

Clean World Zone and Healthy World Zone 2022

Two Zones were run between January and May 2022 funded by **Johnson Matthey's Science and Me programme**. The Clean World Zone (cleanworld22.imascientist.us) ran from 24 January to 18 February 2022. Based on advice from our school recruitment partner the Healthy World Zone (healthyworld22.imascientist.us) ran from 21 March to 20 May 2022 and was extended to accommodate spring-break.

The Zones featured **46 scientists** from a variety of roles working towards sustainability and healthier minds, bodies and communities. **310 (93%) students actively participated** by writing Chat lines, asking follow-up questions and voting.

The continuing pressures of the COVID-19 pandemic meant teachers across the country were experiencing staff and resource shortages. Teachers were struggling to cover the base curriculum, having less time to spend on STEM enrichment activities like *I'm a Scientist*. This reduced the activity and schools reached throughout the two Zones.

Key activity figures

	CW Zone	HW Zone
Schools	8	3
Students logged in	239	94
Students active	93%	94%
Scientists	24	22
Questions asked	178	17
Questions approved	90	5
Answers given	259	31
Live Chats requested	20	12
Live Chats taken place	13	8
Lines of live chat	4,342	2,784
Average lines per live chat	334	348
Votes cast	207	64

Who took part?

The Zones connected 333 students from 9 different schools with 46 scientists across 8 states in the USA. 64 schools applied to take part but likely didn't take part due to the continuing pressures of the COVID-19 pandemic.

85% of active students were part of Title 1 schools receiving funding support from state and local education agencies.

Impressively, 93% of students actively engaged by taking part in live Chats, asking follow-up questions and voting.

The winning scientist in the Clean World Zone was **Amelia Grose**, a PhD student at Michigan State.

The winning scientist in the Healthy World Zone was **Srishti Baid**, a PhD student at the University of Kansas.

Activity

A total of 32 live Chats were requested across the two Zones. 21 took place.

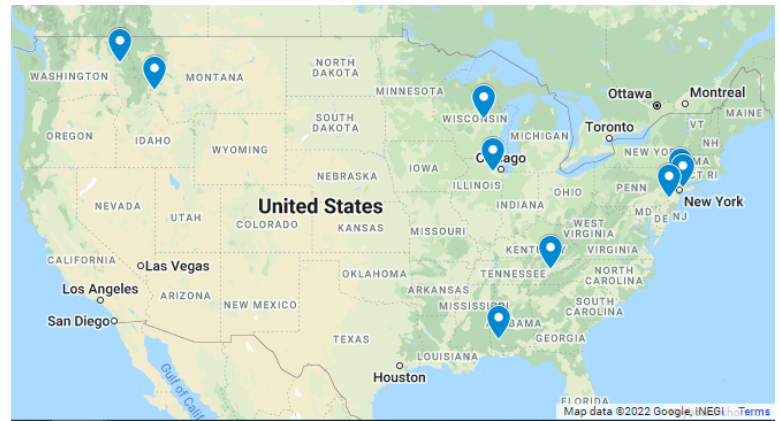
Out of the remaining 11 Chats booked, 10 were canceled and in 1 the school did not attend and did not give notice. All schools were chased and invited to rebook.

Students asked 195 follow-up questions of which 95 were approved and 74 were duplicates.

School activity

Students from 9 schools across the USA participated in the Zone.

85% of active students were from Title 1 schools. A school is considered Title 1 if it has 40% or more students from low-income families, eligible for free or reduced school lunches. These schools are supported with additional funds.



School	Active users	Chats attended	Chat lines (total)	Chat lines (per user)	Questions approved	Votes
Clean World Zone						
Bednarcik Junior High School, Aurora, Illinois (IL)	47	2	249	5	26	40
Clarkstown High School North, New City, New York (NY) (Title 1)	39	4	324	8	5	37
World View High School, Bronx, New York (NY) (Title 1)	34	2	277	8	1	29
Tigerton High/Junior High School, Tigerton, Wisconsin (WI) (Title 1)	31	2	517	17	16	26
Fernan STEM Academy, Coeurdalene, Idaho (ID) (Title 1)	30	1	322	11	22	31
Northwest Middle School , Knoxville, Tennessee (TN) (Title 1)	25	1	214	9	3	23
Jackson Intermediate School, Jackson, Alabama (AL) (Title 1)	22	1	389	18	16	21
Charles Boehm, Yardley, Pennsylvania (PA)	2	0	0	0	1	0
Healthy World Zone						
Clarkstown High School North, New City, New York (NY) (Title 1)	38	4	308	8	2	21
Hamilton Middle School, Hamilton, Montana (MT) (Title 1)	29	3	792	27	3	25
Jackson Intermediate School, Jackson, Alabama (AL) (Title 1)	23	1	312	14	0	18

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

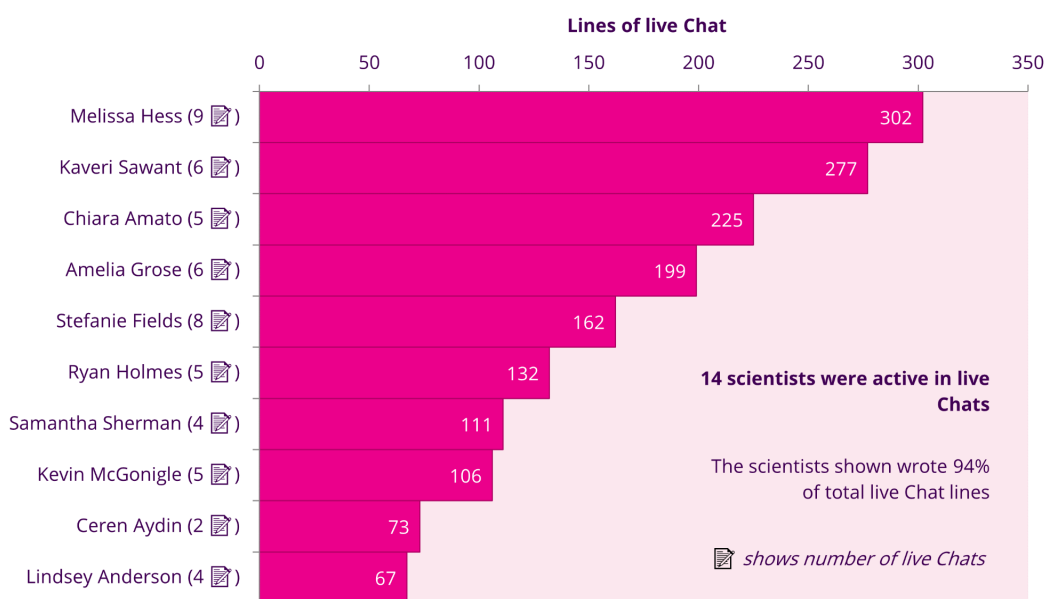
Scientist activity in the Clean World Zone

21 scientists completed a profile in the Zone. See who took part:

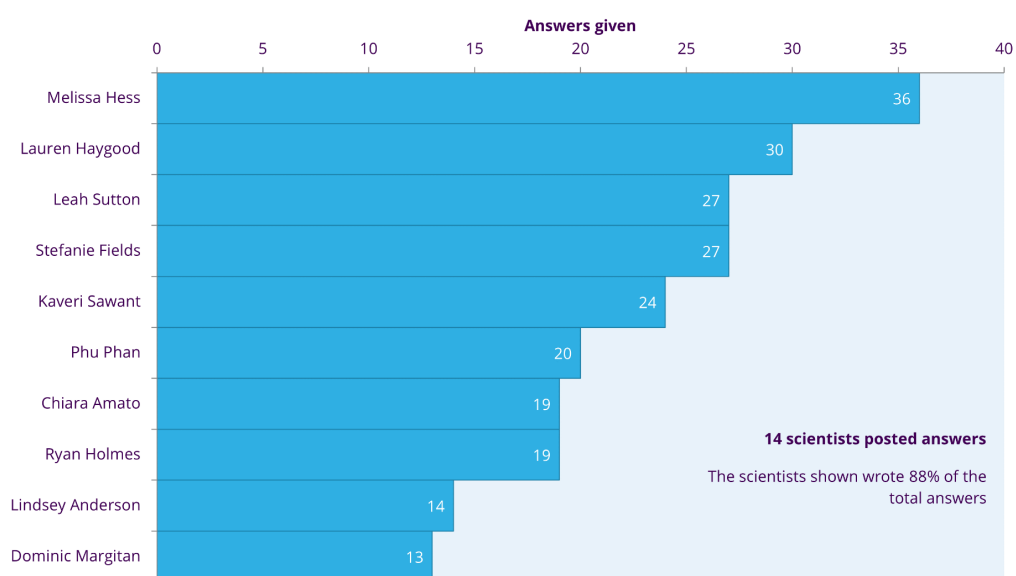
cleanworld22.imascientist.us/scientists

During the Zone the scientists interacted with students by writing 1,765 lines of live Chat, and providing 259 answers to 90 posted questions. On average, 4 scientists attended each live Chat providing students with a diverse range of people with whom to relate.

10 most active scientists in live Chats



10 most active scientists in posting answers

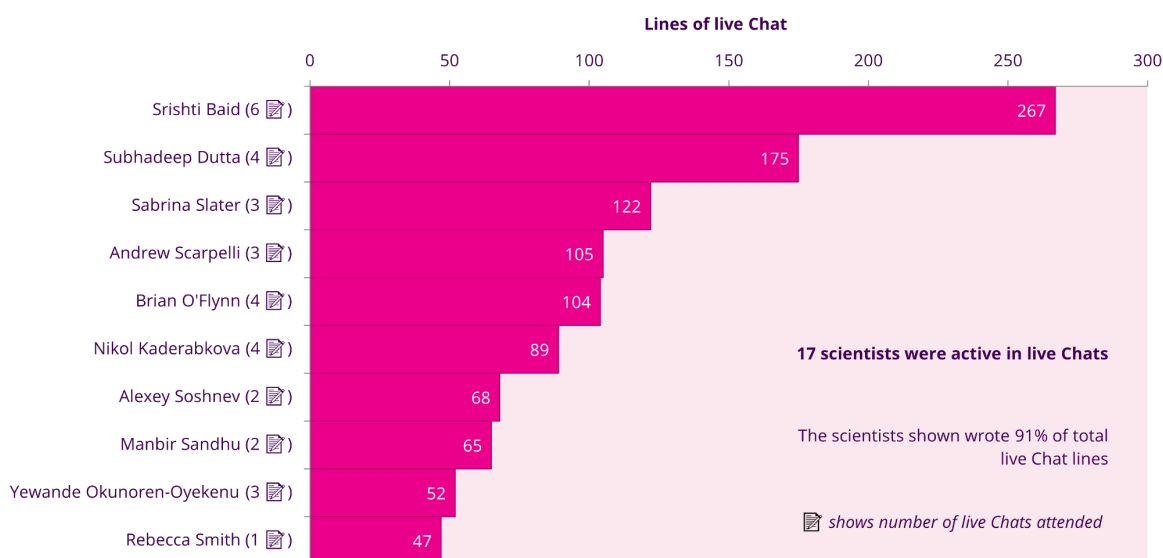


Scientist activity in the Healthy World Zone

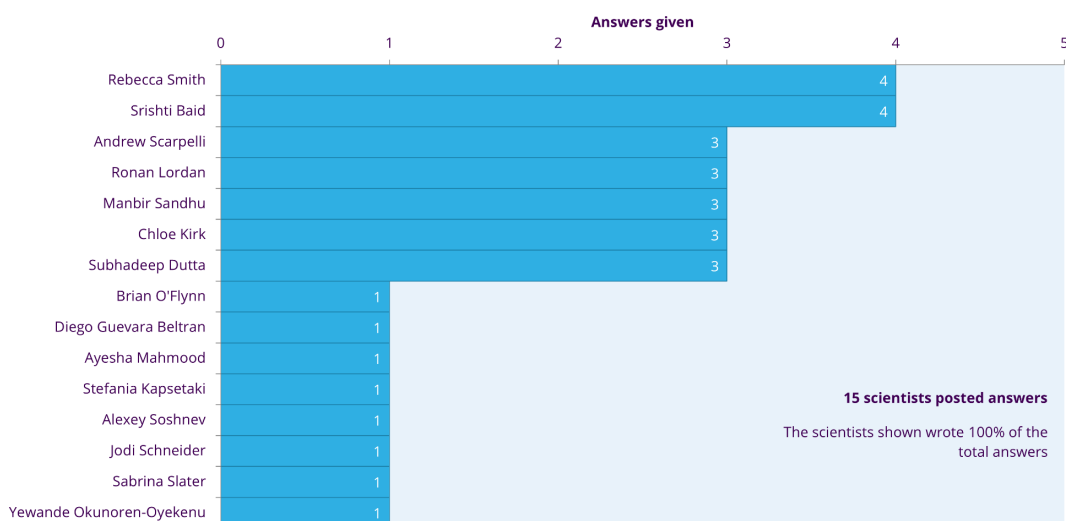
22 scientists completed a profile in the Zone. See who took part: healthyworld22.imascientist.us/scientists

During the Zone the scientists interacted with students by writing 1,199 lines of live Chat, and providing 31 answers to 5 posted questions. On average, 4 scientists attended each live Chat providing students with a diverse range of people with whom to relate.

10 most active scientists in live Chats



10 most active scientists in posting answers



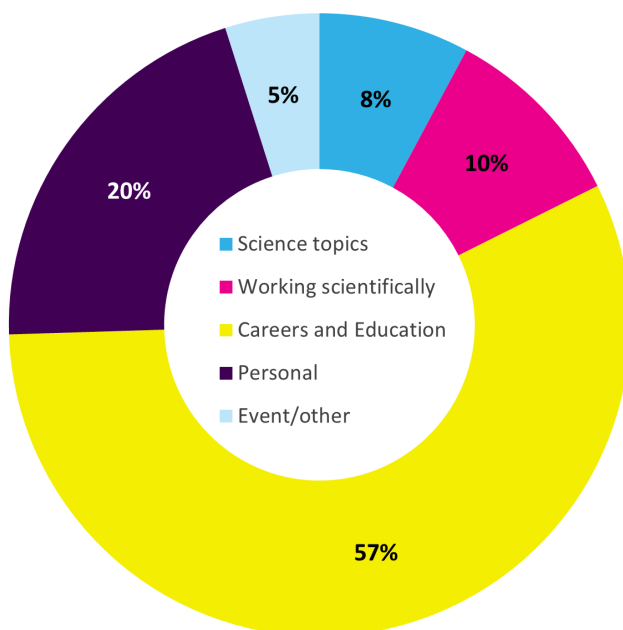
Live chats

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



Follow-up questions

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



How much force does it take to launch a rocket into space?

How much percentage is a half-life of PFAS increased by bioaccumulation?

How does your work save the environment?

Do you work on electrical or alternative energy vehicles?

What is your favorite thing about being a scientist?

Why did you choose to be a scientist if you love baking?

What's your biggest challenge with being a scientist?

If you came with a warning label, what would the label say?

Good engagement

Interactions like these are useful for students to understand the relevance of science by linking their scientific understanding to their everyday experiences:

Student 1: Why is science so important?

Ryan (scientist): Science can be proven, tested, and replicated to confirm unknown ideas. These ideas often lead to results that help society for the better.

Stefanie (scientist): If we didn't have scientists, many of the things you use day to day wouldn't be around. We need science to function really

Student 1: Will any of your work help us in Idaho?

Kevin (scientist): My work ultimately results in cleaner exhaust emissions from vehicles all across the country. So, yes it helps you in Idaho.

Ryan (scientist): Agreed. We help everyone with vehicle emissions

Student 1: Why are you studying rivers in alaska, like what is the end goal?

Ameilia (scientist): The Arctic is really affected by climate change - it is getting warmer quickly there! When it gets warm, the ground that is normally frozen thaws, so we want to see how this thawing ground changes what's in the rivers.

Student 1: I would love to do that

Ameilia (scientist): It's a very cool place to study!

Questions on scientists' research areas or about a specific scientific field are useful to deepen understanding and create interest in the field

Student 1: Why do you work with mice?

Ronan (scientist): Mice are mammals like humans, so when we have questions that we have to ask in science sometimes we need what we call a model organism. That could be flies, mice

or other animals. Right now, I am doing a study to see how exercise affects our daily rhythms so I teach mice to run on a treadmill!

Questions like these allow scientists to build a rapport with students, and support students to see scientists as 'real' people like themselves:

Ashleigh (scientist): Do you have a favorite marine creature?

Student 1: pufferfish! Its cool how they can puff up when in danger!

Ashleigh (scientist): interesting fact about pufferfish, the spines release a toxin and bottlenose dolphins can consume some of that toxin and it makes them feel really happy!

Student 1: thats cool! Is it like humans getting high?

Ashleigh (scientist): Maybe!

Conversations about scientists' education and qualifications show students different pathways into working in science:

Student 1: What did you originally go to school for?

Melissa (scientist): I started in Biochemistry. Dropped the Bio and got a BS in chemistry. Went to grad school for Fuel Science.

Stefanie (scientist): First time, Veterinary Technology. Second time, Chemistry.

Student 1: How difficult is it to become a scientist?

Melissa (scientist): It depends on what you want to do. Some people in my lab have a high school diploma or associate's degree. Two of us have PhDs. You do have to work hard but its very doable.

Chiara (scientist): Very much. There is a lot of studying to do. Research can be very stressful especially if you are working on a new topic without the support of literature. That being said, if we can make it, everybody can.

Scientist Winners

The overall winner, with the most votes at the end of the Clean World Zone was:

- **Amelia Grose**, PhD student at Michigan State

As Zone winner, she receives \$500 to spend on further public engagement projects.



"So often in science, we feel very one-dimensional – that only our research matters. Being part of this program and getting questions from students reminded me of my other dimensions, especially when they asked questions about other aspects of my life – what sports I like, what pets I have, where I want to travel next. The insightful questions that the students asked not only helped me learn how to better explain my research, but also reminded me of all I have to offer."

You can read their full statement at cleanworld22.imascientist.us/2022/02/22/a-thank-you-from-your-winner-amelia

The overall winner, with the most votes at the end of the Healthy World Zone was:

- **Srishti Baid**, a PhD student at the University of Kansas

As Zone winner, she receives \$500 to spend on further public engagement projects.



"This platform not only helped my science communication skills by allowing me to practice simplifying my science for non-science audiences, but it also helped me understand the non-trivial role of simplicity and brevity in talking about science, a lot of which has been emphasized by my Ph.D. mentor."

You can read their full statement at healthyworld22.imascientist.us/2022/05/24/a-thank-you-from-your-winner-srishti-baid

Feedback

I loved how the chat gave my students an authentic audience. We are working on asking questions and how to gain information through conversation, so, it gave them an opportunity to analyze the effectiveness of their questioning by looking at the script the next day. Thank you.

Teacher

Thank you all so much for the cooperation! This was a very nice experience :D

Student

I had fun actually talking with a real scientist!

Student

If you're considering participating, I highly encourage it - the students are so lovely and inquisitive, you can't help but smile at some of their questions and comments!

Amelia Grose (scientist)

My kids loved every minute of this!! They were engaged the whole time and couldn't stop talking about it afterwards! My principal observed during this time as well and she was very excited to see that our little rural babies had this opportunity. Students were able to learn new content and were excited to do so.

Teacher

The scientists were very kind and quick to respond. They were also patient with the kids. Every time they would respond, kids would eagerly read the post and shout for joy if it was an answer to their question.

Teacher

It was so nice to talk to you all. I really loved this. I liked to learn about you guys. Hope to talk to you soon!

Student