The competition is one of our longest-standing school engagement activities: with the help of our members we have been organising and running this for more than 20 years.

The competition takes place in two parts during the academic year.

### Regional heats

Regional heats are organised and funded by the Royal Society of Chemistry Local Sections. These run from September to January and the winning team from each heat progresses to a national final. The format of the regional heats varies across the regions, appropriate to each Local Section.

For the first time in the competition history, the regional heats for the 2020/2021 competition were run as virtual events. We will also be running virtual regional heats for the 2021/2022 competition. This aligns with the approach we have taken for all RSC staff-led events until the end of the year. By running virtual Top of the Bench events it allows us to plan ahead and protect our plans against the likelihood of continued COVID-19 related disruptions later in the year, potentially at very short notice

### National final

The national final is organised by the RSC and before COVID-19 it was held at a UK university in spring each year. Due to COVID-19, the national final in 2021 was also a virtual event. Plans will be made for both a face-to-face and virtual national final in 2022 and a decision will be made based on government guidance.

Examples of written and practical papers from previous national final are available to download from the [Top of the Bench webpage](#), please share these with any schools that you wish.

## Top of the Bench rules

1. Schools cannot enter more than one regional heat competition.
2. Only schools located within the Local Section can enter the Local Section's regional heat (a Local Section/postcode look up table can be found [here](#)).
3. The teams should have 4 students with the following composition:

England and Wales	Two students from Year 9 One student from Year 10 One student from Year 11
Scotland	One student from S2 Two students from S3 One student from S4
Northern Ireland	Two students from Year 10 One student from Year 11 One student from Year 12

4. Students must be in these school years for both the regional heat and the national final.
5. The winning team from the regional competition should be the same team that enters the national final.
6. Teams should be broadly representative of their school's gender balance.
7. Students must not have taken part in previous TOTB competitions. In extraordinary circumstances please contact [TOTB@rsc.org](mailto:TOTB@rsc.org) if this rule restricts schools in your Local Section taking part. With advanced permission from the RSC flexibility with this rule may be possible.
8. For safeguarding reasons all communications should only be with a teacher, not direct with students. The teacher is responsible for the support and safety of their students, and it is very important that students taking part in the remote competition are supervised by their teacher.
9. Schools cannot be penalised if they prepare their students for the competition.
10. Any suspicions of cheating must be discussed with RSC staff ([TOTB@rsc.org](mailto:TOTB@rsc.org)) before approaching/disqualifying the school.
11. The correct answer is what is written on the mark scheme.
12. The competition organiser's decision is final.

## Planning your regional heat

### Date

Regional heats should be run between September and the end of January. The closing date for submitting school entries to [TOTB@rsc.org](mailto:TOTB@rsc.org) for the national final is the **31st January 2022**.

### Format

Reflecting the most recent UK Government advice and prioritising the safety of our members and volunteers regional heats will be virtual events.

We understand that once again this a different approach for TOTB and we do not wish you to feel compelled to organise a competition. If you are not able to organise a regional heat but would like a competition to run in your Local Section please let us know.

In 2020, our members ran various virtual competitions including:

- Online quiz
- Live quiz
- Poster competition (with/without audible description task)
- Practical challenge carried out in individual schools
- Virtual practical challenge
- Assessment of online experiments and name the lab equipment

### Can we use platforms like Zoom/Microsoft teams?

At the start of the first national lockdown in 2020, there were safeguarding concerns around the use of Zoom and we were hearing that some schools had banned its use. This included 'Zoom-bombing' where the screen sharing feature function was being exploited and inappropriate content therefore being shared. Security has been increased since then and Zoom is now widely used for many events. To make your Zoom competition more secure we would advise that you familiar yourself with Zoom and check that you have the correct settings enabled/disabled so only the meeting host can share the screen. It is possible to create a password for the Zoom meeting and also set up a waiting room where the host lets the attendees in and stops anyone unexpectedly joining. We ask that no videos or images are shown of the students and it must be made clear to the teacher that they must not enable their video during the call. We also ask that you **do not** record and store the Zoom meeting which as well as safeguarding concerns there is also GDPR and consent issues. As a further safety check, when setting up these meetings please ensure camera settings are turned to off for the start of the meeting where there is the facility to do so. Similarly if there is the facility to do so please lock the meeting once the session has started.

It is important that the Zoom meeting is set up by the teacher, using the teachers Zoom account and the teacher is present to supervise the students in the school/appropriate setting. It is not appropriate for contact individual students with the Zoom meeting details or for them to join themselves unsupervised. It is also for inclusion reasons that students must join the Zoom meeting in their school/appropriate setting as students may not have access to this technology at home and we do not wish for this to be a barrier. We would also advise checking with all schools you are inviting to your heat what their school's policy is on using Zoom.

Similar platforms such as Microsoft teams can also be used provided the video function is not used and thought is given to ensuring a safe and secure experience for volunteers, teacher and students

### Can we run a competition involving live-streaming?

Live-streaming using a platform like YouTube is also acceptable provided all volunteers involved are happy for this to take place and feel comfortable with the technology that is being used. This could take the format of a host giving a presentation and then running a quiz. The students could then submit their answers live using an online form (e.g. Google forms, or if that was not possible they could email their answers back at the end of the quiz for marking). This could work well but do bear in mind potential challenges this may bring for schools if their internet connection lacks sufficient bandwidth or for schools that may not be able to stream certain content.

### **Can we run a 'non-live' competition?**

A non-live competition is a good option for a virtual regional heat and may work very well for some Local Sections where teachers may struggle to engage with a live competition that has a set date and time. A pre-recorded video of quiz questions or question paper for students to sit or a quiz for the teacher to run themselves will allow a teacher to select the time for the competition that fits with the school timetable. Local Sections may wish to consider whether they have a timeframe for the competition to run in (eg 6 weeks) and whether they wish the teacher (provided teachers are happy to have more involvement) to mark the competition or answers to be emailed back to the Local Section for marking.

This would give a lot more flexibility to teacher to fit into their timetable and might help with engagement from schools who have not previously taken part due to the challenges involved in attending an event out of school hours.

### **Can we run a competition involving an audio recording of students? (eg students presenting a poster)**

Providing it is made clear in the competition joining instructions that it is voices of the students only (no images) and the students are not identified by their name, this would be acceptable for a remote regional heat. Consent would be needed and the teacher will need to confirm that the voice recording does not identify any students. Alternatively a competition could involve producing an animation using graphics

### **What online quiz platforms are available?**

There are several online quiz platforms available including:

- Kahoot is a game-based learning platform where you can create an online game or multiple choice quiz which can be hosted live or shared with the school as a non-live competition. More information about Kahoot can be found [here](#)
- SmartSurvey can be used to create online surveys and forms which would give the options of free text, not just multiple choice questions. More information about SmartSurvey can be found [here](#)
- Google forms is a survey tool which could be used to create a quiz with different question options. More information about Google forms can be found [here](#)

Appendix II contains some of our member's experiences from running their heats which you may also find helpful when planning your competition.

## Support for Local Sections

Planning and organising the regional heat should not be a laborious process. If you are struggling with volunteers, ideas for a virtual competition or need further financial support, we are here to support you.

### Assistance in finding more volunteers

Organising and running a TOTB regional heat can be a considerable amount of work. Should you need more volunteers please contact [TOTB@rsc.org](mailto:TOTB@rsc.org) and we will be able to contact members of your Local Section to let them know of the opportunity to get involved.

### Financial support

If a Local Section requires financial support to run their regional heat, they are welcome to apply to the Outreach Fund. This fund provides financial support to members, individuals and organisations in order to enable them to run chemistry-based public and schools engagement activities. Full details about funding categories, eligibility, criteria, restrictions and deadlines are available on the [Outreach Fund website](#). Please note, the Outreach Fund is competitive and funding for a regional heat is not guaranteed. If you have any further questions about the Outreach Fund please contact [outreach@rsc.org](mailto:outreach@rsc.org).

### Promotion

Your regional heat should be advertised on your Local Section events page and your local Education Coordinator can promote your regional heat through their newsletters or local teacher events. Please contact your local Education Coordinator to organise this route of promotion.

### Resource bank

To help support our Local Sections there is a regional heat resource bank which contains contributions from our Local Sections from their previous face-to-face events. This is secure and held on the RSC internal network to which only staff involved in the competition and our Education Coordinators have access. Should a Local Section require any ideas for their regional heat please contact [TOTB@rsc.org](mailto:TOTB@rsc.org) and we will search the collection on your behalf, and provide by email the appropriate resource. Please be assured, to avoid any teachers or students being in possession of your resources, we will only take a request from a member who is involved in TOTB. If there is any doubt, the TOTB organiser will be contacted to confirm the request. We ask that the resource bank is not shared with any teachers or students. As a disclaimer, we will not be undertaking any quality assurance of the resources and when these are shared it will be made clear they are from the named Local Section and not created or moderated by staff. **Please note, this resource bank was collated when the regional heats were run face-to-face and the resources may need adapting for a virtual event.**

## Inclusion and Diversity

As representatives of the Royal Society of Chemistry, it is expected that Local Sections uphold our values of inclusion and diversity. Chemistry should be for everyone and we are committed to promoting and supporting inclusion and diversity across our education activities. Further details about our [inclusion and diversity strategy](#) as well as the [Diversity data report 2020](#) can be found on our website. In 2020 we also launched the findings from our [Chemistry for All](#) outreach study looking at the learnings from five years of outreach to widen participation.

In the past it has been identified that a lack of diversity of the students taking part in the TOTB competition needs addressing, in particular the low number of state schools participating and the gender imbalance in the national final. We understand that the demographic of the winning school is not in our control, however we believe that through positive action a more diverse range of schools and students can be encouraged to take part in the regional heats, potentially resulting in a more balanced representation in the national final. Understanding who is taking part in the TOTB competition through data collection is the first step to improving inclusion and diversity.

### Gender

To address any gender imbalance, we would recommend that Local Sections **invite schools to submit teams that are broadly representative of their school's gender balance**

### School type

To address the imbalance of school type in the competition we would recommend that Local Sections have a **proportional representation based on the local school landscape** and where necessary **encourage more state schools to enter their regional heats**.

Attracting a broader range of schools to enter your regional heat can be a challenge, especially if the same schools have historically always entered. The following barriers have been identified:

- Contacting state schools and getting interest from state schools may be addressed by sending personal invitations to local state schools with information about the event. A list of schools in your area can be found using the website [www.schoolswebdirectory.co.uk](http://www.schoolswebdirectory.co.uk). Your local Education Coordinator may be able to help with contact names or an introduction. It may also be possible for your Education Coordinator to help.
- Independent or grammar/selective schools filling up places first may be addressed by having a phased invitation process where state schools have priority registration or you may wish to reserve places for state schools.

### Disability and adjustments/assistance

A student's disability or the requirement of adjustments/assistance should not be a barrier to participation in the competition and everyone should have the opportunity to take part. Local Sections are encouraged to communicate that their event **is accessible to all and they can accommodate disabled students and students who require adjustments/assistance**. Should you need advice please contact [TOTB@rsc.org](mailto:TOTB@rsc.org)

### Diversity monitoring

To ensure we are providing equality of opportunity and that the competition embraces inclusion and diversity, we would be grateful if you could complete and return the regional heats monitoring form in Appendix I (this is an excel spreadsheet that can be cut and pasted directly into an email) along with details of the winning school. **Please note we do not need names or dates of birth of the students.**

## Running an inclusive TOTB competition checklist

### Organising committee

- Use a diverse team of individuals for the organisation of an event in order to provide balanced views and reduce the risk of any unconscious bias

### Invitation and Registration

- Make sure all Top of the Bench marketing materials represent the diversity of our community, thinking about language and imagery used and being careful not to perpetuate any negative stereotypes (such as the competition is only for certain schools or students)
- Consider advertisement of the event – have all schools been included in the Local Section?
- Provide information on accessibility offered
- Ensure the event registration is inclusive and considers all potential registrants
  - Request information for adjustments/assistance (eg large text resources required)

### Participants

- Collect diversity monitoring data and send to [TOTB@rsc.org](mailto:TOTB@rsc.org)

A more detailed guide to running an inclusive event can be found on the [RSC website](#)

## Health and Safety

### Risk Assessment

Hazards and risk must be considered, assessed and managed for all events run on behalf of the Royal Society of Chemistry which includes TOTB competitions. Please see our [risk assessment for events webpage](#) for information regarding risk assessments and how to complete the appropriate documentation for your event.

Due to the safety of our volunteers, members and schools we ask that you do not run a competition that involves posting hard copies of documents and **all communication with the schools must be done electronically**

## Safeguarding

All TOTB competitions comply with the [RSC safeguarding policies and procedures](#). It is very important that students taking part in the virtual competition are supervised by their teacher at all times and the teacher is aware they are responsible for the support and safety of their students. It must be made clear when inviting schools to take part in the virtual competition (and any further communications) that contact by email or phone should only be with a teacher, not direct with students. For safeguarding reasons, you must not run a regional heat that involves any photos/videos being stored on a member's personal device.

Further safeguarding information for member networks can be found in the under item 8.3 of [Rules for Member Networks of the Royal Society of Chemistry](#).

The RSC's safeguarding policy, safeguarding procedures and processes and safeguarding incident/concern form are available on our [website](#). If you have any questions regarding safeguarding, please contact the Designated Safeguarding Officers, [safeguarding@rsc.org](mailto:safeguarding@rsc.org).

## GDPR

Please consider what information is appropriate to ask when registering students for the event and ensure you are not collecting any unnecessary data, for example only the year group of the students is needed, **not their date of birth**. Local sections can use an existing list of email addresses to contact schools about their Top of the Bench competition. It is also possible for you to store contact details to invite schools to future Top of the Bench competitions. You will need to include the sentence below in your communications to ensure the schools understand how they can be removed from your mailing list:

*The Royal Society of Chemistry will contact you regarding future Top of the Bench competitions. None of the data we maintain for Top of the Bench will be used for marketing purposes or shared with third parties. If you prefer not to hear about future competitions please let us know by contacting [\[insert Local Section email address\]](#)*

## Timeline and key dates

Now – September	Plan virtual event. Running a virtual competition might be new to some Local Sections so do allow appropriate time to plan how your competition will run this year.
September 2021 – January 2022	Regional heats
Following the event and no later than <b>31<sup>st</sup> January 2022</b> :	<p>TOTB organiser/Local section will need to submit the form in Appendix I to <a href="mailto:TOTB@rsc.org">TOTB@rsc.org</a>. This information includes:</p> <ul style="list-style-type: none"> <li>• Winning school name</li> <li>• Teacher name and email address</li> <li>• Date and format of your regional heat</li> <li>• Diversity monitoring information of schools that entered</li> </ul> <p>Local Sections that miss this deadline of 31<sup>st</sup> January 2022 may forfeit their winning team entering the national final.</p>
Early February 2022 (or before if school details have been provided)	The RSC will contact all schools providing details of the national final and how to register

Appendix I: Top of the Bench regional heats form (please return to [TOTB@rsc.org](mailto:TOTB@rsc.org))

**Local Section:**

**Date(s) of competition:**

**Format of competition:**

**Winning school:**

**Winning school contact and email:**

**Regional heat information**

<sup>1</sup> The Equality Act 2010 defines a disabled person as someone who has ‘a physical or mental impairment which has a substantial and long-term adverse effect on their ability to carry out normal day to day activities.’ For example, this can include diabetes, learning difficulties, hearing or speech impairments, arthritis, heart problems, depression, epilepsy etc.

School name	Postcode	Has the school entered before? (Y/N)	Student	Gender	Disability <sup>1</sup>	Do you require any adjustments or assistance?
				With which gender do you most identify? <input type="radio"/> Male <input type="radio"/> Female <input type="radio"/> Non-binary/gender diverse <input type="radio"/> Self describe <input type="radio"/> Prefer not to say	Do you consider yourself to have a disability as defined above? <input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Prefer not to say	
School 1			Student 1			

			Student 2			
			Student 3			
			Student 4			
<b>School 2</b>			Student 1			
			Student 2			
			Student 3			
			Student 4			

## Appendix II: Virtual regional heats

### Mid-Anglia Local Section

For the RSC Mid Anglia Top of The Bench competition we ran a poster competition with a recorded mp4 Elevator pitch. For 2021/2022 we will run a similar competition with poster and audio because we have all the necessary details and materials now. It is likely we will choose a topical poster topic linked to Chemistry & Sustainability.

### Belgium Local Section

The Belgian International section 2020 TOTB eliminator retained the usual elements of the competition that we run normally: a written test component for individual team members and a practical group exercise.

The competition itself was managed remotely by the participating schools and consisted of a Multiple-Choice 'Written' Section, with questions and marking schemes tailored to the three age groups in the ToTB team. The written test was delivered in an appropriate 'timed' manner at the schools as was the practical element that involved input from all four team members.

The practical task for 2020 was to construct a calibration graph and use it to determine the percentage of baking soda (bicarbonate of soda) present in a commercially produced baking powder. Practical kits were sent to participating schools.

Due to COVID restrictions, including difficulties for different year groups to mix and other related teaching issues, our regional heat was smaller than usual with just four teams from two schools able to enter; normally we would hope for around 12 teams from six or more schools. However, as usual, a committee member came up with some stretching and enjoyable written and practical exercises for the teams.

## Bristol and District Local Section

Bristol and District Local Section have shared below what they sent out in advance to teachers. They also produced a lecture demonstration for the students taking part in the competition: <https://www.youtube.com/watch?v=hO2hvHffL28&list=PLIRvUUtODph9PofEwBZV-RdyPzTJXBN0X&index=5&t=10s>

Dear Colleagues,

Thank you for participating in the regional competition of this national competition. We understand that the setting up of such events is time consuming.

This is the first time we have tried a virtual competition rather than have 16 school teams in the Teaching Laboratories at Bristol ChemLabS.

On the morning of the competition (18 January 2021) you will be sent a file of materials for you to distribute to your team at the appropriate time during the afternoon. We realise that members of your team could be in different bubbles and possibly home isolation (UK or overseas) and so will be working remotely from each other. We also realise that some schools would not approve of students communicating directly with us so we would ask that you become the conduit for communication.

All we ask is that you let us know the time that you send out the materials to your students and the time they send answers back to you to forward to us. They have a 2 hour window between 1:30pm and 6:00pm to get the answers in to you and onto us. Some schools are staging this after normal school hours. We are not expecting all that time to be needed if the students' IT works well.

The quiz is open book/Google. We ask that you do not assist them with the chemistry but possibly assist with any IT challenges.

We have reproduced below the instructions we expect to be giving the students.

The students should have access to a standard school periodic table. i.e. Groups 1 → 8/0

A reminder, this is a first for all of us! Please do not share this information with students in advance.

Thanks again for your support.

## READ THIS THROUGH FIRST

Congratulations on being selected by your school to take part in this chemistry competition. Your team is made up of 1x Year 11, 1x Year 10 and 2 x Year 9s so a very select school team indeed!

There are 4 parts to this competition:

- A general knowledge section.
- A practical chemistry section.
- An identify the equipment section.
- A tie break section.

There is also a 30 minute lecture demonstration you can look at once the competition answers have been sent in. In a traditional chemistry competition this would be shown whilst we are marking. Sadly, not so this year! See <https://www.youtube.com/watch?v=hO2hvHffL28>

You should have access to an electronic folder with the following:

- This introductory paper
- A multichoice question paper and accompanying multichoice question paper answer grid.
- A video file link with recorded experiments, accompanying question paper and answer grid. The YouTube link will not be open until 1:30pm.
- An 'Identify the Equipment' PowerPoint and accompanying answer grid.
- A PowerPoint with 'Chemistry Dingbats' tie breaker. Answers go on the PowerPoint

### **Timings**

You have a 2 hour continuous slot. There is a 15 min add on administration if needed to get your file of answers back to your teacher who will then pass them on to us. The competition period starts at 1:30 pm and finish by 6 pm. Only one set of answers per school team will be accepted.

### **Hints**

Work as a team. You do not all need to be working on the same part of the competition at the same time. Indeed, some of you will be in different places and working with each other over the internet. You may need to share documents. This will be a test of your IT skills as much as your chemistry skills and knowledge. You may want a team leader. You may want to appoint someone to collate the team's results in one place.

The quiz is open book so you can use your google skills (if you think they will help), your text books and class notes. You cannot use your teachers' or classmates' knowledge. This is a competition. Your teachers have stated that you are the people representing your school in this regional event.

Good luck

### **Tayside Local Section**

Schools were invited to take part in two "Flaskmaster" activities (inspired by the television programme Taskmaster). Students were asked to:

1. Grow the best crystal – Most impressive crystal wins
2. Make a chemical model out of household items – most inventive model wins

In addition to photographs of their creations, pupils were also asked to produce a poster to accompany their practical work. Schools ultimately decided on the design and content but were provided guidance about possible questions to consider (see details below).

## **FLASKMASTER**

### Task 1

Grow a crystal.

The largest and most attractive crystal wins.

You must produce a poster that includes a photo of your crystal using the template provided.

You may use any available materials, but the cost of the materials must not exceed £10.

You have until Monday 14<sup>th</sup> December 2020 to complete this task.

Your time starts now!

### Task 2

Build a model of a molecule from household objects.

Most inventive representation of a molecule wins.

You must produce a poster that that includes a photo of model using the template provided.

You may use any available materials, but the cost of the materials must not exceed £10.

You have until Monday 14<sup>th</sup> December 2020 to complete this task.

Your time starts now!

### Instructions for Teachers:

#### **Summary:**

Your pupils have been provided with two tasks outlined above; the first concerns growing a crystal and the second concerns building a molecular model from household objects.

The pupils are asked to produce two posters that showcase the crystal grown or molecular model produced.

You may wish to divide the tasks between the pupils, however, we leave this decision to you.

#### **Submission Date and Subsequent Process:**

The posters should be returned by Monday 14th December 2020.

The posters will be judged and the top performing school declared the winner of the regional heats.

The winning school will be invited to attend the National Final, which is scheduled to take place in March 2021 as a virtual event. More details will be provided in due course.

#### **Guidelines for Posters:**

Each poster should contain a clear photograph of either the crystal or molecular model produced.

In the case of the crystal, the photograph should include a ruler so the size of the crystal can be determined. Supplementary photographs of the crystal can be included when submitting the poster, if required.

The posters should be A2 in size. PowerPoint templates can be found attached to this e-mail.

Any images taken from the internet should be accompanied by an acknowledgment of the author and/or source.

If you need to purchase materials to complete the tasks, please ensure the total cost does not exceed £10 (per task).

The total cost of the materials used should be included on the poster.

The RSC will reimburse any expenses incurred when purchasing materials (up to £20 total).

Although the amount of time the pupils spend on the posters is flexible, we envisage that the poster could be completed in 10 hours.

#### **Suggestions for Posters:**

We leave you and your pupils to decide on the content and layout of each poster, however, we have listed some questions you may wish to consider below:

##### **Task 1:**

- *What is a crystal?*
- *How do they form?*
- *How are they used?*
- *What materials did you choose and why?*
- *How did you approach growing the crystals?*
- *Did you try different approaches?*
- *What conclusions did you reach?*
- *What did you learn from your experiments?*

**Task 2:**

- *What molecule did you choose and why?*
- *Why did you choose the materials you used for your model?*
- *Why is it important?*
- *Where / how is it used?*
- *Does it occur naturally?*
- *How was it discovered? Or first made?*
- *How is it made now?*