

October 2021

The Battery Zone (battery21.imascientist.org.uk/) ran from 27 September to 22 October 2021 and was jointly funded by the **Royal Society of Chemistry (RSC)** and **The Faraday Institution**.

The Zone featured scientists from across the UK, working towards making better batteries for a more sustainable future.

Throughout October 2021, Covid-19 cases in schools peaked to an all time high. This reduced activity in the Zone overall.

Key figures

	Zone
Schools	11
Students logged in	347
Students active	88%
Scientists	17
Questions asked	154
Questions duplicated	112
Questions approved	44
Answers given	200
Scientist comments	23
Live chats	26
Lines of live chat	7,295
Average lines per live chat	347
Votes cast	196

Scientists

17 scientists created a profile in the Zone.

You can see who took part at

battery21.imascientist.org.uk/scientists/

The winning scientist with the most votes from students was **Michael Hills**, Electrochemistry Research Scientist at Johnson Matthey.

Three scientists participated in our Academy Zone where they could build on their understanding of public engagement practices.

Students

347 students from 12 schools across the UK logged into the Zone.

81% of active students were from target schools: 15% from underserved schools and 74% from widening participation schools.

Live chats

26 live chats took place during the activity: 21 were school classes booked by teachers and 5 were additional chats, open to all the students.

An additional 19 live chats were booked: 17 were cancelled and in 2 the school was unable to attend without cancelling.

There were 3 live chats where teachers asked questions on behalf of their students. It is also common for students to share login details or computers during live chats. Therefore, the number of students reached will be higher.

School activity

Students from 11 schools across the UK participated in the Zone. In addition to live chats booked by teachers, there were 4 Thursday evening chats scheduled for the students and their families.

School	WP/U status	Active users	Chats attended	Chat lines (total)	Average Chat lines (per user)	Questions approved	Votes
Reading Girls' School, Reading	WP	169	6	2,273	13	16	116
Shirenewton Junior & Infant School, Monmouthshire	-	27	1	412	15	7	19
The Holmesdale School, Snodland	WP/U	25	6	294	12	12	5
Culloden Academy, Highland	U	24	2	225	9	1	19
Priory Academy, Dunstable	-	19	1	159	8	7	0
Sir Herbert Leon Academy, Milton Keynes	WP	18	1	150	8	0	18
St John's School & Sixth Form College - A Catholic Academy, Bishop Auckland	-	13	1	199	15	0	11
Queen Elizabeth's Girls' School, Barnet	WP	12	1	60	5	1	11
Alexandra Park Primary School, Stockport*	WP	1	1	35	35	0	0
Milldene Primary School, Colchester*	WP	1	1	29	29	0	0
Aylesbury High School, Aylesbury*	U	1	1	25	25	0	0

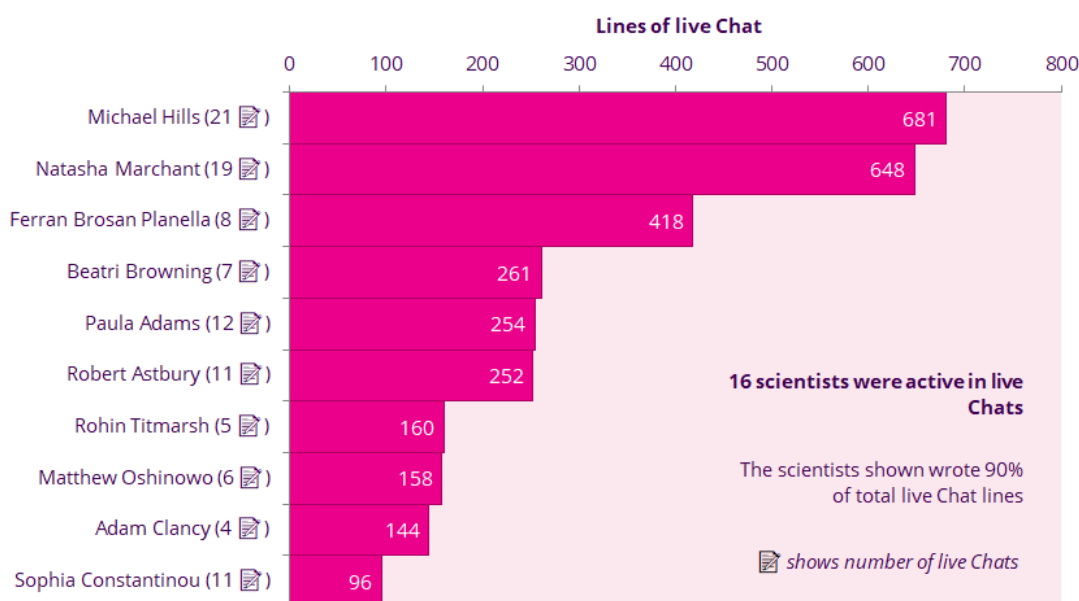
* In these chats teachers typed questions on behalf of their students, with the chat displayed on a screen.

We want to increase the participation of under-represented groups. Find out what we mean by under-served (U) and widening participation (WP) schools, and how you can support us in working with more of these: about.imascientist.org.uk/under-served-and-wp

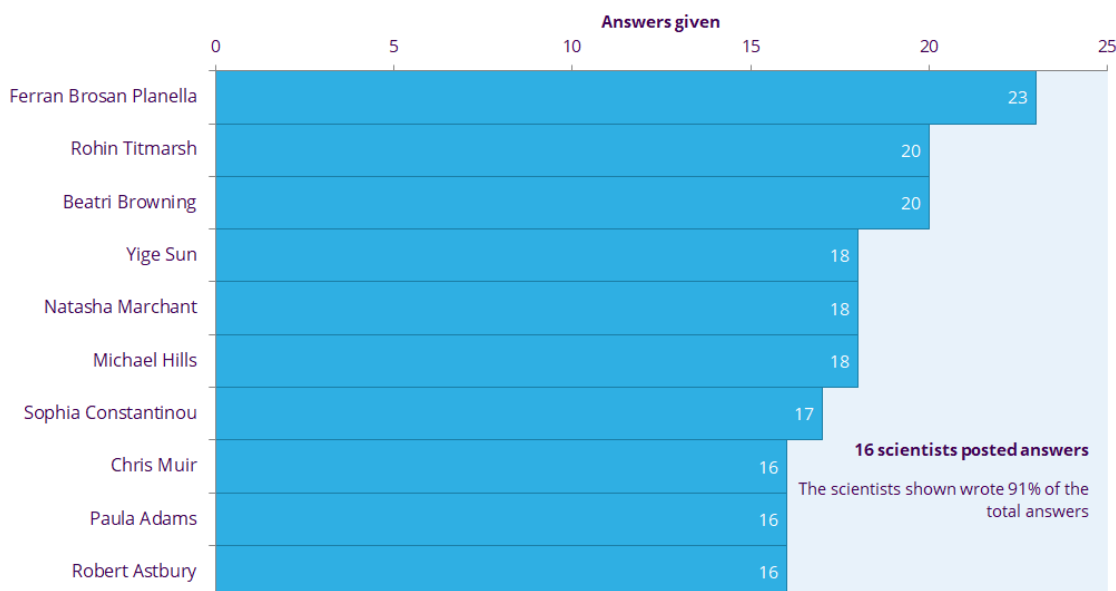
Scientist activity

During the Zone the scientists interacted with students by writing 3,402 lines of live chat, and providing 200 answers to 154 posted questions. On average, 8 scientists attended each live chat.

10 most active scientists in live Chats

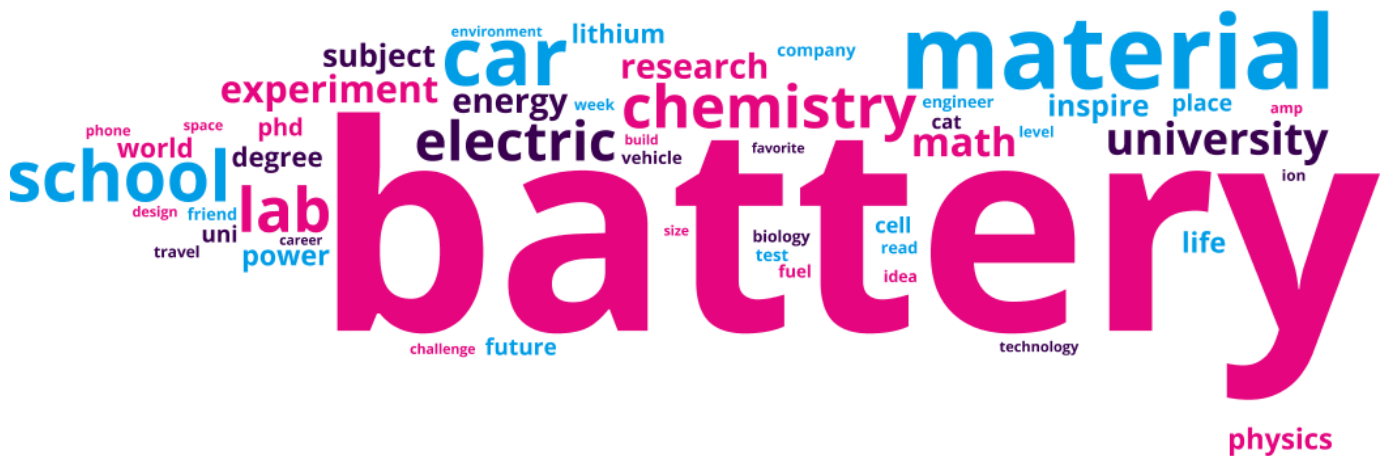


10 most active scientists in posting answers



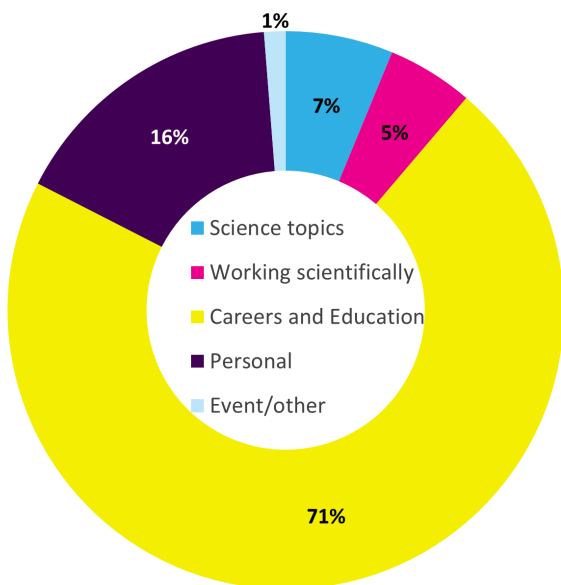
Live chats

The word cloud below demonstrates what students and scientists talked about in live chats. The bigger the word, the more frequently it was used.



Questions in Ask section

The chart below shows an analysis of questions students sent to the engineers. Questions are coded into overarching categories. The examples are coloured by category.



What materials are mostly used for batteries and how do you make electricity for battery's?

How do phones work?

What's the most dangerous experiment you've done?

How dangerous is the testing stage of new batteries?

Was your journey to becoming a scientist easy?

What else would you do if you would've not been a scientist?

What football team do you support?

Good engagement

Being able to see how science is relevant to everyday life and how certain knowledge or science can be utilised is an important part of Science Capital.

Student 1: How does battery science help the environment?

Beatrice (scientist): Battery science is so important for helping the environment. Take the vehicle industry - cars currently run on petrol, made of non-renewable fuels which pollute the air when we burn them to fuel vehicles by getting rid of petrol engines and using batteries instead, we don't produce any polluting gases, which reduces the impact these cars have on climate change.

Connecting with scientists over shared interest and learning that they are “regular people” can help students relate to them. This makes it easier for students to see themselves in science-related careers.

Student 1: other than science. Is there anything else you are really interested in?

Beatrice (scientist): I love baking! I would love to be as good as one of the bakers in Great British Bake Off

Student 1: What is your favourite thing to bake?

Beatrice (scientist): Either brookies (cookies with a brownie centre) or rocky road!

Sophia (scientist): I'm really interested in art! I do lots of drawing and painting.

Student 1: Why did you decide science over art?

Sophia (scientist): It was a really tough decision for me actually, I decided to do science because it was easier for me to do art in my spare time at university than chemistry. I only realised that science was the right choice when I found out about careers in science communication, I get to be really creative with social media posts and I get to learn lots of cool things about science!

Information on the scientists careers can provide insight into how variable careers can be and what students may need to do to get there.

Student 1: What do you need science for in your job?

Michael (scientist): Hi, personally I use science all the time at work. From thinking critically and problem solving to looking through a microscope at samples to determine if they are high quality

Natasha (scientist): all the instruments I use have science behind them and I need science to know how they work and what the result they give me mean!

Student 1: What qualifications do you need to get your job?

Matt (scientist): to do a PhD you will need to have a masters degree first

Student 1: Is that hard? I'm not very good at maths or science so i'm not sure i'd be able to do a job in science

Matt (scientist): It can be hard but that shouldn't put you off! I'm sure you can do it if you really wanted to, if you are interested in the way things work and are inquisitive then science is great for you

Student 1: Thank you for the advice, I'll be sure to try my hardest!

Subject specific questions can help generate interest and knowledge about the scientific field.

Student 1: How soon do you think we will change over to completely electrical vehicles?

Paul (scientist): Completely may take a long time but we will see a huge shift in the next 10-15 years

Adam (scientist): Never! We will be mainly electric and things like cars will swap, but things like airplanes will probably always be fuel based

Robert (scientist): 8-10 years maybe half of the new car sales will be electric... but it takes 20 years for vehicles to completely phase out. So 2050 probably before every car is truly electric

Student 1: What types of things do you build?

Chris (scientist): At the moment we take cells, and then arrange them into a pack, add cooling systems, conductors to carry electricity, and then house it within a really strong Carbon Fibre enclosure.

Student 1: That is actually really cool and interesting to think about. Over the years of your line in work, how have you upgraded the materials that you use after finding out what is better to use in a battery?

Chris (scientist): Yes we've had the chance with multiple projects to build on the learnings each time. For example copper is used as a good electricity conductor, but aluminium is lighter so we sometimes use that now!

Scientist winners

Students voted each week for their favourite scientist to be named Scientist of the Week.

The Scientists of the first and second Week were:



Natasha Marchant, Analytical Scientist at Johnson Matthey



Beatrice Browning, PhD Researcher for the Faraday Institution at University of Birmingham

The third scientist of the week was also the overall winner, with the most votes at the end of the Zone was:

- **Michael Hills**, Electrochemistry Research Scientist at Johnson Matthey

As Zone winner, they receive £500 to spend on further public engagement projects.



"What an electrifying experience! I loved speaking to all the students, teachers and scientists involved in the Battery Zone over the last month and am utterly flattered to have been voted 'Battery King' (a good title, even if I did make it up and give it to myself)."

You can read their full statement at

<https://battery21.imascientist.org.uk/2021/11/05/a-thank-you-from-your-winner-michael-hills/>

Feedback

@imascientist is an incredible online platform that connects school students with working scientists. Students get to not only talk to scientists in the field, but to identify with them.

Scientist



Ferran Brosa Planella

@brosaplanella

Just finished my first chat with students as part of @imascientist (Battery Zone) and what a blast!



An extremely fast-paced activity with really engaged students asking very smart questions. Looking forward to the next session!

The pupils who took part thought it was great to chat with real scientists - lots of brilliant questions and engagement from the pupils

Teacher

You made me love science more! Thank you.

Student

It has been a great experience and I have loved it so much. Really awoken a sleepy STEM and outreach part of me.

Michael Hills, Scientist