*I'm a Scientist,*
*Get me out of here:*

# 2023 Frontiers for Young Minds Zone Evaluation Report

July 2023

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# Contents

# Background

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

*I'm a Scientist, Get me out of here* (IAS, imascientist.org.uk) is an online, student-led, public engagement project where school students have real interactions with STEM professionals.

Researchers create profiles on the website and engage directly with school students through answering posted questions, and in real-time Chats. Students ask questions about whatever they want; questions about careers, research, as well as their wider interests and lives outside of work.

Through taking part, students engage with STEM professionals from a diverse range of backgrounds, disciplines, and industries. They get to see scientists as ordinary people with hobbies, interests, pets, and families. They learn about STEM careers and opportunities in higher education, while seeing how what they learn in school relates to the world around them.

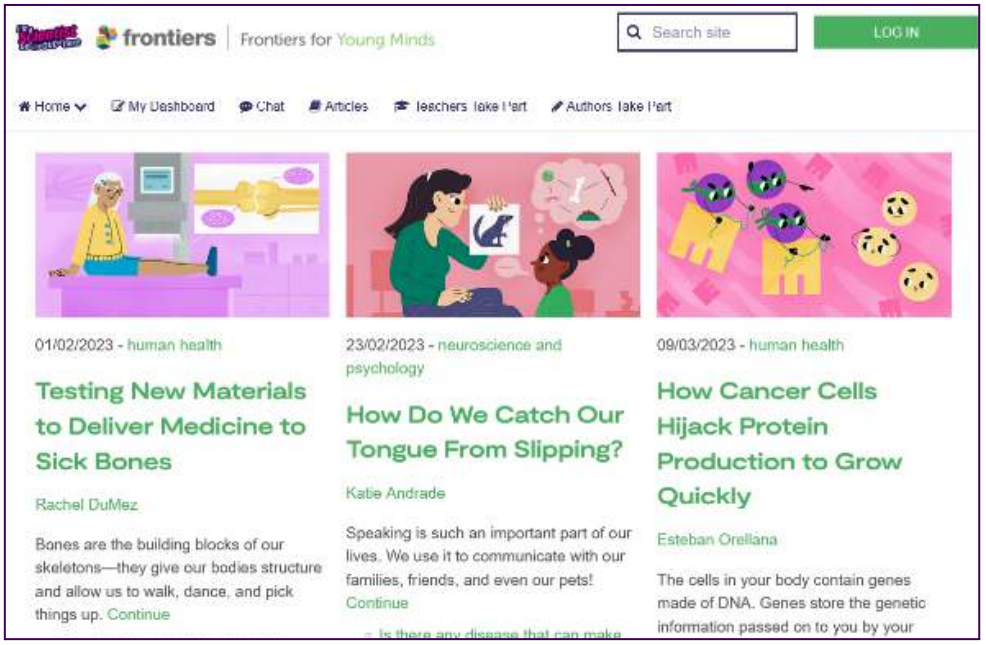
### Frontiers for Young Minds

Frontiers for Young Minds (FYM, kids.frontiersin.org) is science for young people, edited by young people; an open-access scientific journal written by scientists and reviewed by a board of young people.

### *I'm a Scientist:* Frontiers for Young Minds Zone

The Frontiers for Young Minds Zone (fym.imascientist.org.uk) gave secondary school students the chance to delve deeper into science and develop their scientific literacy. After reading the peer-reviewed academic articles on FYM, they could connect with the authors in online Chats.

The Zone ran over 4 weeks, in June 2023.



# Summary of objectives

| Objective | Outcome |
|---|---|
| ***1. Site*** | |
| a. Produce an FYM branded zone at: fym.imascientist.org.uk | Branded zone produced at: fym.imascientist.org.uk<br><br>*See: Appendix III: Site updates and development* |
| ***2. Authors*** | |
| a. Select 10 articles from a single subject area such as "biodiversity" with multiple authors. Invite the authors to participate | Additional subjects were chosen due to response rates from authors and feedback from teachers that additional subjects would be beneficial.<br><br>Ultimately, 10 articles were selected: 4 articles on Biodiversity were selected, 3 on Human health, 2 on Neuroscience and psychology, and 1 on Mathematics.<br><br>11 authors were given access to the site (only 1 article was represented by 2 authors).<br><br>*See: Authors and articles* |
| b. Provide briefing notes for authors and offer training sessions | Authors were provided with briefing notes, and invited to join training sessions over Zoom. Additionally, demonstration Chats were run; and before each Chat, the moderator would briefly go through the process with the author. |
| ***3. Schools*** | |
| a. Recruit 30 schools to participate<br>i. FYM schools to be given priority<br>ii. Schools from lower income areas and distant from universities to be given priority | 90 schools registered to take part, 86 were given access to the Zone, 15 actively took part.<br><br>3 of 6 participating UK schools were distant from universities, 2 were from lower income areas.<br><br>*See: School registrations* |
| b. Promoted as post-16 activity | Following discussion with FYM and teachers the activity was additionally promoted to younger students in KS3, 4, and 5. |

| Objective | Outcome |
|---|---|
| c. Schools from CEST +/- 1 hour to assist with time zone management | Range of time zones was broadened following registrations from schools and authors in additional time zones. |
| ***4. Activity*** | |
| a. Site live for student activity from 3 January to 31 March 2023 | With agreement with FYM, following feedback from teachers and an extended planning period, the Zone ran in June. |
| b. Host 10 open chats: 1 for each article | Open Chats were initially scheduled for each article. After lack of engagement in the initial sessions however, the remaining sessions were cancelled. |
| c. Host 15 class chats at times suitable for authors and schools | 12 Chats took place.<br><br>22 Chats were scheduled; 5 were cancelled in advance, in 4 cases the authors did not attend, and in 2 Chats the school did not attend.[1]<br><br>*See: Summary of activity* |
| d. Moderate chats and follow up questions | All chats and follow up questions were moderated. |
| e. Provide updates and promotions to participating students and teachers | Participants were updated through emails and posts on the site.<br><br>*See: Appendix IV: Schools promotion and recruitment* |
| ***5. Evaluation*** | |
| a. Evaluation plan to be agreed in advance to include:<br>i. Web metrics and analytics<br>ii. Student/teacher/author surveys<br>iii. Teacher/author interviews<br>iv. Produce evaluation report | Evaluation findings, metrics, and analytics are detailed in this report.<br><br>Teacher interviews were carried out.<br><br>Students were surveyed before and after taking part.<br><br>*See: Feedback and impact* |

[1] In 1 case, neither the school nor the author attended.

# Planning

## Planning

Planning for the collaboration between IAS and FYM started in August 2022. A formal Memorandum of Understanding was agreed in late November 2022. Conversations about design continued through to February 2023 before the process of recruiting authors could be started. An initial slow response from authors of Biodiversity themed papers slowed down the launch to schools, but a flurry of author sign ups in April allowed for an early May launch to schools for a June activity.

June was not ideal. While it was fine for UK schools, in the US, Ireland, and Spain schools were about to break up for their summer holidays.

## Article selection

The articles to be featured in the Zone were selected ahead of recruiting authors. Initial criteria for article selection were:

- Topic of the article to be linked to Biodiversity. The intention was that by having all articles linked to the same theme, it would be easier for teachers to select alternative articles should the authors of their first choice article not be available.
- Authors to be based within CEST +/- 1 hours.
- Articles to have a minimum of 2 authors. The intention was that there would be multiple authors in each chat.

Initial slow response from authors on the Biodiversity topic, and authors and schools registering from additional time zones led to these criteria being broadened.

## Author briefing

Authors were given training and briefing before taking part in Chats.

All participating authors were emailed with an explanation of the project, a link to the briefing notes and instructions on how to get started. Multiple 30 minute Zoom sessions were run to meet, and explain to authors how the activity would work, and demonstration Chats were run with live streams.

Finally, before each Chat, the moderator would briefly go through the process with the author.

# Participants and activity

## Summary of activity

| Students and schools | |
|---|---|
| Students logged in | 238 |
| Students active[2] | 137 |
| Students active % | 58% |
| Schools active | 15 |

| Authors and articles | |
|---|---|
| Authors given access | 11 |
| Authors active | 10 |
| Articles represented | 10 |

| School Chats | |
|---|---|
| Requested | 40 |
| Scheduled | 22 |
| Attended | 12 |
| - *Cancelled in advance* | *5* |
| - *School no show* | *2* |
| - *Author no show*[3] | *4* |
| Lines of Chat (students only) | 865 |
| Average lines per Chat | 58 |

| Open Chats | |
|---|---|
| Scheduled | 10 |
| Attended by students | 0 |

| Follow up questions | |
|---|---|
| Asked | 43 |
| Approved | 41 |
| Answers | 40 |

### Active Engagement

241 students from 15 schools logged into the Zone. 57% of students actively engaged through joining a Chat, or posting a follow up question or comment.

4 Chats were run through a single account — with the teacher typing questions on behalf of the students in the class — and it is also common for students to share computers in pairs or groups; it's likely therefore that the actual number of engaged students is higher.

Students engaged with 10 authors. Authors from all 10 articles either took part in Chats, or answered follow up questions.

The overall proportion of active students was lower than we would expect in a normal IAS activity. This looks to be mostly due to some Spanish schools registering a full class of students, but not

[2] Active students are those who joined a Chat, asked a follow up question, or posted a comment.
[3] In 1 instance, neither the school nor the author attended

having a chat or running it through their teachers. For english speaking schools with student-led chats the active ratio was 85%.

**Requested, scheduled, and attended school Chats**

In total, 40 Chats were requested, with 22 being booked. Before being booked, timings would be confirmed with the authors; reasons for Chats not being booked included:

- Schools requested more than 2 Chats. We restricted schools to 2 to avoid overbooking authors.
- Slots being already booked for other Chats.
- Author availability.

Of the Chats booked, 12 were attended: 5 were cancelled with advance notice from the school; in 3 Chats, the school attended while the author did not; in 1, neither the school nor author attended; and in 1 neither the school nor the author attended.

Regarding the cancelled sessions: Scheduling issues often arose around confusion over time zones, and in-school issues sometimes led to Chats having to be cancelled or rearranged.

In 4 cases where a school was unable to book their preferred chat students used the Ask feature to post questions to the authors.

**Open Chats**

An open Chat (open to all students taking part) was scheduled for each article. After a lack of engagement in the first 5 sessions, and lack of commitment to further Chats, the decision was taken to spare the authors' time and cancel the 5 remaining sessions.

# Site statistics

Statistics below show activity on the Zone during the activity.[4]

| **Page views** | |
|---|---|
| Total views | 7,704 |
| Unique views | 3,173 |

| **Exits to FYM site** | |
|---|---|
| Total clicks | 158 |
| Unique clicks | 126 |

**Visits and acquisition**

| ***Visits by role*** | ***Visits*** | ***Average visit time*** |
|---|---|---|
| *All roles* | *972* | *7 min 24 sec* |
| Students | 251 | 12 min 51 sec |
| Teachers | 112 | 6 min 56 sec |
| Authors | 103 | 7 min 54 sec |
| No role (Non-logged-in) | 506 | 5 min 42 sec |

[4] Site activity from 30 May to 7 July 2023.

# Authors and articles

- 11 authors representing 10 articles signed up to take part and were added to the site.
- 7 authors attended live chats, though due to a school absence in 1 chat, only 6 interacted with schools. The most active authors in Chats were:
    - Rodrigo Disner *(A Blessing in Disguise: From Fish Venom to Novel Medicines)*
    - Esteban Orellana *(How Cancer Cells Hijack Protein Production to Grow Quickly)*
- 10 authors posted answers and comments to follow up questions asked by students. The most active authors in follow up questions were:
    - Eva Rath *(Organoids—Mini Guts Help Answer Big Questions About Intestinal Nutrient Transport)*
    - Ryan Weir *(Agrobacterium: Soil Microbe, Plant Pathogen, and Natural Genetic Engineer)*
    - Lilach Soreq *(How Do Our Brains Change as We Age?)*
- Authors from all 10 articles engaged in either Chats, or by answering follow up questions.

| Article topic | Article | Author | Chats attended | Answers to follow up questions |
|---|---|---|---|---|
| Biodiversity | *A Blessing in Disguise: From Fish Venom to Novel Medicines* | Rodrigo Disner | 3 | 2 |
| | *Agrobacterium: Soil Microbe, Plant Pathogen, and Natural Genetic Engineer* | Ryan Weir | 2 | 9 |
| | *How Do Bacteria "See" Molecules Inside Themselves?* | David Hiller | - | - |
| | | Andrew Knappenberger | - | 1 |
| | *Tricking the Bees: How Some Flowers Cheat* | João Aguiar | 2 | 5 |
| Human health | *How Cancer Cells Hijack Protein Production to Grow Quickly* | Esteban Orellana | 3 | 3 |
| | *Organoids—Mini Guts Help Answer Big Questions About Intestinal Nutrient Transport* | Eva Rath | - | 10 |
| | *Testing New Materials to Deliver Medicine to Sick Bones* | Rachel DuMez | - | 1 |
| Mathematics | *What Does Math Have to Do With Patterns in Fish?* | Alexandria Volkening | 1 | 2 |
| Neuroscience and psychology | *How Do Our Brains Change as We Age?* | Lilach Soreq | 1 | 6 (+5 comments) |
| | *How Do We Catch Our Tongue From Slipping?* | Katie Andrade | (1 school absence) | 1 |

# Schools and students

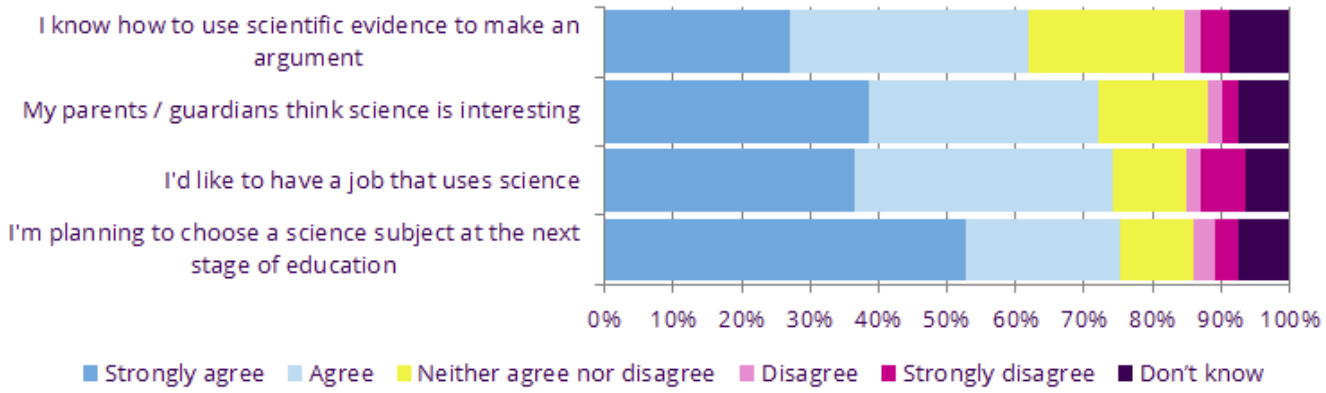
## Student pre-Chat survey

Students were invited to complete a survey before taking part in the activity. The survey was embedded on their profile pages, with the intention that it be filled in before reading any articles or taking part in any Chats.

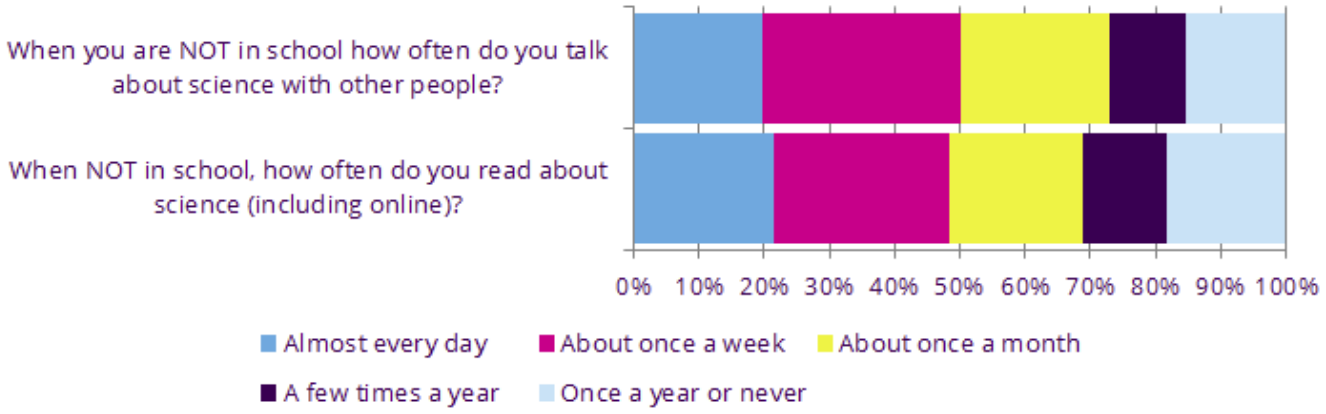
The purpose of this survey was to understand who the students taking part were, and an understanding of the existing level of science capital that the students had.

101 of the 242 students (42%) who logged into the Zone, completed the pre-event survey.

**How much do you agree or disagree with the following statements?**




**Engagement with science outside of school**




Based on these responses, it is likely that many of the students taking part had a high level of science capital already. This would tie in with the teacher feedback where they were choosing high-attaining groups of students (top sets), and A-level groups to take part.

## School registrations

**92 teachers from 90 schools registered to take part:** Registrations came primarily from teachers in Spain (40 teachers) and the UK (38 teachers), with additional registrations from the US, Ireland, India, Japan, Malaysia, Qatar, and Saudi Arabia.

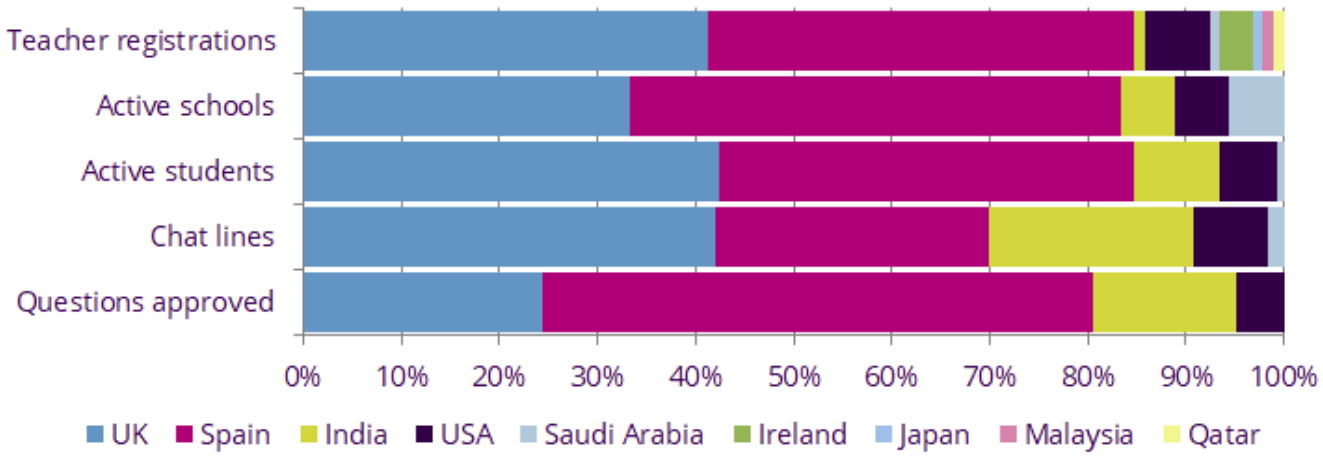
**86 teachers were given access to the Zone:** Those not given access were asked for information missing from their registration and did not reply, or applied late.

**Students from 15 schools actively took part:** Participating schools were primarily in Spain (7 schools) and the UK (5 schools), with additional schools taking part from India, Saudi Arabia, and the US.

The majority of teachers who did not take part, did not give reasons, though some did: In Spain, the summer term ended in mid-June; a teacher in Japan was unable to take part at any of the times the authors were available due to time differences and constraints of the school timetable; other teachers had issues with changing timetables.

**FYM schools:** 7 schools registered following promotion from FYM. 4 were given access to the Zone, 2 actively took part: ASPIRE Higher Secondary School, India; and King Abdullah University of Science and Technology, Saudi Arabia.

## Activity by country



## School activity

| School | Location | UK Priority | Student logins | Active students | Articles engaged with | Chat sessions [5] | Chat questions[6] | Follow up questions approved |
|---|---|---|---|---|---|---|---|---|
| Trinity CE Secondary School | Kent, UK | - | 26 | 23 (88%) | Agro-bacterium | **1** | 71 | - |
| La Salle Burgos | Spain | | 31 | 20 (65%) | Bees | **1** | 24 | 2 |
| Darrick Wood School | Kent, UK | - | 16 | 13 (81%) | Cancer cells | **1** | 32 | - |
| Colegio Santa Teresa de Calahorra | Spain | | 13 | 13 (100%) | Maths | **1** | 26 | - |
| MidKent College | Kent, UK | U | 15 | 12 (80%) | Agro-bacterium | (1) | (60) | 9 |
| ASPIRE Higher Secondary School | India | | 14 | 12 (86%) | Brains, Cancer cells | **3** (1) | 62 (7) | 6 |
| Colegio El Regato | Spain | | 25 | 11 (44%) | Organoids | - | - | 10 |
| Beaulieu Convent School | Jersey, UK | U | 9 | 9 (100%) | Fish venom | **1** | 24 | - |
| Clarkstown High School North, Rockland | USA | | 9 | 8 (89%) | Bees | **1** | 34 | 2 |
| IES Blas Infante | Spain | | 27 | 6 (22%) | [Many articles] | - | - | 10 |
| Colegio Santa Ana | Spain | | 6 | 5 (83%) | Fish venom | **1** | 11 | 1 |
| IES Sierra Sur | Spain | | 4 | 3 (75%) | Organ-oids | (1) | (1) | - |
| Colton Hills Community School | West Midlands, UK | WP/U | 1 | 1 (100%) | Cancer cells | - | - | 1 |
| King Abdullah University of Science and Technology | Saudi Arabia | | 1 | 1 (100%) | Brains, Tongues | (2) | - | - |
| IES Ramón Pignatelli | Spain | | 29 | - | Bees, Fish venom | **2** | 28 | - |

[5] Booked sessions which did not go ahead due to the author or school not attending are shown in (brackets).
[6] Figures represent the number of questions asked to authors in Chats, excluding Chat lines such as "Hello", or "Thanks". Figures in (brackets) represent questions in Chats that unfortunately were not answered as the author did not attend.

In addition to the schools listed above, students from 2 other schools logged in to the Zone, though they did not engage.

The video format of the Chats meant that it was not necessary for every student to have their own account and to type in the session — though this was possible, and was encouraged — instead it was not uncommon for many questions to be asked through a single account, therefore the number of actively engaged students is expected to be higher than the figures shown above. For example, in the case of 1 school where there appears to be 0 active students, but 28 questions were asked in the Chats; these questions were asked through the teacher's own account.

## Student site profiles

| | Students | %[7] |
|---|---|---|
| Provided an email address | 154 | 67% |
| Opened emails from the site | 108 opened 263 emails | 47% |
| Downloaded a certificate | 20 | 9% |

[7] % of 229 home zone student accounts

# Chats

## Requests, bookings, and attendance

Teachers were asked which articles they were most interested in when registering. There was little-to-no correlation between these choices, and the articles for which teachers eventually requested Chats. Reasons for this will likely include some teachers selecting the articles on the form before having looked properly at them, but author availability is likely a larger factor. With only one author per article, the times at which Chats could be booked were limited, and teachers likely had to choose the authors who were available during their class times.

The table below shows which articles were requested for Chats by teachers. Due to matching authors' and schools' schedules, it was often not possible to book a session for the requested article, and instead alternate articles were offered.

| Article | Requested | Booked | Attended | Cancelled /no show |
|---|---|---|---|---|
| *How Do Our Brains Change as We Age?* | 10 | 3 | **1** | 2 |
| *Organoids—Mini Guts Help Answer Big Questions About Intestinal Nutrient Transport* | 6 | 3 | - | 3 |
| *Agrobacterium: Soil Microbe, Plant Pathogen, and Natural Genetic Engineer* | 5 | 4 | **2** | 2 |
| *Tricking the Bees: How Some Flowers Cheat* | 5 | 2 | **2** | - |
| *How Cancer Cells Hijack Protein Production to Grow Quickly* | 4 | 3 | **3** | - |
| *A Blessing in Disguise: From Fish Venom to Novel Medicines* | 4 | 3 | **3** | - |
| *What Does Math Have to Do With Patterns in Fish?* | 4 | 1 | **1** | - |
| *Testing New Materials to Deliver Medicine to Sick Bones* | 2 | 1 | - | 1 |
| *How Do Bacteria "See" Molecules Inside Themselves?* | 1 | 1 | - | 1 |
| *How Do We Catch Our Tongue From Slipping?* | 1 | 1 | - | 1 |

## Chat activity

The word cloud shows the most common words used in questions from students:

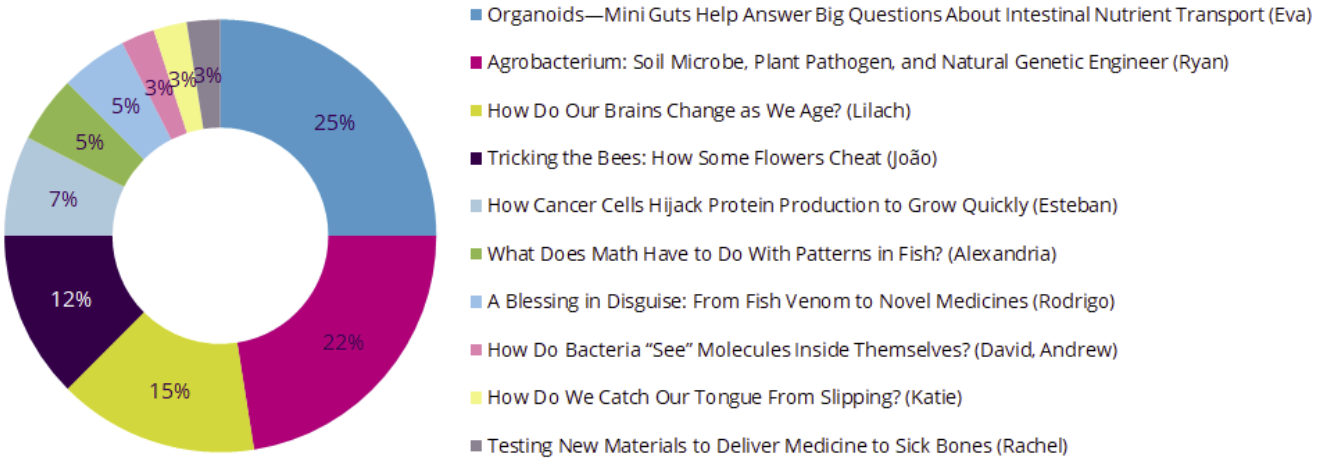

# Follow up questions

Students from 5 schools asked follow up questions following Chats. In all cases, the articles the students asked questions of were the same as those from their Chat.

Additionally, 3 schools which did not take part in a Chat asked additional questions. 1 of these schools asked questions on a single article, for which they had booked a Chat session that unfortunately had to be cancelled. 1 school asked questions of 9 different articles, and the remaining school had a single student asking a question of 1 article.

The quality of the follow up questions was excellent. The majority demonstrated a reading of the article and were relevant to the authors.

### Questions by article

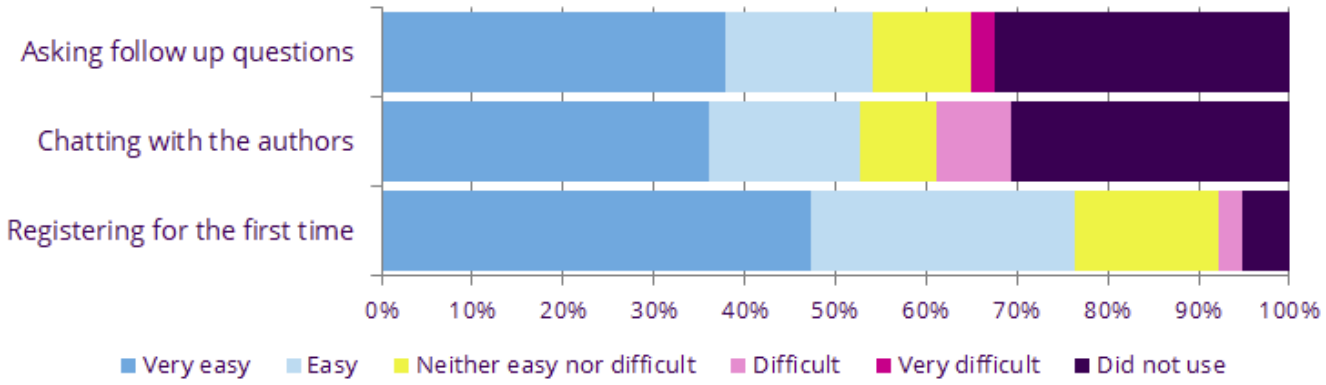


# Feedback and impact

## Students

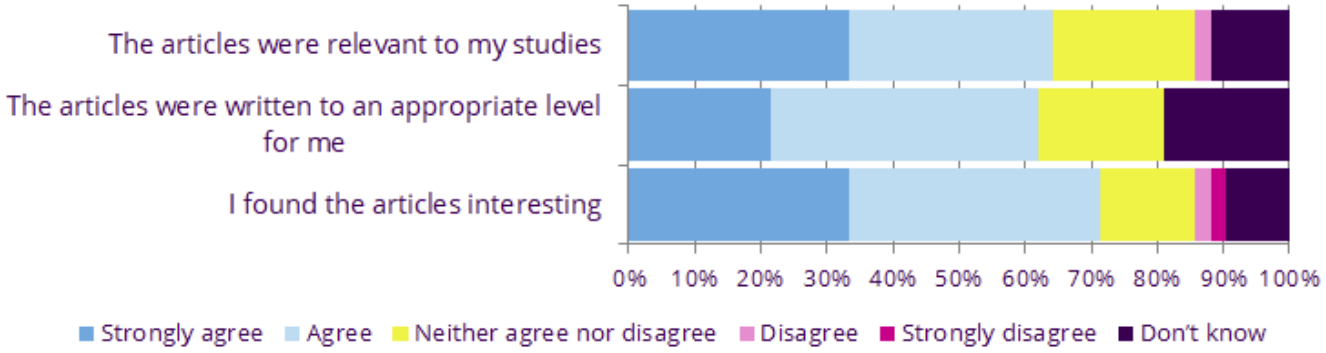
Students were invited to complete a short survey after they had completed their Chat. 45 of 234 students (19%) who actively participated completed the survey.

**How did you find using the Frontiers for Young Minds Zone?**



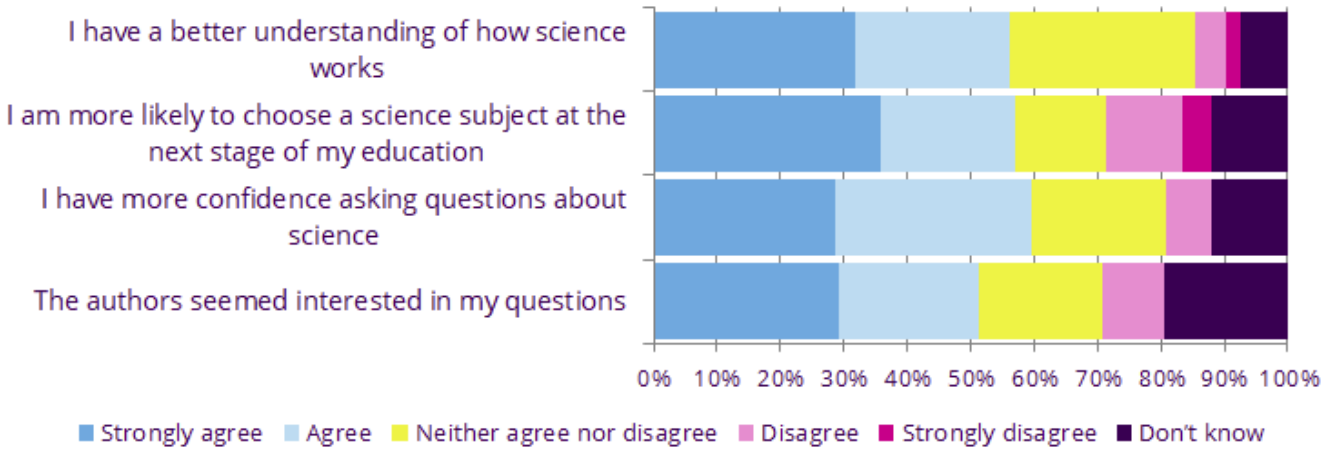

The majority of students found the site easy to use.

**How much do you agree or disagree with the following statements about the articles you read?**




The majority of students found the articles relevant, interesting, and to have been written at an appropriate level.

**After taking part in the Frontiers for Young Minds Zone, how much do you agree or disagree with the following statements?**




The majority agree that they have a better understanding of how science works, more confidence asking questions about science, and are more likely to choose a science subject at the next stage of their education after taking part. They also found the authors to be interested in their questions.

Many of the students taking part likely had an existing high level of science capital,[8] and reported already being likely to consider STEM subjects at the next stage of their education, or were already interested in jobs that use science. The majority of these students however, are still reporting positive impacts of taking part in the FYM Zone; taking part adds to, and supports existing science capital, while helping students to develop skills and knowledge.

[8] See: *Student pre-event survey*

# Teachers

Following the activity, telephone interviews were conducted with 4 participating teachers to discuss their experience.

## How the activity was used

### Year group selection

Typically, the teachers interviewed had taken part with students from around 13 to 18 years old.

> I used with top set year 10, would be nice to use with other year groups and abilities but to use with younger years I would need to adjust articles to allow students to access them. The length of articles alone would be a barrier for some students.
> **Teacher A, Post-event interview**

Additionally, teachers said they would be willing to take part with younger groups, one teacher said that the articles would be accessible for these cohorts.

### Article selection

The teachers interviewed felt that the choice of articles was good, linking to a range of curriculum areas, including specific topics as well as modelling and ethics.

> Really liked the way the images were in the article, well written and illustrated for young people.
> **Teacher A, Post-event interview**

One teacher at a school in Spain discussed the language used in the chosen article:

> The article [*(What Does Math Have to Do With Patterns in Fish?)*] was really good, I read it at home planning activity and thought students would understand but they couldn't do it for homework without my support and needed help with English. I didn't really know my students level of English because I always teach them in Spanish - I teach them maths and science.
> We read it in class together and they were able to understand the article with my help, we translated key terms together and I asked them "what do you think it means" to check they understood. We did the activity (mathematical modelling from the article) to make the fish patterns in class.
> **Teacher D, Post-event interview**

### Preparation

Teachers had students read the articles ahead of the Chat, either individually, in groups, or as part of the lesson.

One teacher had provided the article as homework, checking verbally that the students had understood; checking to see if they could recall the key concepts.

Another teacher had provided the article as the students came into the lesson, but said it would have been better to have prepared more, in advance:

> Would have been better to read it the lesson before, in future I'd get them to do what we do with Y13 reading scientific articles; we photocopy onto middle of an A3 page and get them to dissect in pairs, making notes around the outside of the article to really aid comprehension. Lower down school is excellent practice for A Level prep. Read it themselves before sharing in pairs.
> **Teacher A, Post-event interview**

## Benefits for students

Teachers interviewed were positive about the outcomes and benefits to students. One teacher at an international school mentioned students being more interested in pursuing science qualifications in further education. Additionally, teachers discussed increased understanding of opportunities, comprehension, and of how science works.

> With FYM I wanted to make sure students are aware of how broad ranging biology is which the article did. Chance to apply knowledge to real life science which makes them understand it more, improves attainment as well as enjoyment during the event. It's so purposeful.
> Good for literacy, the more they read the better they get across all subjects, that comprehension affects all subjects. I really want to promote reading and to then be able to see the author was great.
> **Teacher A, Post-event interview**

> They really enjoyed it and were hanging on every word. The article and our chat showed students that no matter how much we know they are opportunities to research and learn more - so valid for them to find out about science.
> **Teacher C, Post-event interview**

> I think it worked well to show them the applications of the science that they have to study here in school and they will use it in the future in their jobs and this shows them how. Some students liked the nature topic and were very interested in asking her Qs.
> **Teacher D, Post-event interview**

# Additional feedback

## Video Chats

Teachers who had taken part in IAS previously, using text only Chats were asked about the comparison with the video Chats. There were positives and negatives.

> I was pleasantly surprised, it was so great to have the author there and to have direct access to them. Students really enjoyed this version (have done text based before which was good too - both have value). It was an extra special experience.
> **Teacher A, Post-event interview**

> Benefits - whenever they were watching the author, they were listening to every word. Genuinely listening rather than battering the keyword or thinking about focussing on what they'd ask next (as they do in text-text chats). They were really part of the conversation.
>
> Down sides - A lot more lulls that text-text chats because author was continuing talking (filling the silence I think) and students didn't feel they could type another question. Advising the author to take strategic breaks to invite questions would help.
> A video-video or text-text format leads more into a natural chat. Text-text can use the reply function and create a thread - more naturally flowing conversation for younger years.
>
> **Teacher C, Post-event interview**

One teacher commented that it was difficult to get the students to listen to the author's responses for the full 40 minutes where they weren't able to type in the Chat the whole time; as there was only 1 author responding to questions, the teacher felt — reasonably — that the number of questions asked had to be limited.

Another teacher however, noted that they understood the Chat may have been overwhelming for a single author, were it text-only.

For a teacher in Spain, teaching students in Spanish, the video Chat worked much better than a text Chat would have, when speaking in English:

> Much better with video than text-text, I liked the way it worked this time. My students are 13-14 and sometimes they didn't understand the scientist well because she was fast speaking for non native speakers. With the video we could watch it again next lesson and talk about the answers from the scientist.
> **Teacher D, Post-event interview**

## Open Chats

Open Chats were initially scheduled for each of the articles, but none were attended. When asked about these Chats, teachers mentioned that they had told their students about them, but had perhaps not emphasised them, or promoted them too much. After lack of engagement in initial sessions, the decision was taken to cancel the remaining sessions.

One teacher mentioned that they didn't want to assign homework that wasn't directly revision-related, as the students had mock exams coming up. They were also a little wary of the students being rude to the authors when the teacher was not there (Year 10 students).

Another teacher only realised the Open Chats were available too late to make use of them, but commented that they would be valuable for teachers as well as students:

> I'd also like to attend the open chat to develop my subject knowledge - IAS has an impact on students and longer / wider impact on teachers / teaching. Gives me the ability to draw current research into the classroom.
> **Teacher C, Post-event interview**

## Timing

When asked about the best time of year to run the activity, responses varied depending on year groups.

> I would use with both year 12 and 13. However, I would be more likely to use with Year 13 much earlier in the year than now [(summer term)], due to external exams
> **Teacher A, Post-event interview**

> Now [(summer term)] for Y12. Students just finished AS exams, I wanted to keep it useful / linked to curriculum and help them remember what they'd been revising. Linking to career aspects as well, good time of year for UCAS applications / thinking about progression.
> **Teacher C, Post-event interview**

## Posters and login cards

The teachers interviewed, when asked, had not used the posters or login cards.

# Learning and challenges

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| **Activity management and Chat scheduling** | Much more hands-on management was required compared with a typical IAS activity: Chats had to be manually booked in to make sure the Authors would be available, there was also time spent matching teacher/class availability with Authors and appropriate articles. | In Phase 2 a combination of improving our systems and author familiarity will ease this situation |
| **Video Chats** | - Difficult to have multiple Chats running simultaneously as this required separate Zoom calls. Led to people joining the wrong Zoom call. More time consuming.<br>- Zoom worked well; it was familiar, and simple.<br>- In Chats where there were fewer than 5 students, the video functionality felt unnecessary, text-only Chat (as in standard IAS) would have worked well in these situations.<br>- Youtube livestream had a lag of ~20 seconds. This was awkward for authors, as the conversation was stilted. This would need an alternative with less lag in future. Though functionally, it did work. | The limited capacity and confusion over time zones required concurrent chats in June. We would avoid this on a longer period of activity.<br>Before Phase we would test some alternatives to YouTube livestream to eliminate the lag. |
| **Open Chats** | - No open Chats were attended by students.<br>- Chats were promoted in weekly emails to teachers, posts on sites to students, listed on open Chat article page.<br>- Some teachers were hesitant to have younger year groups (Year 9/10) take part without teachers being present, other teachers didn't appreciate the benefit, and may not have seen the activity as an independent learning opportunity.<br>- The timings of the Chats could be improved. | It is worth persevering with Open chats in Phase 2, but only after a couple of months have passed and allowed us to build up sufficient student numbers and demand.<br>We will try after school times. |
| **Event timing** | Initially the activity was planned for January to March, but was moved to the summer term following teacher feedback that this would be more appropriate for the post-16 students, together with difficulties in recruiting authors. | The project can work best if teachers can align the activity with their curriculum teaching. This requires a longer period of availability and more notice. |

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| **Authors** | Authors were often not available when they had said they would be. Having only 1 author per article made scheduling difficult and meant the Chats could not go ahead if an author did not attend. It would be helpful to have multiple authors per article.<br><br>There were multiple Chats scheduled where the author did not show up. | We are likely to remain with one author per chat due to scheduling.<br>However if more articles and authors were signed up it would make it easier for teachers to find a chat (or replacement chat) that suits. |
| **Time zones** | Chat bookings and requests were listed as "GMT+1", as in British Summer Time (BST). This led to some confusion among teachers.<br><br>Teachers in Spain thought the +1 was added to change it to the local time in Spain (though this would have been GMT+2, for CEST). This also proved confusing on a wider scale and for UK teachers, as it isn't a commonly used time zone descriptor.<br><br>It would have been clearer to say "UK time". | In Phase 2 we would implement local times for chat bookings. |
| **Teacher emails** | Teacher feedback across IAS projects has highlighted that teachers are receiving more emails than before and it is a challenge to stand out from the crowd. Teachers are also requiring more notice for activities where they are needing to plan further and further ahead. | We cannot control the amount of email that teachers receive. It will simply take time to build awareness of the project and to allow teachers to include it in their regular scheme of work. |

# Recommendation

This pilot project has shown signs of success. Feedback from teachers and students was positive. The quality of questions in the chats and in follow-up is excellent. The authors were mostly excellent.

It increasingly takes time to establish a new project with teachers. There are too many competing demands on their attention. To be more successful we need to allow teachers more time to understand the project and to schedule it into their scheme of work allowing them to align it with their curriculum teaching.

We recommend that we run the project again in a second 'Pilot Phase' for a complete school year (or as much of one as possible), but to keep it on the IAS server to maintain the FYM brand protection.

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# Appendices

## Appendix I: Preliminary teacher research

Preliminary research was conducted by teacher interviews to learn how the project might be used in schools.

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| **Age groups** | Teachers interviewed discussed using the activity with a wide range of age groups.<br><br>One teacher said they would use it with Sixth formers. When asked about the language used in the articles being aimed at KS3 pupils, the teacher said this wouldn't put them off; the language is accessible for everyone.<br><br>Another teacher felt it would depend on the articles themselves and how they link to the topics being studied. |
| **Class activity or independent learning?** | Teachers discussed using the activity as both a class activity, and for independent learning. One teacher suggested that it would be used in class for younger groups, and as independent learning for KS3 and 4. |
| **Timing** | Timing would vary depending on year group.<br><br>Multiple teachers felt that it would be best in the summer term, once coursework and exams had finished. |
| **Topic selection** | When asked if Biodiversity would be a useful topic for the article selection, a number of teachers interviewed felt that a broader range of topics would be more beneficial. |

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| **Benefits to students** | A number of potential benefits were mentioned:<br>- Contextual application of content<br>- Skills, group discussion<br>- Understanding structure of articles, citations vs. references, how articles are published<br>- Online activity allows use of assistive technology<br>- Independent learning, encourage students to be inquisitive<br>- Discussion skills (discussing articles with each other)<br>- Careers<br>- How authors communicate, use of appropriate technical language<br>- Make journal articles more relatable |
| **Support required** | A couple of teachers mentioned that students knowing that they can use their participation on their UCAS application, should be a good motivator to take part.<br><br>Other teachers mentioned videos explaining the site for students. |

# Appendix II: Changes to initial project plan

Based on feedback from teachers, as well as difficulties in recruiting authors, a number of changes were made to the initial project plan.

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| **Dates** | Initially the activity was planned to run January to March. Delays in approvals and a slow initial response from authors resulted in moving it back to June. |
| **Article topics** | Initially, the plan was to select articles on the single topic of Biodiversity. Difficulties in recruiting authors, together with feedback from teachers suggesting that a wider range of topics would be beneficial, led to broadening the topics to include other areas. |
| **Time zones** | Range was increased due response from authors. |
| **Chat format** | The standard IAS Chat format is text-based.<br><br>The plan was to select articles with multiple authors, meaning that each Chat could focus on a single article, while having multiple authors respond to questions.<br><br>With each article having only 1 author on the site, it was felt that the Chats would not flow, and may be overwhelming for the author. The decision was made to run the Chats as hybrid video-text chats; where the students would ask questions as text, and the author would respond over video.<br><br>If a chat involved five or fewer students, we would ask the author to respond via text. |

# Appendix III: Site updates and development

Various updates were made to the site, including development of additional functionality:

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| **Branding** | Site design on the FYM site was updated to match FYM branding. |
| **Display of articles** | Site updates were made to improve and enable article layout including tags, excerpts, images, and linking articles to the appropriate authors. |
| **User dashboard layout** | Updates were made to the site to allow new features on the user dashboards including following articles, and student progress bars. |
| **Chat booking form on articles** | Due to limitations with school groups wanting to chat with the authors of a specific article (rather than a wide range of scientists in a typical IAS activity), the regular Chat booking form was not appropriate. Instead the form was changed to show teachers only the times where the author would be available, and they could then request the booking, which would then be confirmed with the author(s) before being booked in.[9] |
| **Follow author/article** | Widgets were added to the site, allowing users to follow a particular author or article, which would then display in a feed on their profile, as updates, including news posts, questions about that article, as well as displaying the article on their profile. |
| **Video Chats** | Zoom was used to run Chats and livestream through YouTube simultaneously. |

[9] See *Learning and challenges*

# Appendix IV: Schools promotion and recruitment

## Promotion

Teachers were recruited from different countries.

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| **UK** | - 10 teachers were contacted as part of the initial project research. Most of the teachers in the UK who booked were these teachers.[10]<br>- End of April, mailer sent to a specific group of post-16 teachers (184 teachers)<br>- Early May, further group emailed (514 teachers)<br>- Throughout May and June, included in weekly emails to teachers signed up to the main IAS mailing list (up to 2,787 teachers) |
| **Republic of Ireland** | Teachers who had taken part in IAS in Ireland were invited to take part. Response was low, likely as schools close for summer in early June. |
| **Spain** | An email was sent to teachers in Spain who had previously taken part in *Somos Cientificos* (IAS in Spain).<br><br>There was an excellent response from teachers with many teachers expressing interest; 50% of post-16 science teaching in Spain is taught in English which made the FYM Zone site attractive. The time of year however, did not match well with teaching in Spain, with schools closing in early June. |
| **Germany** | Teachers who had taken part in IAS in Germany were invited to take part. The response was poor, likely because there was already a zone running in the German activity, and the FYM Zone would be in English. |
| **USA** | All teachers that had registered for IAS in the US were invited to take part, many of these schools however were middle and elementary schools which were not the target for the FYM Zone. Additionally, many schools in the US close for summer by early June. |

[10] See *Appendix I: Preliminary teacher research*

## Registration process

Teacher registration opened in April.

Teachers were asked to register using a short form asking for basic contact details, their school, as well as the articles in which they were most interested, and the age groups with which they would be taking part.

Teachers received an automated confirmation email.

From Thursday 11 May, registrations were reviewed, accounts were created, and teachers were contacted with instructions on how to access the site, choose an article to focus on, give their students access, and request Chats. Registrations after this date were processed within 2 working days.

## Communications

Following the initial onboarding email (information on accessing the site), follow up emails were sent with further instructions on selecting an article and requesting a Chat. These were sent 3 days, and 1 week after the first email.

Additionally, teachers were emailed the week before their scheduled Chat with a reminder, and instructions on preparing the students.

Weekly emails were sent to all teachers highlighting Open Chats for the current, and following week.

# Resources

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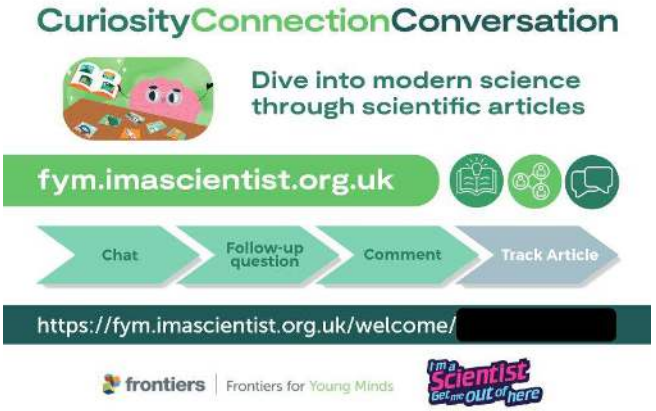
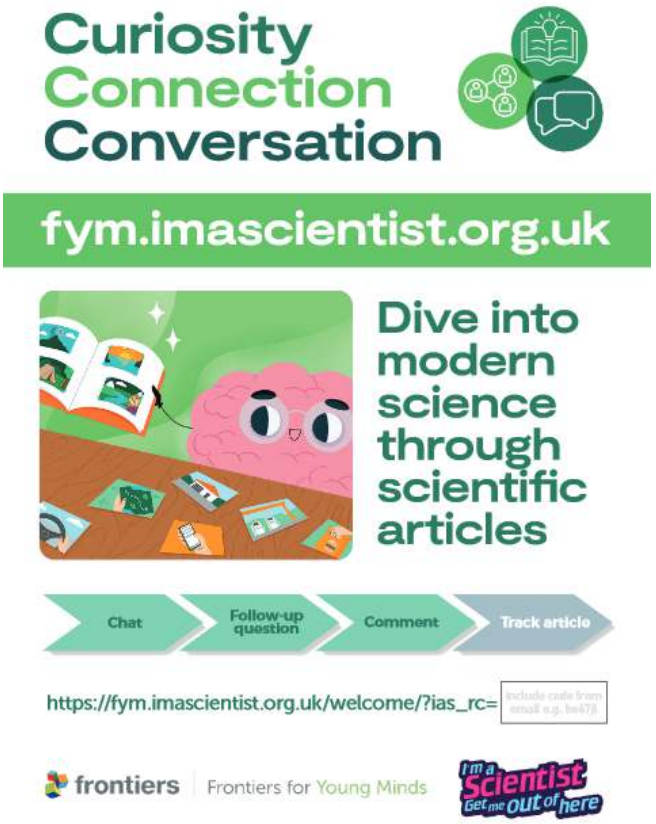
| **Student registration cards**<br>Registration cards were created which could be given to each student. They provided students with instructions for accessing the site, and importantly, were designed to function as a reminder to use the site for independent learning.<br><br>Number distributed: 29 |  |
| **Posters**<br>A poster was created to be displayed in schools.<br><br>Number distributed: 87 |  |