

SUMMER ROADSHOW 2018



ABOUT THE CHAOS ROADSHOW

What is CHaOS?

Cambridge Hands-On Science, fondly known as CHaOS, is a nonprofit, voluntary student group based at the University of Cambridge which believes that science is exciting and relevant to everyone. Our aim is to transfer our enthusiasm to the general public through fun hands-on experiments, bringing science to as many different people as we can.

How did CHaOS and the Roadshow begin?

CHaOS has been running for nearly 20 years. Our first events were held in Cambridge as part of the Cambridge Science Week. In 2002, some of our members thought it would be fun to pack some of our experiments into a van and take them around the country for a week - and hence the Roadshow was born! From these humble beginnings, our volunteers have developed the Roadshow so that every year we are on the road for over a month, with this year's trip being 7 weeks long!

How does the ChaOS Roadshow work?

Our events are based around hands-on experiments which all ages can try, covering all aspects of science from physics and engineering to biology and how our body works. Small groups are guided through each experiment by an enthusiastic volunteer, experienced in demonstrating the science behind it at an interesting and accessible level, tailored to the ability of the children. In July and August 2018, CHaOS brought these experiments to schools, libraries, shopping centres and other events and venues around the country. In 7 weeks we visited 26 venues across England and Wales and saw over 6,000 visitors. Over 70 volunteers from the University of Cambridge gave up part of their summer in order to make the Roadshow a great success!



Who funds CHaOS?

CHaOS is committed to making our experiments accessible to as many people as possible, so we do not charge for entry into our public events. We do ask that schools make a small contribution to our running costs, but each visit is heavily subsidised by the generosity of our financial supporters (this year: University of Cambridge, Royal Society of Chemistry, Biochemical Society, Institute of Physics and the Society for Applied Microbiology). Careful budgeting keeps the cost of the Roadshow to below £3 per person reached. We keep our costs down by accommodating our demonstrators in campsites whilst on the Roadshow, filling up on delicious school dinners and doing as much of the rest of our cooking as possible on a camp stove.

How much does the Roadshow cost?

Each year CHaOS spends approximately £15,000 over the course of the Roadshow, with the main costs being transport (around £8,000, including vehicle hire and demonstrators' train fares), food (£2,500) and venue hire (around £500). We are therefore hugely grateful to our sponsors for enabling the Roadshow to take place!

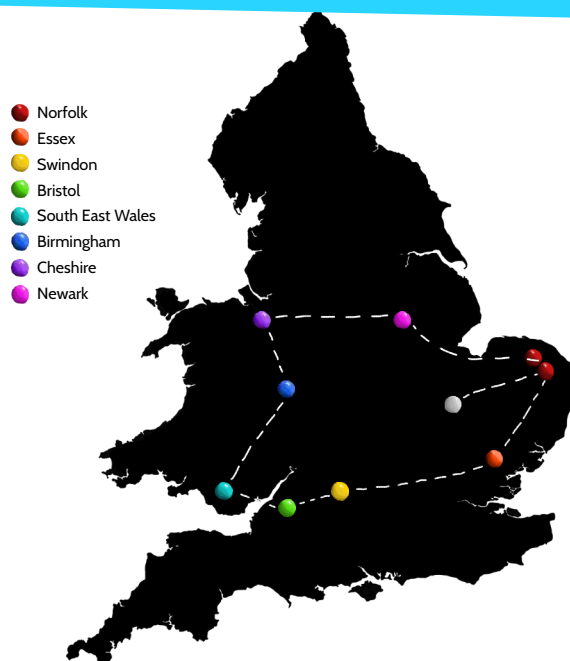
ROADSHOW ROUTE 2018

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
					30 th June Cambridge Scouts District Camp	1 st July Travel Day
2 Travel Day	3 Ormiston Denes Academy	4 Thomas Gainsborough School	5 Archbishop Sancroft School	6 Travel Day	7 The Forum	8 Museum of Power
9 Travel Day	10 Bridlewood Primary School	11 Buckland CE Primary School	12 Dorcan Academy	13 Travel Day	14 Bristol Central Library	15 Clifton Suspension Bridge
16 Travel Day	17 Cardiff West Community High School	18 Heolddu Comprehensive School	19 Llswerry High School	20 Travel Day	21 Lapworth Museum of Geology	22 MAC Birmingham
23 Travel Day	24 Wrexham Library	25 St John's Market	26 Travel Day	27 Travel Day	28 Chamboree	29 Chamboree
30 Chamboree	31 Chamboree	1 st Aug Chamboree	2 Chamboree	3 Travel Day	4 Travel Day	5 Peterborough One Retail Park
6 Mansfield Museum	7 Lincoln Central Library	8 Newark Royal Market	9 Grantham Library	10 Travel Day	11 Norjam	12 Norjam
13 Norjam	14 Norjam	15 Norjam	16 Norjam	17 Travel Day		

WHERE DID WE GO?

One of the main aims of CHaOS is to visit areas of the country where children and young people have limited access to science. This can be areas in which there are very few (or no) permanent science museums, or those which no other groups like us travel to.

With that in mind, this year we started in Cambridge, heading afterwards to Norwich, Essex, Swindon, Bristol, South East Wales, Birmingham, Cheshire, Newark and then we headed back to Norwich. Our events this year included school visits, a Scout Camp and two Jamborees, as well as one-day public events in museums, libraries, shopping centres and university buildings.



WEEKEND 1 Cambridgeshire Scout Camp

We kicked off the summer roadshow slightly differently this year. Instead of packing our tents and sleeping bags, a group of us headed to the Cambridge Scouts District Camp for a single day event, just a hop and a skip from Cambridge. There, we entertained young scouts by getting them to solve engaging puzzles such as thinking about (and testing!) the probabilities behind game shows and how to 'build' a tree. Some of them loved it so much they didn't want to move on to the bouncy castle and rock climbing etc. - they wanted to do more science!

29th Jun - 1st Jul



Norfolk Schools WEEK 1

1st - 5th Jul

Relishing the extra two nights sleep in our beds, we packed all of our experiments, kit and equipment into our van as usual on Sunday, and set off from Cambridge to Diss in Norfolk on Monday to begin the roadshow in earnest!

We visited 3 schools during our week in Norfolk. At Ormiston Denes Academy we enjoyed a busy day showing a selection of experiments to years 7s and 8s. We also took part in Thomas Gainsborough School's annual science fair, where we saw lots of very enthusiastic children from local primary schools. At Archbishop Sancroft School we were able to show some of our outdoor experiments to years 6 to 10, and the water rockets went so well that one ended up on the school roof!

WEEKEND 2 Essex Public Events

6th - 8th Jul

From Norfolk we headed down to Essex, where we stayed in glorious heat on a wheat farm. Our two public events at The Forum in Southend on Sea and at the Museum of Power in Langford were enjoyable and well received, despite the sweltering weather and the World Cup trying keep potential visitors away. The hot air balloons were entertained in the air conditioned Forum, but didn't fare so well in the warm Museum of Power, where they failed to rise due to the warm air surrounding them. Fortunately we had many other experiments up our sleeves!



Swindon Schools **WEEK 2**

Following an long drive from Essex to Swindon on Monday, Week 2 began with visits to Bridlewood and Buckland CE Primary Schools on Tuesday and Wednesday respectively, where we saw students from Year 6 all the way down to Year 2! A nostalgic return to primary school lunches made the two days of fun demonstrating bridge-building and animal skulls all the more exciting. On Thursday we went to Dorcan Academy to take over a couple of science labs and entertain the year sevens and eights in their end of year activities with robot programming and extracting the DNA from kiwis. The excellent weather meant we were able to cap off the week on our last night by giving a few demonstrations to 'Farmer Gow's'; our hosts for the week, around the campfire.

9th - 12th Jul



WEEKEND 3 Bristol Public Events

13th - 15th Jul



This Saturday we were at Bristol Central Library, enticing all the children starting the summer reading challenge with science. Whilst England may not have made it to the World Cup Final, our defeat resulted in a fantastic turnout of over 400 people at the Clifton Suspension Bridge on Sunday. The weather was glorious all weekend; stalls were placed outside on the bridge near Feathers McGraw, which drew many families to the bridge as they attempted to visit all the Wallace and Gromit statues scattered across Bristol. Although we didn't have time to set up our own suspension bridge experiment, we still succeeded in delaying many families' sightseeing adventures by fascinating them with arch bridges, cantilever bridges and lots of science!

West Wales Schools **WEEK 3**

Week 3 saw the roadshow visit South Wales (we visited schools in Newport, Cardiff and Bargoed.) Across the three secondary schools we saw a wide range of pupils; from the younger students we had come to see, to some older sixth form students who helped assist with the event. Moreover, we tried demonstrating CHaOS without words at schools with large numbers of refugee children who didn't speak English.



16th - 19th Jul

WEEKEND 4 Birmingham Public Events

20th - 22nd Jul

It was soon time to return to England for Weekend 4, and to our new base at a lively Scout Campsite just outside Birmingham. Saturday saw us pop-up at the University of Birmingham's Lapworth Museum of Geology. While the museum's impressive galleries may have outshone CHaOS' modest rocks and fossils box, we were able to enthuse museum visitors who, for one day only, could get to grips with science beyond spotting their favourite dinosaurs! On Sunday, we set up shop at the MAC - an arts and culture venue - and met many theatregoers, cafe dwellers and families out enjoying the lovely weather. After a long day of demonstrating, we enjoyed the remainder of the weather ourselves over a mammoth BBQ.



Cheshire Public Events WEEK 4

After getting through many miles of traffic on the M6 we finally made it to Cheshire, where we planned to camp for two whole weeks. On the Tuesday we returned to Wales, this time to Wrexham. We started our day at the library with some experiments both inside and outside. The heavy rain forced both us and many passersby to move inside where there were many exciting experiments to see. The next day we returned to St John's Market in Liverpool for the second year in a row. We worked together with passing children in a challenge to persuade their parents to take a break from their shopping in order to learn some science!

23rd - 25th Jul



WEEK 5 Chamboree

26th Jul - 3rd Aug

For the fifth week of the roadshow we were lucky enough to take part in the Cheshire International Scout Jamboree: Chamboree! Demonstrating alongside an excellent local team of science and tech enthusiasts with their own experiments, we saw the best part of the 3700+ explorers, rangers, scouts, guides, cubs, brownies, beavers and rainbows that attended over the six days. We can also now add Bear Grylls to the long list of people CHaOS has demonstrated to this year! On Sunday morning, new CHaOS demonstrators Jennifer and Oliver braved a true northern downpour to present our 'Spinny Chair' to the Chief Scout at the Chamboree Peace Ceremony, attended by about 1,000 scouts hardy enough to face the weather. Observing the camp science and tech team with their demonstrations presented many opportunities for new experiment inspiration. For what are being described as the cheapest experiments CHaOS has acquired to date, a constant stream of tea and fruit cake, and perfect hosting, we'd like to thank Will Burnham, our zone coordinator.



Newark Public Events **WEEK 6**

5th - 10th Aug

Our last week of public events started at The Peterborough One Retail Park, where families visiting the nearby car boot sale were drawn in by the prospect of having a go on our trebuchets. At Mansfield Museum visitors learnt about animal skulls underneath the Museum's mighty Irish Elk skull, while at Lincoln Central Library, despite the excellent weather, we were busy with people eager to get a go with the ever popular robots. We also enjoyed demonstrating at Newark Royal Market and Grantham Library,



WEEK 7 Norjam

11th - 18th Aug

For the final week of the 2018 roadshow we headed to the Norfolk International Scout Jamboree - "Norjam!" The 8-day event was attended by over 4,200 scouts and explorers aged 10-18. We managed to demonstrate the majority of our experiments during the week, including our biggest experiment, our suspension bridge, which was set up this year for the first time in four years. Our "tree" experiment was also particularly well received. Nestled in a corner of the craft barn, our work was cut out competing with over 75 scouting activities including woggle making, glass etching and pyrography (which we even got the chance to experience first hand!). Despite this, we still maintained a constant flow of visitors, and when Norjam asked scouts and scout leaders for feedback, the top three things in the Craft Barn included CHaOS for every single scout & guide questioned, without exception!



WHAT WAS NEW THIS YEAR?

This year has seen the development of many new experiments:

Robots - We expanded by buying two new control units which allows us slightly more capacity at Crash, Bang, Squelch - our one-day event in March - as well as allowing us to do more with the robots on the roadshow. We've also acquired some different sensors which will expand the range of challenges we can run.

Turtle Robots - The three we bought are mainly designed for primary schools and aim to introduce children to basic programming ideas, with scope to move on to loops and functions.

Giant Breadboards - An experiment to build basic circuits, explore which materials are conductors and which are insulators. There's also scope to make more advanced circuits and build a heat alarm, reversing sensor and more. This all uses oversized components for small children.

Computer Dissection - The idea is a show and tell experiment like our Cuddly Microbes experiment but using parts of a computer (non cuddly sadly). However it'll introduce people to various parts, how to store data (floppy disk!) and such.

Spaghetti Bridges - This experiment looks into beam strength, using spaghetti to demonstrate how thin beams can buckle instead of breaking, and comparing its behaviour to thicker beams.

Jamboree Kit - We have invested in several tools to help with setting up workshops at Jamborees.

Some of our popular experiments have been repaired:

Quite a few repairs have been undertaken, at a more significant cost than previous years already.

Suspension Bridge and Spinny chair have undergone extensive hardware repairs, there has been much aesthetic work and Electromagnetism, Hand Model and Lung model are currently being worked on.

WHAT DID THE KIDS SAY?

"Superb! Estonian Scouts really enjoyed it!"

"I like the Water Cannon. I got wet."

"Very interesting and extremely well explained. Thank you."

"The Polarising Filter station was very well explained and interesting. Thank you."

"Suspension Bridges are cool!"

"Absolutely amazing. This is groundbreaking stuff!"

"Really, really good. 100% would go again!"

"Every station was well explained and very informative. I learnt more about light in 30 minutes than I did in 5 of my 1 hour science lessons."

"Very informative and interesting. Learned a lot!"

"It was awesome"

"This is why I'm taking Physics for A-level"

"Best part of the craft workshop by far"

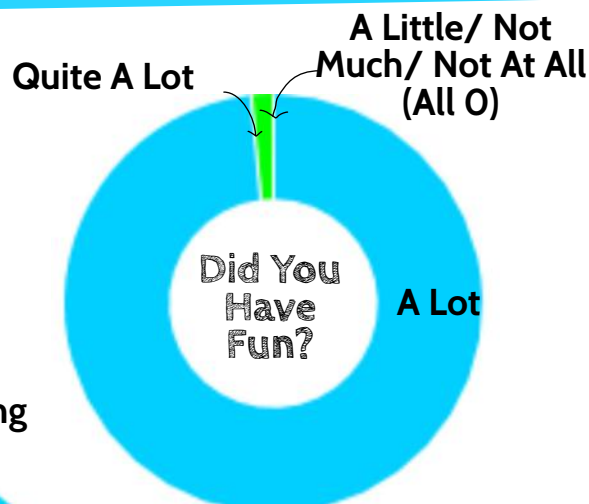
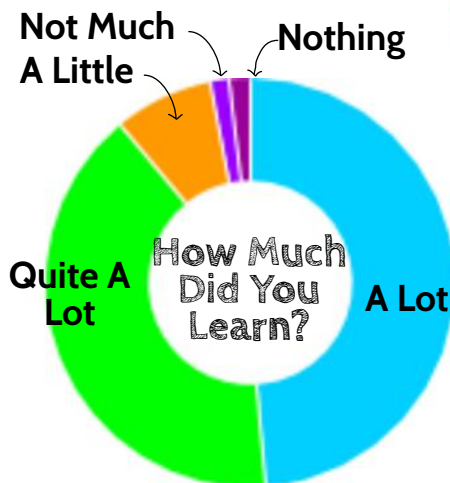
"Every area was well run and well explained as well as being relevant and interesting with just the right level of interaction, well done."

"I loved talking with Ed about the skulls!"

"Fun and interesting :)"

WHAT DID FAMILIES THINK?

We reached 1000s of people in public events this year. We asked our visitors to give us their feedback and collected over 200 questionnaires representing their views. The average visit length to our events was around an hour and a half, and most people were intending on coming, with most visitors having heard about our events through social media, and around 16% simply walked past and were drawn in by the fun we were having!



HOW CAN WE IMPROVE?

Demonstrator Comments:

"If we could stop at an extra school for a couple hours on Fridays on the way between campsites, to try to reach more children"

"More chance to familiarise with the kit"

"A diagram for van packing?"

"Better publicity for the public events, working with the event locations to advertise and make the event more known beforehand in local schools and the wider community"

"Replacing broken or worn out Biology models, adding more coloured laminated diagrams, adding more X-rays of broken bones and adding a wider collection of skulls"

Public Comments:

"Bigger. Come to Edinburgh and more explosions."

"Maybe more experiments next time."

"Needs to be signed better as we had trouble finding it as we did not know the particular area well."

"Do them in public locations e.g. town squares etc."

"Publicise through radio/ what's on in Liverpool etc."

"More experiments that the kids can do safely at home."

THE CHAOS COMMITTEE WOULD LIKE TO THANK:

All of our demonstrators:

Amanda Buckingham, Andrew Sellek, Arion Pons, Ben Akrill, Ben Johnson, Brendan Ng, Bryony Yates, Buffy Eldridge Thomas, Cara Woods, Chantelle Foster, Charlotte Barrett, Charlotte Griffiths, Charlotte Palmer, Clare Gayer, Claudia Antolini, Conor Cafolla, Dan James, David Bebb, Edward Davies, Emese Ratkai, Emma Cadma, Emma Gough, Emma Vinen, Esmae Woods, Eva Higginbotham, Finlay Knops-Mckim, Fiona Coventry, Gabriel Cradden, Gaia Ganzer, Georgia Harris, Grace Exley, Greg Palmer, Hannah Sanderson, Helen Gildersleeves, Herschel Chawdhry, Honor Pollard, Jacqueline Siu, Jamie Bragg, Jan Mieszczaak, Jared Jeyaretnam, Jean Pichon, Jennifer Simpson, Joanna Tumelty, Jonathan Woods, Josh Garfinkel, Käthe-Marie White, Katie Angell, Laura Wells, Leah Ward, Liz Gaberdiel, Lucy Cracknell, Mairi Eyres, Maria Chiara Storer, Marius Weber, Matt Le Maitre, Matt Worssam, Mithuna Yoganathan, Natalie Cotton, Oliver Allen, Oliver John, Olivia Armitage, Olivia Healey, Owais Jawaaid, Paife Orwig, Peter Methley, Polly Hooton, Richard Mifsud, Robert Gayer, Sam Thomas, Sarah Wiseman, ShenZhen Newman, Simon Thomas, Sophie Miocevic, Thomas Gessey-Jones, Thomas Smith, Thomas Webster, Will Benfold and Yaron Bernstein.

Our coordinators and hosts:

Andrew Varley and Debbie Mullinger from the Cambridge Scouts District Camp; Julie Mayo at Ormiston Denes Academy; Natalie Beer at Thomas Gainsborough School; Emma Johnson and Claire Leeder at Archbishop Sancroft school; Joe Passingham at The Forum (Southend-on-sea); Debbie Thomas at the Museum Of Power; Ian Baker at Bridlewood Primary School; Louise Warren at Buckland CE Primary School; Roseanne Reddington at Dorcan Academy; Polly Ho-Yen and Julia Ball at Bristol Central Library; Laura Hilton at the Clifton Suspension Bridge Visitor Center; Angela Darke at Cardiff West Community High School; Paula Poole at Heolddu Comprehensive School; Mrs Janet Ashford at Lliswerry High School; Anna Chrystal at the Lapworth Museum of Geology; Damien Vincent at MAC Birmingham; Karen Morrisroe at Wrexham library; David Wightman at St John's market; Will Burnham from the Cheshire Scout Jamboree "Chamboree"; Jonathan Frascella at the Peterborough STEMfest; Jodie Henshaw at Mansfield Museum; Louise Woolley at Lincoln Central Library; Ian Harrison at Newark Royal Market; Charlotte Caves at Grantham Library and Tom Wheeler from the Norfolk Scout Jamboree "Norjam".

We also want to say a massive thank you to the rest of the CHaOS team and countless others who were involved in helping the 2018 CHaOS Roadshow to run so smoothly. As ever, a special thanks goes to our many drivers, without whom the roadshow simply couldn't happen!

Finally, thanks to all of the school pupils and families who attended our events and made our efforts worthwhile with their endless enthusiasm.

Our Generous sponsors:



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