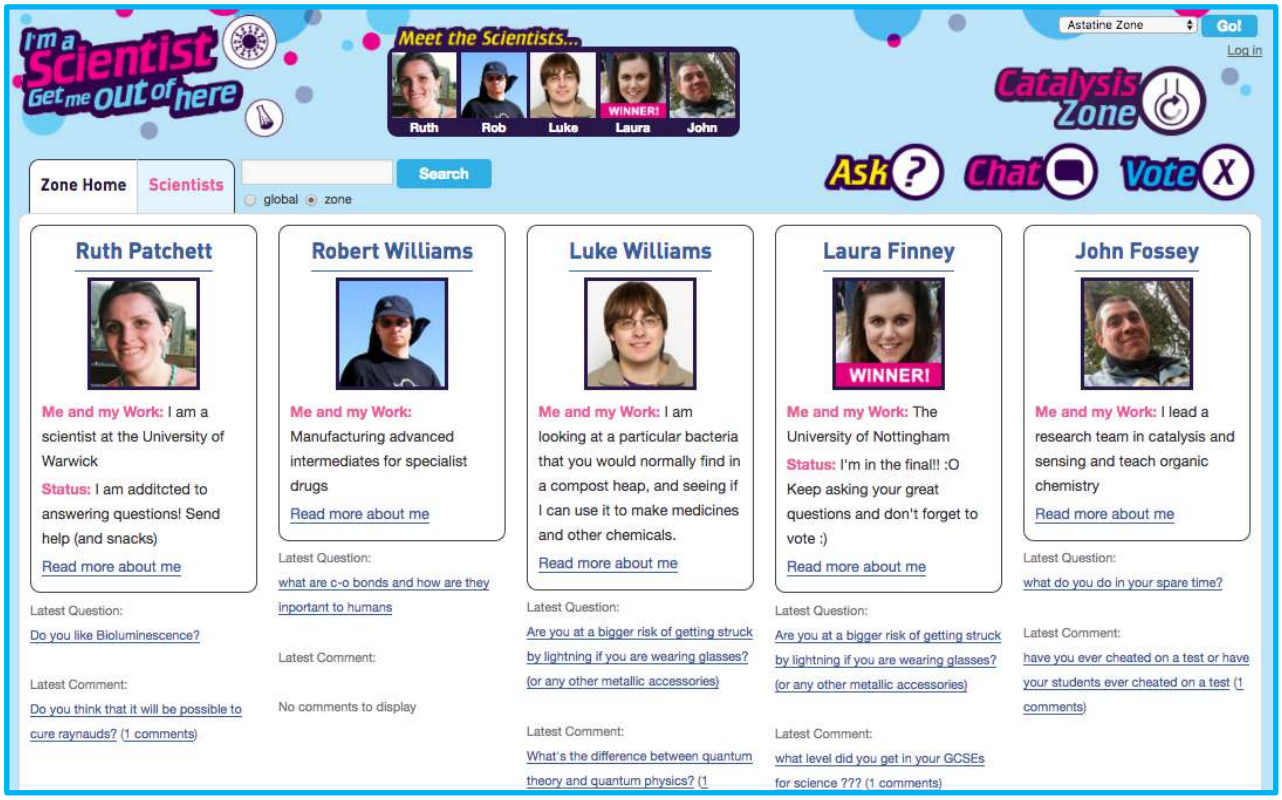
Evaluation Report

I'm a Scientist, Get me out of here!

RSC funded zones 2016



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Contents

1. **Executive summary 3**

2. **Introduction and background 4**

3. **Activity in the zones 5**

4. **Questions and live chats 6**

   Examples of good engagement 7

5. **Participation 8**

   Scientists 8

   Scientists' interviews 9

   Schools 10

6. **Publicity 12**

7. **Feedback 13**

8. **Future perspective 13**

I. Executive summary

Here is a summary of our main findings after evaluating the 9 RSC funded zones of I'm a Scientist, Get me out of here 2016.

1. **Scientists improved their science communication skills and enjoyed an invigorating experience**: *"Taking part in this competition has reminded me why I love science, and I shall return to my research with renewed enthusiasm!"* **– Steve Street, Drug Discovery Zone**

2. **The zones saw a great number of conversations around chemistry themes** with keywords like "climate change", "toxic", "enzymes", "battery", "drug", "energy", "bacteria" being prominent in questions and live chats.

3. **30 RSC members took part in I'm a Scientist thanks to this funding agreement.** 25 took part in the 8 RSC funded themed zones and another 5 were spread in 2 general zones.

4. **8 RSC members were voted winners in the 9 RSC funded zones in 2016** and will continue to promote their research on chemistry with the £500 prize money.

5. **Widening participation in schools:** 125 schools got a place to take part in I'm a Scientist RSC funded zones in 2016 the UK and Ireland. Of these, 31 (25%) were rural or Widening Participation schools, an improvement from last year, where 17% fulfilled this condition.

6. There are **94 Royal Society of Chemistry members** registered in our scientist lists, waiting to take part in I'm a Scientist, and **chemistry topics are the most popular among teachers**. The withdrawal of funding from the Royal Society of Chemistry in the future means that this demand will be left unanswered.

2. Introduction and background

I'm a Scientist, Get me out of here! (IAS)

I'm a Scientist, Get me out of here! is an online event where students get to connect with real scientists. It's an X-Factor style competition between the scientists, where students are the judges.

The event has 3 parts: ASK, CHAT and VOTE. Students ASK questions and have text-based live CHATs with the scientists. Students learn more about the scientists, and let scientists know their opinions. And finally, students VOTE for their favourite scientist to win £500 prize to be spent on more science communication.

The event takes place over two weeks, online at imascientist.org.uk, and it is split into "zones", which are either general (named after an element) or themed. In each zone there are 5 scientists and around 400 school students in 20 classes. IAS is designed to bring real science to life for students, supported by carefully developed classroom resources.

The Royal Society of Chemistry (RSC) agreed to support I'm a Scientist over 3 years through to the end of 2017. However, in 2016 their support for I'm a Scientist has been suspended. In 2015 and 2016, they've funded 9 annual zones across the UK and Ireland. Part of the arrangement was that we include RSC members in five of our General Zones to show school students the full breadth of science.

The Royal Society of Chemistry

The Royal Society of Chemistry is the largest organisation in Europe for advancing the chemical sciences. Supported by a worldwide network of members and an international publishing business, our activities span education, conferences, science policy and the promotion of chemistry to the public.

In the UK, the RSC are the largest non-governmental supporter of UK chemistry education. Their activities encompass formal and informal education from primary through to Higher Education levels and they are committed to providing Continuing Professional Development (CPD) for those teaching chemistry. They work closely with the government and other organisations on issues which may impact on science education and encourage initiatives to attract students to the chemical sciences from all parts of society and raise awareness of potential careers with chemistry.

3. Activity in the zones

We ran 9 RSC zones in 2016, distributed in four events:

- 3 zones in I'm a Scientist UK March 2016: Biochemistry Zone, Climate Change Zone, Toxicology Zone
- 3 zones in I'm a Scientist UK June 2016: Antibiotics Zone, Catalysis Zone, Mercury Zone
- 2 zone in I'm a Scientist UK November 2016: Drug Discovery Zone, Energy Zone
- 1 zones in I'm a Scientist Ireland November 2016: New Materials Zone

Two of these zones were for primary students only: Climate Change Zone and Mercury Zone.

IAS Figures: Historic average since 2012, average of all zones in 2016, and RSC funded zone average in 2016.

	HISTORIC AVERAGE	'16 ZONES AVERAGE	'15 RSC ZONES AVERAGE
Registered Students	372	512	447
% of students active in ASK, CHAT or VOTE	85%	87%	88%
Questions asked	718	961	533
Questions approved	309	408	240
Answers given	553	520	560
Comments	78	72	41
Votes	295	413	332
Lines of live chat	5202	5474	6836
Live chats	15	19	19
Average lines of live chat per chat	347	288	360
Schools	10	15	12
% of approved questions	43%	42%	45%
Answers given per approved question	1.8	1.3	2.3

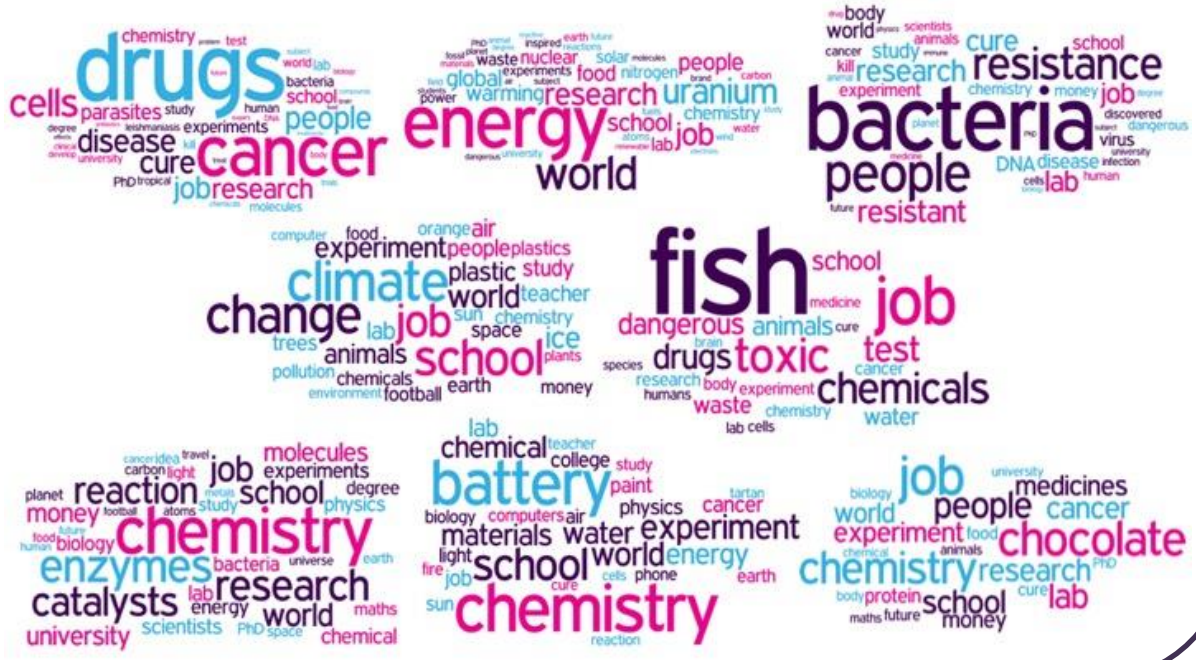
Most figures for RSC funded zones in 2016 fall around the average for all I'm a Scientist zones.

Of note, on average, each question received responses from more than two scientists in RSC zones. This means that students received a variety of responses from different scientists, something that can't be provided by a single scientist in a typical school visit.

The total number of questions asked is lower in RSC zones compared to the annual and historic averages. This could be due to the lack of familiarity of students with research subjects related to chemistry, compared with other STEM subjects, which further supports the need for these kinds of chemistry outreach activities.

4. Questions and live chats

Most popular words from the 2016 RSC themed zones live chats. The size of the word represents its usage and popularity



The word clouds above unveil some popular keywords like “cancer”, “world”, “school”, “fish”, “toxic”, “chemicals”, “chemistry”, “enzymes”, “battery”, “chocolate”, “school”, “research”. Some zone themes pop up: Drug Discovery Zone, Energy Zone, Climate Change Zone, New Materials Zone.

The most attention calling words above probably are “fish”, “drugs” and “bacteria”. Lauren Laing, winner of the Toxicology Zone, studies fish, and tries to understand how pollutants can be toxic to wild populations. In the Drug Discovery Zone there were lots of questions about clinical drugs and drugs of abuse and addiction. Finally, in the Antibiotic Zone students were keen to learn more about antibiotic resistance and the most resistant bacteria known.

Example questions in the RSC funded zones in 2016
How long does it take for mercury to change from solid to liquid?
Can you fight pathogens with photochemistry?
What are C-O bonds and why are they so important to humans?
Why do some people become addicted to drugs and others don’t?
What is your opinion on carbon dioxide and how are we humans affecting the green house effect?
Have you ever been discriminated in the science world because you are a female?
What is the lightest waterproof material and how much does it cost?
Are the campaigns to save energy worth doing? Does it make a difference?

Examples of good engagement

Most of the scientists in the RSC funded zones in 2016 had an enthusiastic and engaging tone, here are just some examples of outstanding engagement, to give a flavour of how students and scientists interacted.

"What do you think will be a larger threat to humans: a missile or a microbe??" – **Student**

"A missile filled with microbes" – **Student**

"Yikes a missile filled of microbes, that is too scary to think about." – **Danna, scientist**

"Biological weapons are a real concern!" – **Jonny, scientist**

"Bioterrorism is a real threat. I think [a missile filled with microbes] is the best answer." – **Daniela, scientist**

"Is that actually possible? To fill a bomb with harmful bacteria?" – **Student**

"Hmm…not sure actually. I think it would kill a lot of the microbes when it blew up." – **Danna, scientist**

"This has got a tad too serious :/" – **Student**

"It doesn't even take that much. The ventilation systems at the airports would be a way of spreading dangerous airborne pathogens." – **Daniela, scientist**

In the Antibiotics Zone, scientists and students were good at connecting in the live chats, through interesting topics that included multiple students and scientists in the conversation.

The scientists always provided useful and encouraging advice, like the example below where they discuss science careers advice in the Mercury Zone:

"I would like to be a vet when I'm older do you have any tips to achieve my goal??" – **Student**

"To become a vet you have to do well in science at school, but it's also important that you really care about animals. To get into university it can help if you do volunteer work, maybe walking dogs, or helping at an animal shelter or even helping out at a vet surgery when you're older" – **Melissa, scientist**

"I am volunteering at a local farm at the moment, it is so exciting!" – **Student**

"That sounds great! Keep up the good work."– **Melissa, scientist**

"Thank you very much!" – **Student**

5. Participation

Scientists

RSC members

25 RSC members took part in the 8 RSC funded themed zones in 2016. We aimed to recruit at least 3 RSC members for each themed zone – a target of 24 in total.

Additionally, the RSC funded one general zone (Mercury), with a mix of scientists from different fields (biomedicine, psychology, environmental sciences…). That funding allowed for five RSC members to take part in at least five general zones in different events throughout 2016:

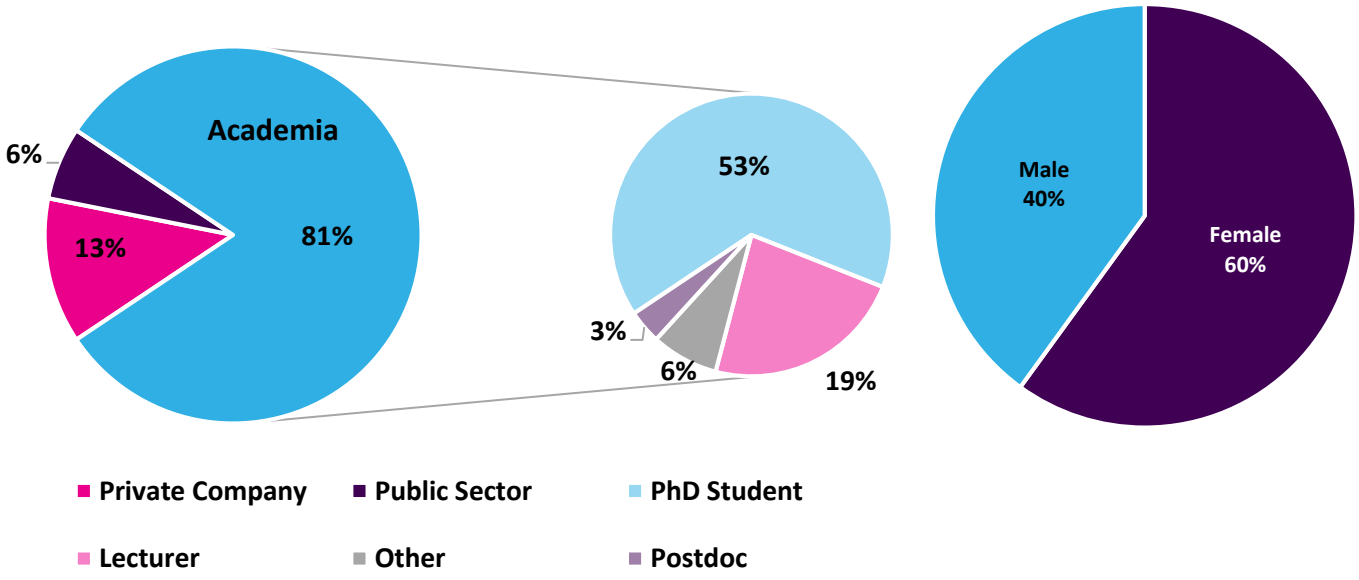
- Kelly Houton in the Platinum Zone, March 2016
- Melissa Ladyman in the Mercury Zone, June 2016
- Waqar Ahmed in the Mercury Zone, June 2016
- Angus Cook in the Mercury Zone, June 2016
- Deborah Prunty in the Lead Zone, June 2016

We offered a place to an additional RSC member in one general zone in November 2016, but they dropped out before the event started.

Altogether, **30 RSC members took part I'm a Scientist in RSC funded zones in the UK and Ireland in 2016**.

All scientists in RSC zones

When the scientists apply to take part in I'm a Scientist, they write a one sentence summary of their work. This summary is sent to students and teachers, who rate the scientists based on their descriptions and how much they'd like to see them in the event. We also try to get a mix of research interests and academic levels (from PhD students to Professors), variety of institutions, and a balance of female and male scientists, as well as scientists from minority ethnic backgrounds. This is very important for helping every student find a relatable role model in the event.



Of the 30 scientists who took part in the 9 RSC funded zones, 60% were female and 7% were from black or minority ethnics. The majority (81%) of the participants were academic scientists, and over half of these were PhD students. Only 13% of scientists came from the private sector.

Scientists were widely spread in different institutions in the UK and Ireland, as shown in the map to the right.

In each zone, there were four rounds of voting with one scientist evicted in each. Students can cast one vote in every round. In the 9 RSC funded zones, 5 winners (56%) were female, and a total of **8 RSC members were voted winners.** This means that they will be able to continue to promote their research on chemistry with the £500 prize money.

For example, Elizabeth Cooper was voted winner of the Materials Zone from March 2015, and was awarded £500. This year she collaborated with her local science centre and organised a science club involving chemistry laboratory experiments. You can read more about Elizabeth's project at: about.imascientist.org.uk/2016/what-elizabeth-cooper-did-with-her-prize-money/. Read all winner reports at about.imascientist.org.uk/category/prize-winner/

Scientists' interviews

We conducted a telephone interview with Matt Kitching, Lecturer at Dublin City University and New Materials Zone participant; Professor Chris Blanford, from The University of Manchester and Biochemistry Zone participant, and Jenny Batson, Project manager at Exonate Ltd and Drug Discovery Zone participant. Both Matt and Chris are RSC members.

Benefits from taking part

For the three scientists interviewed, taking part was a good way of improving their communication skills and confidence in how they communicate with a younger audience.

Matt thinks that *"probably beforehand I would have been worried about dumbing down stuff too much. I would have probably gone too far in dumbing down and actually they're pretty smart, they ask good questions. How to get the balance between interesting facts and science will be a thing that I will take away from it."*

Chris is particularly keen on this audience as they are "a *group of people I want to encourage to universities."* He also underlined other advantages of the I'm a Scientist format, like reaching remote areas without having to spend a long time to get there.

""There are certain cold spots in the greater Manchester areas where they don't have as many interactions with the STEM ambassadors. I don't have much time to visit schools, but if someone

is prearranging these chats it allows me to touch say ten or fifteen different schools or groups, and share my enthusiasm."

For Jenny, it was a good opportunity to "*detach yourself from full on science"* She learnt *"how to deal with loads of different types of questions."*

Comparison with other outreach activities

Matt said he hadn't done much outreach before, other than university open days, but he thought I'm a Scientist was much more interactive: *"You got to have a lot (more) interaction, (…), often in open days people are a bit nervous".*

For Chris, the online format was key to using researchers' time efficiently and communicating their research to students living in hard to reach areas:
"*Instead of me having to spend an hour and half getting out to somewhere in West Lancashire I can still connect with them. I think we would have a greater engagement among our academics who might be put off by losing 3 hours a day for a twenty minute chat".*

Suggestions of how to improve the event

Matthew would like there to be a way to get feedback from students about whether his answers in ASK were "hitting the spot".

Whenever a scientist answers a question, the student who sent it receives an email with the answer and links to "ask more" or "comment". We need to investigate how to encourage students to leave more comments on the answered questions, so more conversations happen there.

Schools

125 schools (red dots on the map to the right) **got a place in I'm a Scientist RSC funded zones in 2016**. 80% of these schools actually took part in the event, in line with our expected 20% dropout rate. We oversubscribe zones with 25 classes, when we expect around 20 classes to show up in each zone.

Widening Participation

Being online we can reach those who are currently underserved by science outreach activities, and this is one of our current strategic aims: increase the diversity of the schools taking part in I'm a Scientist. Since there is little data available on which are the most disengaged schools, we have created our own definition, taking into account distance to Higher Education Institutions, and Widening Participation indexes. We are targeting non-independent schools that fulfil at least one of these criteria:

- the % of students achieving 5 grades A*–C at KS4 is below 45%
- the % of students achieving level 4 in reading, writing, and maths at KS2 is below 45%
- the % of students eligible for free school meals is higher than 41%
- POLAR3 is in the first quintile
- A SEN School
- A school that is more than 25 miles away from their nearest Higher Education Institution

In Ireland, schools need to fulfil one of the conditions below to be considered a WP school:

- A school in Carlow, Cavan, Clare, Kerry, Leitrim, Louth, Monaghan, or Roscommon.
- A DEIS (Delivering Equality of Opportunity in Schools) school.

Of the 125 schools that got a place to take part in RSC funded zones in 2016, 31 (25%) were in widening participation schools, according to our definition**.**

These schools are prioritised on the application stage; they get allocated before other schools, and they're more likely to get the number of classes they want.

We have also offered all the new teachers phone call introductions to the event, we checked that they all book chats before the event starts and we offered to help with the bookings in if they haven't booked one. This extra attention to widening participation schools makes sure they get the most of taking part and come back in the future.

ChemNet Students

ChemNet is a Community offers help and support for students who are 14 to 18 years old and studying chemistry. We offer **ChemNet students** the opportunity to take part in I'm a Scientist.

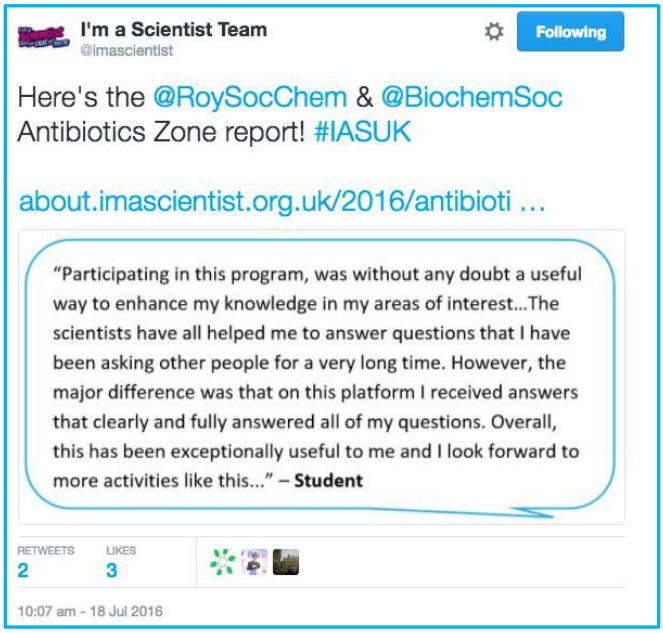
Last year we didn't get many ChemNet students taking part in I'm a Scientist, so we followed a different strategy for the March 2016 and June 2016 events:

- We allowed ChemNet students to register themselves directly at a URL on the site
- We uploaded an I'm a Scientist banner on the ChemNet home site
- We added content about I'm a Scientist in newsletters sent to ChemNet members
- We were given an account on the ChemNet Forum so could promote I'm a Scientist from there, where we:
    - posted a list of all the scientists taking part in RSC funded zones, short bios, links to their profiles and example questions other students were asking
    - invited ChemNet students to join an open chat
- RSC promoted the event on Twitter
- RSC mentioned I'm a Scientist in a webinar aimed at ChemNet members.

Despite all this, we didn't get any ChemNet students logging in. It seems clear that either ChemNet students are not particularly interested in interacting with scientists online, or we don't know how to communicate this opportunity to them effectively.
We didn't do any promotion in November 2016.

6. Publicity

I'm a Scientist (@imascientist) regularly tweeted updates and popular questions and linked to @RoySocChem. Some of the scientists were very good at engaging with other participants and teachers on Twitter. Here are just some examples, but you can find more at #IASUK and #IASIE.



7. Feedback

Scientists

Scientists improved their communications skills and enjoyed talking to students and to other scientists. For some of them, taking part was a revealing experience; they learned about the students' interests and often got reminders about why they got into science in the first place:

"Taking part in this competition has reminded me why I love science, and I shall return to my research with renewed enthusiasm!" – **Steve Street, Drug Discovery Zone**

"The questions the schools asked were incredible! There were so many that I was taken aback by as they were all so fantastic, everything from catalysis, chemistry, biology, physics and my views on political and topical issues were asked; I think you all should be very proud. The whole event was a great experience and I would recommend it to anyone." **– Laura Finney, Catalysis Zone**

I've really enjoyed answering the questions you had about science, but also ourselves, jobs, what we did at school, stuff like that. It's been fascinating to find out what YOU want to find out (even if we did never manage to answer where astronaut poo goes…)" **– Angus Cook, Mercury Zone**

Students and teachers

Teachers learned more about their students' interests and how much they enjoy engaging with real people. Students gained an increased awareness of what scientists actually do and how this affects the world around them and their daily lives. They engaged in debates with scientists during the live chats, and asked them about their personal opinions and experiences, and they took advantage to ask about the things they've always wanted to know:

"Participating in this program, was a useful way to enhance my knowledge in my areas of interest…The scientists have all helped me to answer questions that I have been asking other people for a very long time. However, the major difference was that on this platform I received answers that clearly and fully answered all of my questions. Overall, this has been exceptionally useful to me and I look forward to more activities like this..." **– Student, Antibiotics Zone**

*"I've learnt how the children enjoy engaging with scientists and finding out about the world around them. An enjoyable, memorable learning experience"***– Teacher, Climate Change Zone**

8. Future perspective

There are still **94 Royal Society of Chemistry members** registered on our scientist lists, waiting to take part in I'm a Scientist, in the UK and Ireland.

Chemistry related topics are popular with teachers. In our latest teacher survey, "Drug Discovery Zone" and "Materials Zone" were the highest voted options for secondary and primary teachers respectively, from a list of 28 zones covering biomedicine, physics, geology and ecology.

The lack of funding from the Royal Society of Chemistry in the future means that this demand from scientists and teachers will be left unanswered. We hope to find alternatives sources of funding to help chemists communicate their research to students all around the UK and Ireland.