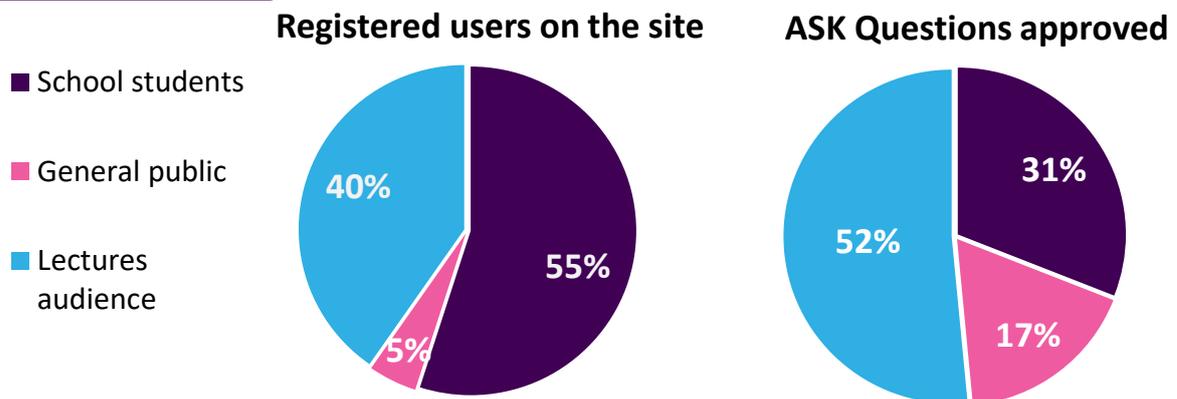


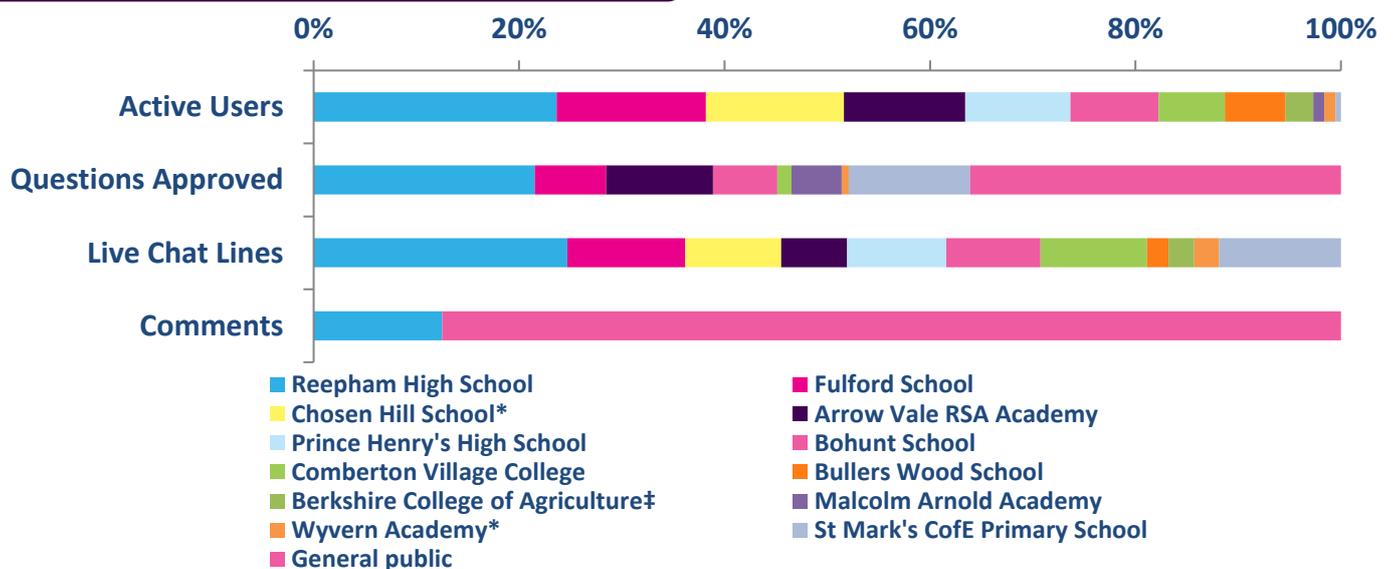
CHRISTMAS LECTURES ZONE 2016

The CHRISTMAS LECTURES Zone of *I'm a Scientist* was funded by Lloyd's Register Foundation. The online event allowed school students, the viewing public and Lectures attendees to continue the conversation about the Royal Institution's CHRISTMAS LECTURES, 'Supercharged: Fuelling the future' and its theme of energy. The 24 experts online included the Lectures host Saiful Islam and members of his university department, as well as PhD students studying solar cells, members of the Lectures production team, human metabolism researchers, and engineers from energy companies. Attendees at the filming of the Lectures could submit written questions to the site using question cards and have answers from experts emailed to them. This proved popular and 195 questions about energy and the Lectures were sent in by the audience. Members of the viewing public submitted 52 questions to the site on similar topics, most anonymously. The school students taking part were similarly on topic in live chats with experts and in the ASK section. Overall the Zone was focused around the future of energy, the Lectures themselves, the work of each expert and advice for a science career.

User data at a glance



Data for schools and the general public



* Widening participation schools, as defined at <http://about.imascientist.org.uk/2016/widening-participation-2016>

‡ The students here are from an alternate provision school and do science lessons at Berkshire College of Agriculture
St Mark's CofE Primary school took part mainly through one teacher's account.

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Experts' activity in this year's CHRISTMAS LECTURES Zone

EXPERT	ASK ANSWERS	LIVE CHAT LINES
Petra Cameron, Senior Lecturer, University of Bath	34	17
Yasmin Ali, EON Control Room Manager	33	0
Bethan Charles, PhD Student, University of Bath	32	104
Craig Fisher, Chief Researcher, Japan Fine Ceramics Center	32	53
Jemma Rowlandson, PhD Student, University of Bristol	28	95
Saiful Islam, Christmas Lectures Presenter and Professor, University of Bath	26	0
Mechthild Lubke, PhD Student, UCL & IMRE Singapore	25	67
Piers Barnes, Postdoctoral Researcher, Imperial College London	23	61
Charles Footer, PhD student, UCL	18	33
Paul Shearing, Reader, UCL	13	0
Oli Weber, PhD Student, University of Bath	12	25
Karl Byrne, Christmas Lectures Manager, Royal Institution	9	67
Chris Eames, Research Scientist, University of Bath	8	84
Davide Moia, Postdoctoral Researcher, Imperial	8	0
Jenny Heath, PhD Student, University of Bath	5	66
Hannah Moir, Lecturer, Kingston University London	4	37
Jawwad Darr, Professor of Materials Chemistry, UCL	3	63
James Betts, Reader, University of Bath	3	0
Thomas Ashton, Postdoctoral Researcher, UCL	2	17
Natasha Simons, Christmas Lectures Assistant	2	0
Laurence Hardwick, Reader in Chemistry, University of Liverpool	1	17
Tom Cook, Series Producer, Windfall Films	1	0
Javier Gonzalez, Assistant Professor, University of Bath	0	16
Iain Aldous, Postdoctoral Researcher, University of Liverpool	0	15

Key figures from this year's CHRISTMAS LECTURES Zone in comparison to previous years

PAGE VIEWS	CHRISTMAS LECTURES ZONE 2016	RI ZONES AVERAGE 2013-2015
Total zone	13,882	25,942
ASK page	1,001	1,775
CHAT page	1,379	4,390

Popular topics

The questions and live chat discussions revolved around the themes and demonstrations from each Lectures episode: 'Let there be light', 'People power' and 'Fully charged'. Many people wondered whether there's enough energy for the future, and asked about new, sustainable and unlimited sources of energy and their effect on the planet.

There were also questions on the initial motivation and career of the experts. For example, Petra was asked who inspired her to become an energy materials chemist.

Students were interested in career options too. Craig and Jemma talked about how long it took them to become a scientist. They also gave advice on science subjects that would be good to do to pursue a science qualification.

Participants were also curious to explore scientific topics stemming from the demonstrations in the lectures. For example, a member of the audience wanted to know what chemicals in the ping-pong balls make them explode. Members of the viewing public were also likely to ask questions following on from what they had watched in the broadcasts of the Lectures.

	CHRISTMAS LECTURES ZONE 2016	RI ZONES AVERAGE 2013-2015
Registered users	462	499
% of registered users active in ASK & Live Chat	79%	84%
Questions asked total	353	391
Questions approved	297	170
Answers from experts	320	232
Comments	15	51
Schools	12*	24
School live chats	11*	29
Lines of live chat	3,002	7,873
Average lines per live chat	273	271

*See 'Improving school take up of the event' below



Keywords from live chats in the zone, size of the word represents its popularity

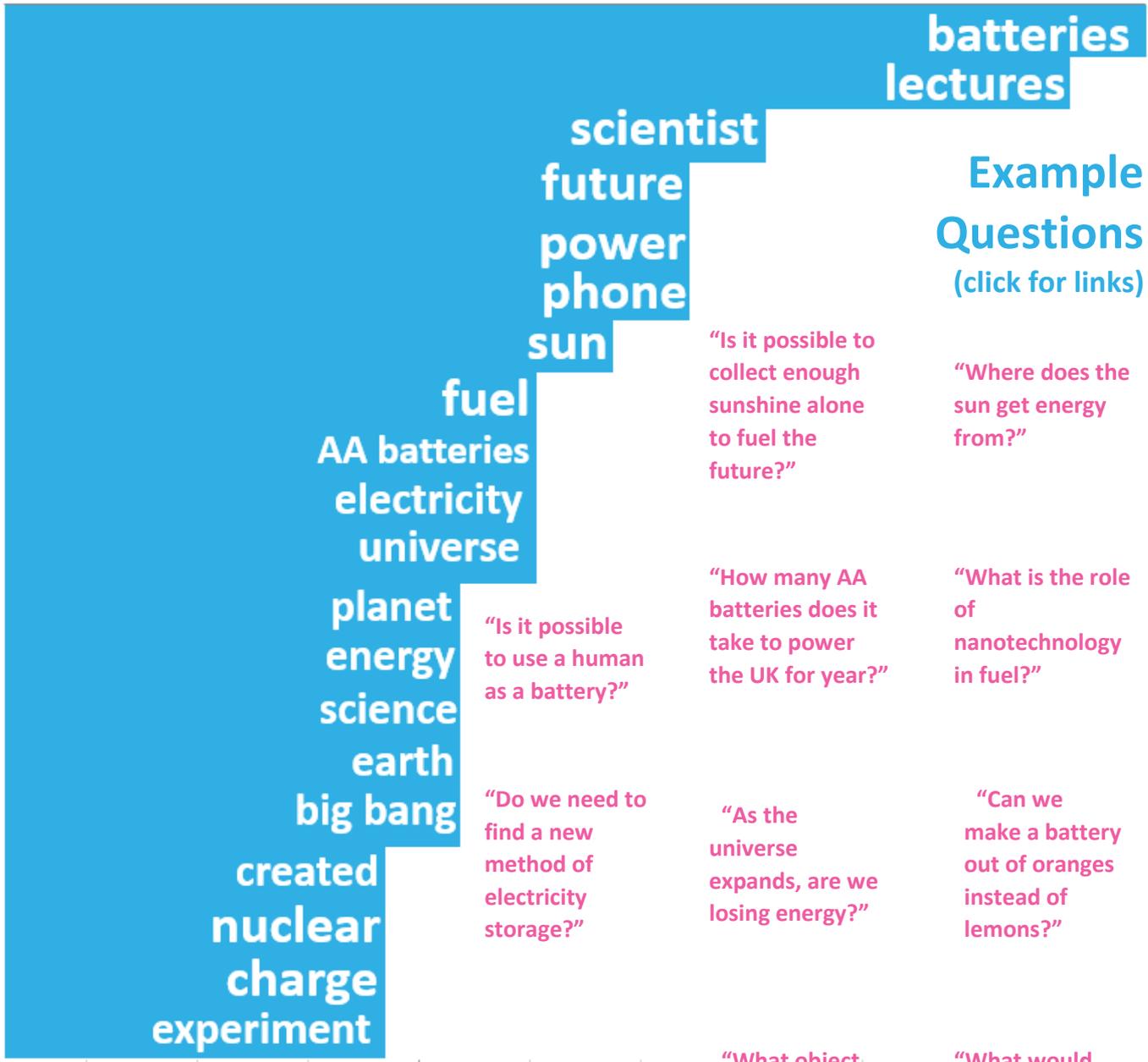


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Keywords of questions approved in the zone. Length of bar represents frequency of use.

0 3 6 9 12 15



Example Questions (click for links)

“Is it possible to collect enough sunshine alone to fuel the future?”

“Where does the sun get energy from?”

“How many AA batteries does it take to power the UK for year?”

“What is the role of nanotechnology in fuel?”

“Is it possible to use a human as a battery?”

“Do we need to find a new method of electricity storage?”

“As the universe expands, are we losing energy?”

“Can we make a battery out of oranges instead of lemons?”

“Can the energy from atomic and particle collisions be used on a smaller scale like charging your phone while on the go?”

“How was the Big Bang discovered?”

“What object on the planet generates the most energy?”

“What would happen if you could create or destroy energy?”

“Does the discovery of sub-electron particles have any implications for how we will store and manipulate electricity in the future?”

“If energy can't be created or destroyed then how does it exist?”

“Is nuclear fusion really unlimited?”

“Why would sea's materials be better for our batteries?”

Examples of good engagement

The experts answered questions about a wide range of scientific ideas behind the source, development, use and future of different types of energy. These included discussions on themes familiar to the public such as solar panels:

lightspeed56, student: How powerful are solar panels?

Jemma: That depends a lot on the material the solar panel itself is made of, and if it's in the right place! We measure a solar panels power by how much of the Sun's light that shines on the panel can be converted in electricity, which we call the efficiency. Normal solar panels made of silicon are usually around 16% efficient, which isn't bad but it could be better. You can get more efficient panels however these are a lot more expensive. A lot of research into solar is about making more powerful solar panels, and making sure the materials that are in them will last a long time.

153 questions by members of the Lectures' audience were approved, and many related directly to what had happened in the lecture they attended. This illustrates that they took the opportunity to find out more on topics that the lectures had made them curious about, as in this question about the AA batteries used as a comparison for human energy output in 'People power':

Member of the audience: What chemicals do we share with a double AA battery that allow us to compare the energy in a human to a AA battery? And why an AA battery and not an A battery - are there less chemicals in an A battery?

Petra: Humans do naturally contain very small amounts of metals that you can also find in batteries (e.g. zinc is an essential element for human health). However people do not have AA batteries inside them! People do generate energy though – we eat food, which is oxidised inside our bodies to release energy. By comparing a human to a AA battery we are comparing the potential of both people and batteries to generate energy – although we do it in different ways!

The live chats also gave students the chance to ask about decisions the experts made when becoming scientists:

Ilovephysics: Do you have any advice for a student hoping to pursue a career in the sciences? Is a PhD absolutely necessary? I know nothing is ever truly necessary but still is it truly necessary?

Meggi: I think as soon you get passionate you might actually want to do a PhD because you will have never so much freedom in research than during your PhD. But there is no need for a PhD.

Chris: Yes, you need a PhD. But a PhD is the fun part. You get to play with all the science equipment and there are no exams!

nicola7123: Did you know you wanted to be a scientist while you were still at school?

Jenny : Not at all, I always wanted to be an artist. I got into science through one of my A level teachers.

Audience winner

Presenter Saiful Islam was asked to choose his favourite question asked by the audience at the lectures. Saiful chose the question: **"How does the superconductor work to levitate?"** asked by James A from London, during Lecture 3, 'Fully charged'.

For his prize, James received a signed prop from the first Lecture, 'Let there be light', as well as a gift voucher.

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Improving school take up of the event

In total, 13 teachers from 12 schools took part in the Zone. We know that schools in CHRISTMAS LECTURES Zones students will take part primarily by doing one lesson for a live chat. In total, 17 live chats were booked by teachers this year. However, 3 were cancelled in January and another 3 were not attended by the schools, meaning 11 classes did live chats, which is below the average for CHRISTMAS LECTURES Zones (29 classes).

We looked into this and found that, because we gave priority to certain schools for the first time, not enough teachers were given places at first in December to anticipate the traditional lower take-up rate for the event (18%–26%, see table), when compared to the regular I'm a Scientist event (80% take up). We also initially limited teachers to one chat booking each, which limits their classes who can use the Zone. In addition, due to the short lead time this year, we were unable to reflect on take up in previous years sufficiently. Our priority was developing a new way to involve the Lectures audience, and this was a successful part of the Zone for the first time.

In future, we will give more registered teachers the opportunity to get their classes involved when the Zone opens for bookings, and allow them to book multiple live chats to ensure that as many school students as possible can take part.

	2014	2015	2016
Teachers sent log ins	55	147	78 (55 in Dec, 23 in Jan)
Teachers participated	10	39	13
Students registered	285	767	255
Questions asked	173	874	126
Live chats	22	37	11

Feedback during the event

A very good idea. I wish I had more time to answer more questions. Direct Q & A like this is not done when giving talks.

Saiful, Scientist and Lectures presenter

Thanks chris i have learnt lots today!!!!!!!!!!!!

PunchingBadgers, student

Sorry for the enormous amount of questions - the pupils were very excited! **Teacher**

 Mark my Words
@stmarkmywords

 Follow

Fantastic live chat with [@imascientist](#) & [@Ri_Science](#) Christmas lectures. Some interesting questions from Y5 and amazing answers. Thank You

