

SUMMER ROADSHOW

1st July - 15th August 2019

(7 weeks of CHaOS...)



What is CHaOS?

Cambridge Hands-On Science (CHaOS) is a non-profit, voluntary student group based at the University of Cambridge. We believe that science is fun, interesting and relevant to everyone, no matter their background. Our aim is to bring our knowledge and enthusiasm to children everywhere - we do this by driving a van full of "hands-on" experiments across the country.

How did the Roadshow begin?

CHaOS has been running for over 20 years. Since 1998, we held events in Cambridge as part of Cambridge Science Week. In 2002, we went on the road and ventured beyond Cambridge for a week - this was the birth of the Roadshow! We have grown as a student society massively since then, and today we are able to run Roadshows lasting 7 weeks!

How does the Roadshow work?

There are generally three types of CHaOS events run during the Roadshow:

1. School events
2. Public events
3. Jamboree events

In all three types, we bring a selection of our experiments. These could cover any of

Biology, **Chemistry**, **Physics**, **Maths**,
Engineering, **Medicine** or **Geology**.

Each experiment is demonstrated by one of our enthusiastic volunteers, who will be able to show off a cool effect to the children, and then explain the science behind it. We tailor our demonstrations to fit the child's age, interest and ability.

In schools, we generally set up in some labs or a hall, and demonstrate to whole classes of children, taking them off teachers' hands. When not in schools, we usually ask to host an event for the day at various public venues, including libraries, markets or museums.

Finally, for one week this year, we split our volunteers and went to two Scout Jamborees. These are a nice change from the usual things we do, and it gives us a further opportunity to reach out to even more children!

Where does our money come from?

This endeavour is not cheap. We need to consider the costs of travelling to venues, getting volunteers to us (usually via train), camping in one region for a week, food and general looking-after of our volunteers. In all, the roadshow usually comes to somewhere between £10,000-£20,000.

We do not charge for entry to our public events, as our goal is to reach out to as many people as possible. We ask schools for a small voluntary contribution for our work with them on school events. However, our main source of funding is our very generous sponsors, which this year included organisations such as:



IOP Institute of Physics



**BIOCHEMICAL
SOCIETY**



**ROYAL SOCIETY
OF CHEMISTRY**



Where did we go this year?

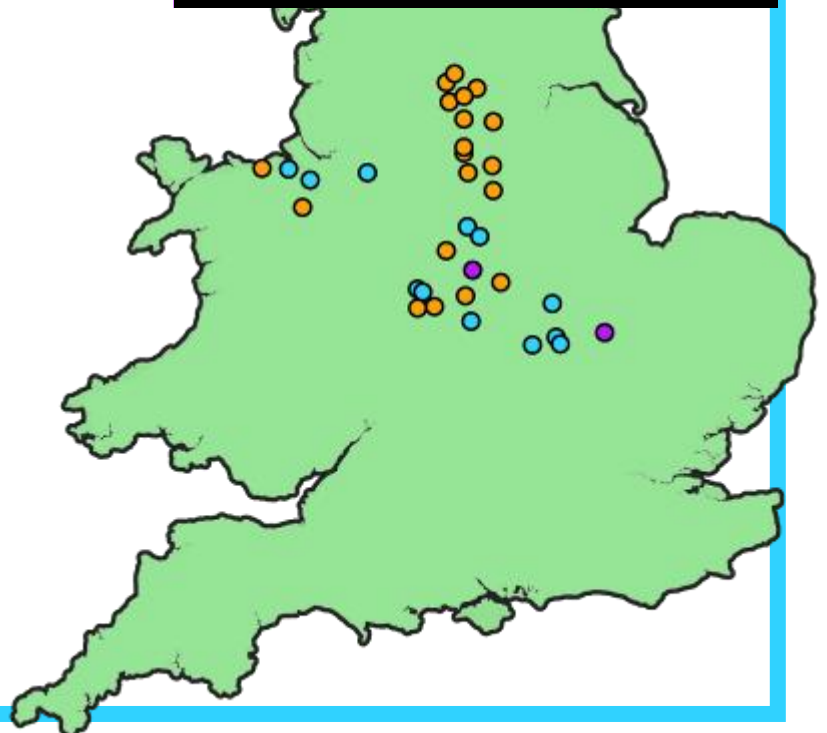
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						30 June Travel Day
1 July Studfall Junior School	2 Kingsthorpe College	3 Irchester Community Primary School	4 Wrenn School	5 Travel Day	6 Midlands Arts Centre	7 Hatchford Brook Summer Fair
8 Earlsdom Primary School	9 Wilson Stuart School	10 Great Barr Academy	11 Great Barr Academy	12 Travel Day	13 Wrexham Library	14 Ffordd Las Community Centre
15 Golfryn Primary School	16 Kingsmead Primary School	17 Ysgol Treffynnon	18 Rest Day	19 Travel Day	20 Burton Outdoor Market	21 New Walk Museum
22 St Benedict Catholic Academy	23 Merrill Academy	24 Nuneaton Library	25 Jamboree Preparations	26 Jamboree Preparations	27 Jamboree Preparations	28 Jamboree Preparations
29 CamJam Charnwood	30 CamJam Charnwood	31 CamJam Charnwood	1 August CamJam Charnwood	2 CamJam	3 Travel Day	4 Creswell Crags Museum
5 Sheffield Winter Gardens	6 Kelham Island Museum	7 The Mansfield Museum	8 Chesterfield Museum & Art Gallery	9 Travel Day	10 Queen's Mill	11 Cusworth Hall Museum
12 Oakwell Hall NCMME	13 Leeds Central Library	14 Barnsley Market	15 Wakefield College	16 Travel Day		

When looking for areas to visit, we try to target those where science access for children is not as prevalent. When looking for schools, we try to target less well-off schools, where perhaps students are performing below the national average, particularly in science.

- This year, we travelled to
1. Northampton & Kettering
 2. Birmingham
 3. North Wales
 4. The Midlands
 5. Nottingham & Sheffield
 6. West Yorkshire

In addition, we went to two Scout Jamborees at the same time - CamJam and Charnwood.

KEY	
School event	Public event
Jamboree event	Non demonstrating day



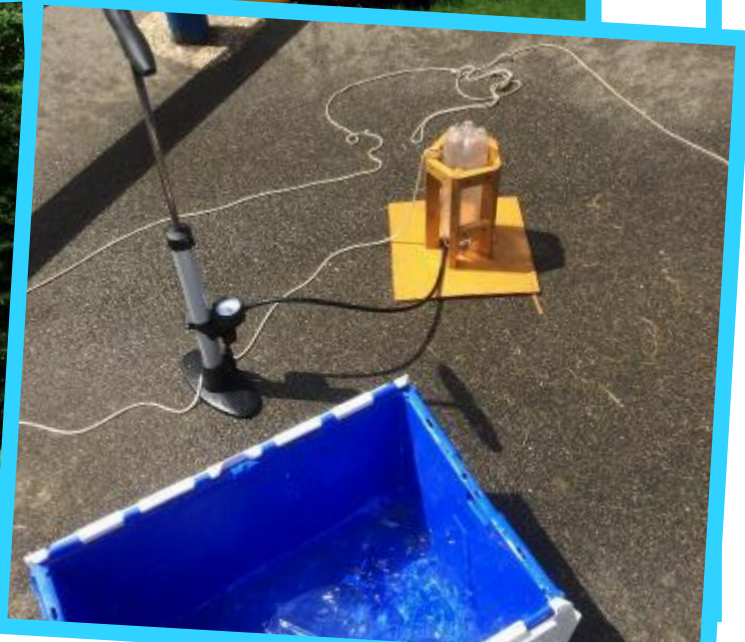
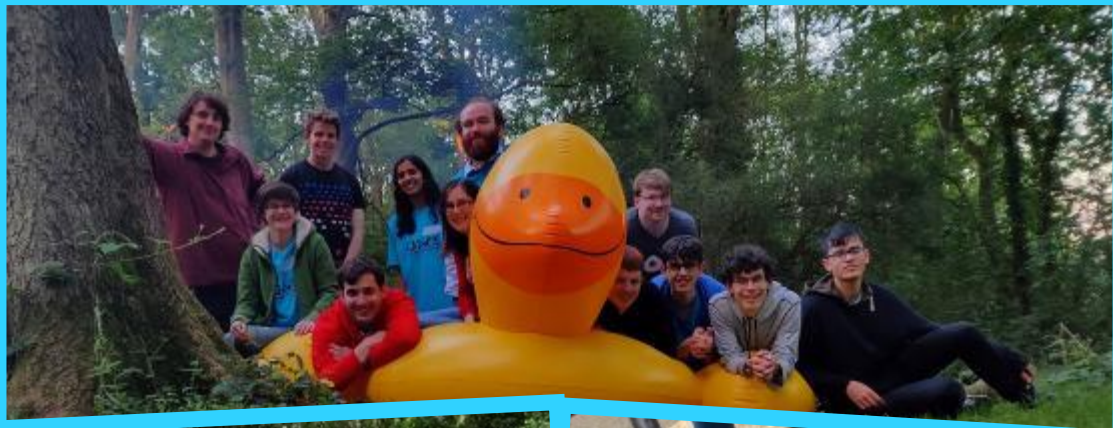
WEEK 1

Northampton & Kettering

To kick off tour this year, we headed to schools in and around Northampton & Kettering. We visited *Studfall Junior School*, *Kingsthorpe College*, *Irchester Community Primary School* and *Wrenn School*. We saw lots of kids from both primary and secondary school years. In each school, we ran multiple sessions (roughly 1 hour long), and in each session the children were split into smaller groups to see the demonstrators. We tried to make sure each school had a mix of experiments to show off, including **Animal Skulls**, **Fruit Batteries** and **Arch Bridge**.

The children of Irchester Primary ran a “Reverse CHaOS” session, where they were showing **us** some cool experiments! They were part of “Lab_13 Irchester”, who are encouraged to explore science in a dedicated space in the school. Alice Draper, a former CHaOS member, now working at Irchester, was at the heart of organising this day. We learned so much from the kids, and we borrowed a few of their ideas for ourselves - in particular, we found that **Sounds from a Slinky** is a much cooler version of our **Sounds from an Oven Shelf**.

Finally, the children of Studfall Junior School enjoyed us so much, they wrote us letters telling us so! Lots of them mentioned **Prism Goggles** in particular as their favourite.



WEEK 2

Birmingham

Our next stop was Birmingham, where we would have our first public events on the Saturday and Sunday. These were at *The MAC* and *Hatchford Brook Summer Fair*. The public brought their kids along to see things like **Organ Vest**, **Exploring Genes** and **Spinny Chair**. The Summer Fair in particular was interesting, as a giant inflatable dinosaur named “Golfzilla” sat opposite us.

We also visited three schools over four days during the week. These were *Earlsdom Primary School*, *Wilson Stuart School* and *Great Barr Academy*. We had previously visited Wilson Stuart School (a special needs school) and some of the children fondly remembered us. Due to the nature of this particular school, we brought more sensory experiments, such as **Oil and Pyrex** and **Air Streams**. They responded very well to our visit! At Great Barr Academy, we ran a “CHaOS Plus” session, where we talked to older kids about higher education, as well as going deeper into some of our experiments. We had a chance here to try some of our new/rare experiments, such as **Cornflour Monster** and **LEGO Seismometer**.

Lastly, after hearing such wonderful stories about the place, we blew off some steam one evening and visited Birmingham’s famous *Star City*, treating ourselves to some food, films and fun!



WEEK 3

North Wales

Our third week saw us visiting places around North Wales. At the weekend, we went to *Wrexham Library* and the *Ffordd Las Community Centre* in Rhyl. The latter event in particular was helped by publicity on Facebook. We brought along experiments including **Giant Hand Model** and **Water Rockets**.

During the weekdays, we went to three schools: *Golftyn Primary School*, *Kingsmead Primary School* and *Ysgol Treffynnon*. At Kingsmead, as the students were about to head home, we had a fire evacuation for the first time in our memory, though our Safety Officer was pleased that this wasn't caused by us! We particularly enjoyed supporting the fledgling science department at Ysgol Treffynnon - the school had been without permanent science teachers in the previous year, so we hope some CHaOS magic helped enrich their students' learning in the face of this disruption.

This week also gave rise to many new things. **Scant Wassum** was one child's favourite experiment, and definitely not an illegible scribble they had written for us. We had also developed a signal for delivery of prunes to our experiment stations when we were hungry. See diagram below for efficient summoning instructions.

Finally, after a long week, we also had a day of rest, rewarding the hard work of our volunteers with a trip to the beach!



WEEK 4

The Midlands

After a brief stop at *Star City* once again (apparently CHaOS's favourite place now) we arrived at our campsite in North Warwickshire. The public events for this week were at *Burton Outdoor Market*, *New Walk Museum* in Leicester and *Nuneaton Library*, and the schools we saw were *St. Benedict Academy* and *Merrill Academy*, both in Derby.

The hot weather allowed us to go outside and bring experiments such as **Cornflour** and **Trebuchets** to the public venues. We also took **Boris** for a walk around Burton upon Trent to bring people to us. One girl enjoyed the event so much she refused to leave, and another came and found us at our next venue the following day! The weather wasn't all kind - we experienced a nasty wake-up call on a particularly stormy night. We discovered the damage the following morning (see image below). However, we did not let this storm dampen our spirits!

At the schools we did more of the usual, including **Cuddly Microbes** and **Spaghetti Loading**, but we also did some extra things... At St. Benedict Academy, we ran another "CHaOS Plus" session with the year 12s. At Merrill Academy, we held a Q+A session with the kids, to encourage them to think about science at higher education. In both cases we were trying to dispel myths such as having to be "rich" or "posh" to go to Cambridge.



WEEK 5A

Charnwood

We had a few days off to prepare for a CHaOS first - two Jamborees at once! We had elaborate plans for splitting our experiments between the two venues, making sure to keep a good mix at both. The first Jamboree was *Charnwood International Scout and Guide Camp*, located in Leicestershire. We were in the STEM tent for the week. Our demonstrators had fun showing off a real **IR Camera** we borrowed, and challenging kids to see if they're smarter than animals with **Animal Cognition**. We had fun with some other activities on offer at the camp when not demonstrating, like jumping on bouncy castles and learning about riot policing!

Unfortunately, our time at this scout camp was cut slightly short, as the weather was not kind to the delicate farm ground we were based on. The Jamboree was closed early, but that didn't stop us! Some demonstrators were quickly transferred to the second Jamboree...



CHARNWOOD 2019



WEEK 5B

CamJam

Our other Jamboree was *CamJam*, located just outside Huntington. Unlike Charnwood, the camp was built on a racecourse, and so the ground was much more forgiving to adverse weather. As a result, CamJam lasted the full week, gaining some Charnwood refugees for the final demonstrating day.

We had our own marquee in the “Fire It Up” zone of the Jamboree. We showed the kids the power of **Vacuums** and **Vacuum Bazookas**, challenged their brains with **Thinking Caps**, and annoyed everyone in the tent with the loud pops from **Electrolysis**. We also built lots of things, including the rare and difficult **Suspension Bridge**, and our own second **Boris** from spare parts. We’re still not sure how the original is taking it. The kids all appeared to love our section, with many coming back on subsequent days. The adults praised our enthusiasm, and even got involved with some demos themselves!

In the evenings we played games and danced to the live music CamJam offered. We also dabbled in activities such as Fire Juggling and Cannon Running.



WEEK 6

Sheffield & Nottinghamshire

After the craziness of being in two places at once, we continued our tour towards The North. Schools were closed for the holidays at this point, so all our events were now public events. Over the week we went to *Creswell Crags & Prehistoric Gorge*, *Sheffield Winter Garden*, *Kelham Island Museum*, *The Mansfield Museum* and *Chesterfield Museum & Art Gallery*.

We showed the kids lots of experiments such as **Blood Groups**, **Tree** and **Polarisation**. We even experimented with pizza ovens we found back at the campsite, to treat ourselves after a long day of work!



WEEK 7

West Yorkshire

Our last week took us to West Yorkshire. Again the whole week consisted of public events. We went to *Queen's Mill*, *Cusworth Hall Museum*, *Oakwell Hall*, *National Coal Mining Museum*, *Leeds Central Library*, *Barnsley Market* and *Wakefield College*. We made messes with **Slug Bubbles** and **Mini Explosions**, showed off **X-rays** and **A Bug's Life**, and taught kids how to be programmers with **LEGO Robots**.

It seems too that we didn't learn our lesson about doing two events at once, as we did precisely this again on the Monday. We called in extra reinforcements for the day to help us out with this, and we made it work well.

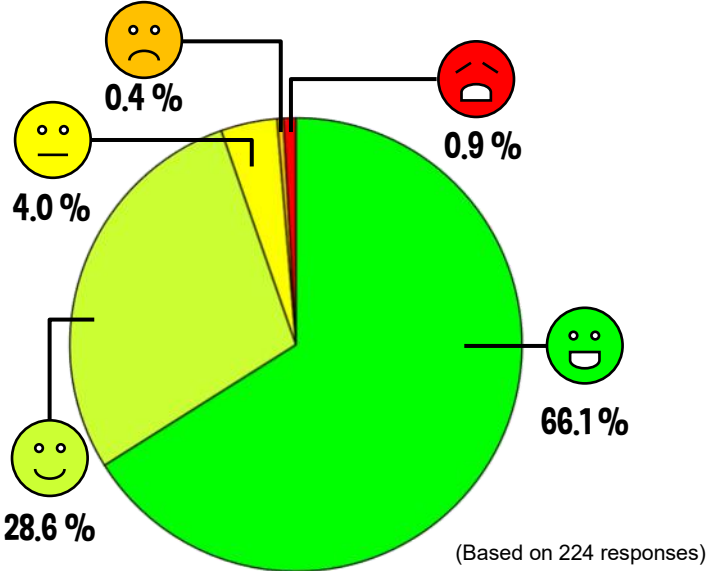
Despite it being the end of a long and tough 7 weeks, spirits were still high, and we hope the children of The North (and indeed the rest of the country) had a great time with us!



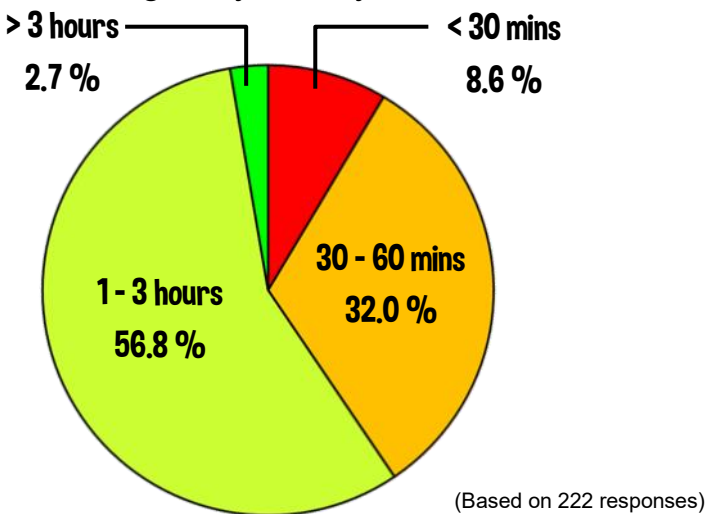
STATISTICS

We offered our visitors questionnaires to ask about their time with us, and we received over 200 responses...

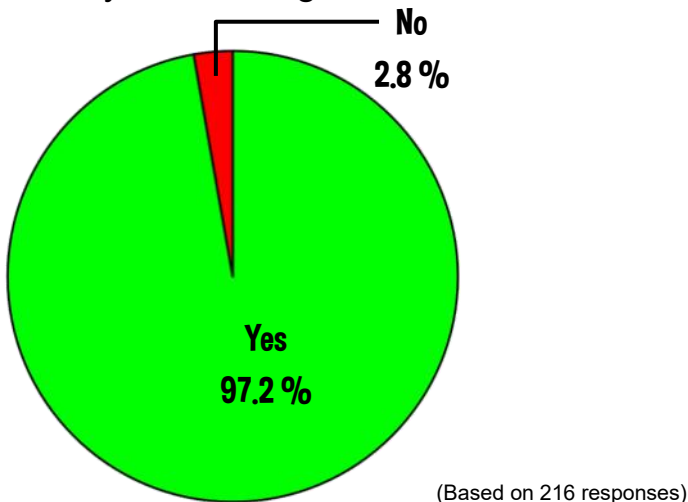
How much did you enjoy the event?



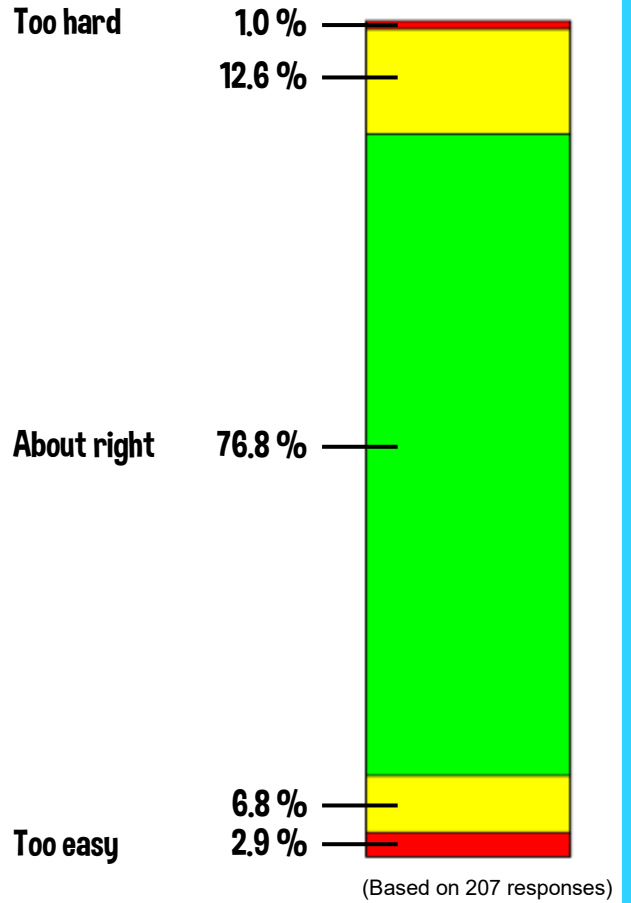
How long did you stay?



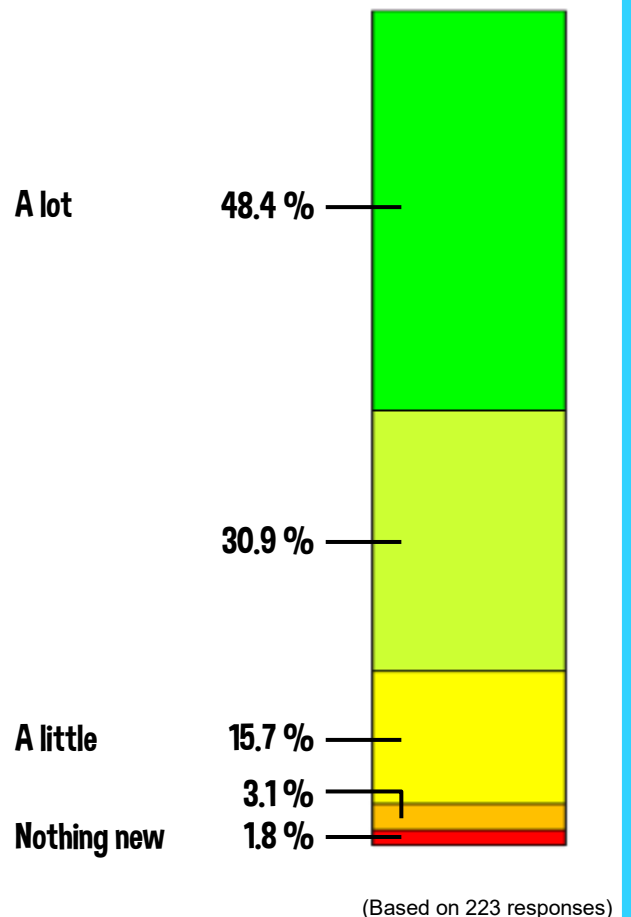
Would you come again?



How well suited was the content?



How much did you learn?



New things for this year...

We did lots of new things this year, including...

Two Jamborees at the same time

As detailed in the previous pages, we went to Charnwood and CamJam at the same time. With some logistical magic, and a boost in student volunteers, we made this a success, and would definitely consider doing it again!

Longer weeks

Last year we designated most Fridays **and** Mondays as travel days / non-demonstrating days, but we thought that this limited the number of venues we could visit. So we dropped a travel day this year, and had some six-day weeks! It is a little more tiring, but it is definitely worth spending as much time as we can demonstrating whilst we're in an area!

CHaOS Plus on Tour

Previously, CHaOS Plus was an experimental idea we didn't do very often. However, this tour we brought it to multiple schools (notably *Great Barr Academy* in Week 2 and *St Benedict's Academy* in Week 4). This allowed us to explore the science of some of our experiments more deeply, as well as chat to some older kids about science in higher education, and giving them encouragement to think about it in the future.

Experiments

As always, when we have the inspiration we'll build on or improve our existing experiments. For example, as mentioned in Week 1, [Sounds from an Oven Shelf](#) has been upgraded to [Sounds from a Slinky](#) (courtesy of the children of Irchester Primary). The fact that we had to be in two places at once also prompted the duplication of some experiments - for example we now have multiple types of [Prism Goggles](#), and of course two [Borises](#). We also have new [Animal Skulls](#), new LEDs for [X-rays](#) and [Polarisation](#), a new set for [Platonic and Archimedean Solids](#), and a new way to create [Cornflour Monster](#). We have many more plans for the improvement of many of our experiments in the future...



What nice things did the public have to say?

“Perfect!”

“Everybody was so friendly and answered all our questions.”

“It’s awesome!”

“Staff were fantastic with the kids”

“Very knowledgeable people and all experiments were so interesting.”

“DO MORE!”

“Really confident and knowledgeable presenters.”

“Everything was very interesting.”

“Thank you!”

“It was a really good introduction to my five year old who found it very interesting.”

What could we improve on?

“More ads.” “Crowd control”

“Create more experiments suitable for different age groups.”

“Sometimes difficult to see or interact” [due to being busy]

“More experiments and more time.”

The above comments were expressed multiple times. Also a few felt that some of the sessions were “boring”, though this may be due to having to demonstrate to large groups at times, and not having enough experiments available. It seems we need to be **BIGGER!**



Someone also asked if we could have a “Tortoise feeding station”. We’re not quite sure what to make of this...

What about teachers?

Good comments...

“They [older students in CHaOS+] very much enjoyed it. They really enjoyed meeting people who are a few years ahead of them, and found the team really approachable!”

“Children visibly enjoyed the practical side of today.”

“Used equipment we wouldn't have access to (e.g. the skulls, wind machine)”

“Most experiments weren't directly on the spec, but that didn't matter - they talked to the team whilst taking part, and benefitted from that.”

“Presenters were friendly, calm, knew their stuff, asked questions to get children thinking.”

“V. well organised”

“Lovely session for our children. Thank you.”

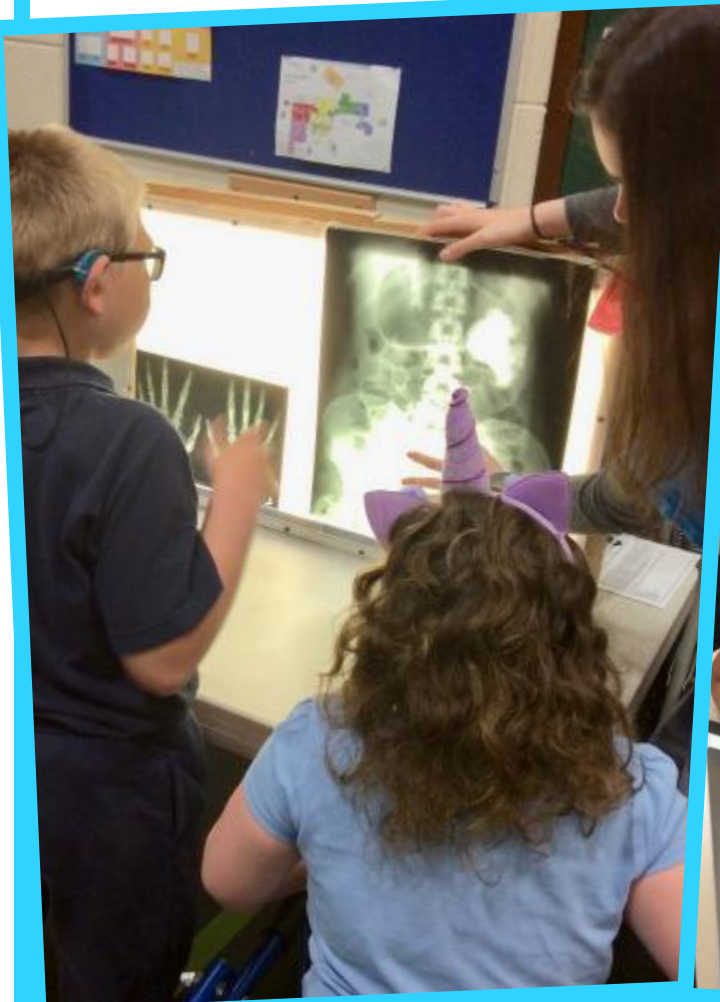
and suggestions for improvement...

“Maybe simplify some of the language used, or images/diagrams to help show why something happens.”

“Trying to link to the National Curriculum”

“Maybe there could be a few more activities that all students could participate in rather than a couple to demo.”

“Some investigations took longer than others.”



Finally, we would very much like to thank...

...all our fabulous volunteers for giving up their time over Summer to help us:

Alice Draper, Amy Tuson, Andrew Quarrell, Andrew Sellek, Angus Thomas, Beatrix Huissoon, Ben Akrill, Brendan Ng, Caitlin Stark, Cassie Chan, Celia Kessler, Conor Cafolla, Dan James, Daniel Cropper, Daniel OToole, Danielle Bullamore, Elena Everatt, Emma Crickmore, Esmae Woods, Franziska McManus, Friso de Graaf, Gabriel Cradden, Gaia Ganzer, George Little, Grace Exley, Greg Palmer, Heather Corden, Hero Ross Bain, Holly Smith, Imogen Holmes, Jack Kelsall, Jacob Atkinson, Jake Rose, Jamie Bragg, Jared Jeyaretnam, Jennifer Simpson, Jialin Feng, Joanna Tumelty, Josh Garfinkel, Kate Crowther, Katie Angell, K-M White, Kureha Yamaguchi, Lakshiv Dhingra, Leah Ward, Lizzy Apsley, Martin Croft, Matt Le Maitre, Matt Worssam, Meghan Bird, Miffles, Oliver John, Olivia Armitage, Polly Hooton, Rhea Mittal, Richard Williams, Robert Gayer, Samuel Amey, Simon Thomas, Sophie Baldwin, Sophie Mioceovich, Susannah Simpson, Thien Hong Vu, Thomas Webster, Tom Smith, Xanthe Malcolm...

...all of the venues for hosting us and supporting us:

Studfall Junior School, Kingsthorpe College, Irchester Community Primary School, Wrenn School, MAC, Hatchford Brook Summer Fair, Earlsdom Primary School, Wilson Stuart School, Great Barr Academy, Star City, Wrexham Library, Ffodd Las Community Centre, Golftyn Primary School, Kingsmead Primary School, Ysgol Treffynnon, Burton Outdoor Market, New Walk Museum, St Benedict Catholic Voluntary Academy, Merrill Academy, Nuneaton Library, Charnwood, CamJam, Creswell Crags Museum & Prehistoric Gorge, Sheffield Winter Gardens, Kelham Island Museum, The Mansfield Museum, Chesterfield Museum & Art Gallery, Queen's Mill, Cusworth Hall Museum, Oakwell Hall & County Park, National Coal Mining Museum, Leeds Central Library, Barnsley Market, Wakefield College...

...and of course once again our generous sponsors:



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