Describing the Cambridge Hands-On Science Summer Roadshow 2009
What is CHaOS?

Cambridge Hands-On Science, more fondly known as CHaOS, is a non-profit voluntary student group based at Cambridge University that believes science is fun and relevant to all. We are dedicated to transferring our volunteers’ enthusiasm for science to the general public through exciting hands-on experiments. We hope to make science more accessible and perhaps even teach people something in the process!

We've built up our experience of engaging the public over the last decade; CHaOS began as a single event at the Cambridge Science Festival, and now reaches visitors all over the country in many types of venues. The success of our Science Festival event prompted us to take our experiments further afield to reach people who would not usually experience science beyond the school curriculum. From humble beginnings as a week-long tour in 2002, our volunteers have developed the roadshow into the four-week long science extravaganza it is today.

Our events centre around hands-on experiments for children of all ages to try, with each staffed by a lively and knowledgeable student demonstrator. Small groups of children are guided through each experiment, whilst the demonstrator explains the science behind it in an interesting way and at an appropriate level. At some events we also run short talks, enabling us to show off some of our more explosive experiments!

CHaOS taking over a large laboratory for the Crash, Bang, Squelch! event at Cambridge Science Festival.

CHaOS taking over a large marquee at a festival during the summer roadshow.

CHaOS was sponsored by: IOP Institute of Physics AstraZeneca
How does the Roadshow work?

Every summer CHaOS packs all of its experiments into a large van, a group of enthusiastic student demonstrators into a minibus, and sets off around the country. We aim to visit people in different areas of the country each year. The 2009 CHaOS roadshow visited 10 schools, 5 public venues, 2 festivals and a museum, reaching 4000 members of the public.

Who are the demonstrators?

The CHaOS demonstrators are a group of student volunteers, from first year undergraduates to final year PhDs (and some who graduated long ago!). This year a total of forty-seven demonstrators travelled the country, equipped with tents and camping stoves, giving up anything from a couple of days to four weeks of their holiday, all in the name of science communication.

What experiments do they demonstrate?

CHaOS has been designing and building experiments for over ten years. These incorporate the combined understanding of generations of students and cover a wide range of scientific principles, relating concepts to their use in everyday life. A few of our favourites are our big bridges, mini explosions, extracting DNA from kiwi fruit, and Boris the plastic skeleton.

How is it funded?

CHaOS is committed to making science accessible to all, so entrance to our public events is free. CHaOS relies on sponsorship to provide funding, and careful budgeting has allowed us to keep our costs below £3 per person reached.
What did the public think of CHaOS?

At public events, CHaOS distributes voluntary questionnaires, allowing us to gauge our visitors opinions, and find out a little about their demographic. We collected 101 completed questionnaires, representing the opinions of 291 visitors. As in previous years, opinion was extremely positive about our events, with over 98% of visitors saying that they would visit one of our events again.

This year the roadshow reached over 4000 visitors, each spending around an hour exploring our hands-on experiments under the guidance of our demonstrators.

This included around 2000 school children in the classroom, whilst at our public events most of our visitors came as a family, although we did find a few unaccompanied adults, keen to investigate for themselves!

The data also show that our public events appeal to people who may not otherwise take an active interest in science, with a majority of respondents coming from a non-scientific background.

Our visitor numbers vary slightly from year to year, depending on the size of venues visited and some unpredictable factors such as swine flu! In spite of this, CHaOS has again shown itself able to efficiently and cost-effectively coordinate fun and informative events within local communities.
What did the schools we visited think of CHaOS?

As always, the feedback we got was overwhelmingly positive. Pupils enjoyed the visits from CHaOS; the hands-on nature of the sessions meant that lots of more challenging pupils were “fully engaged for the whole session.” Their teachers told us that they were offered “a different angle on the science they are being taught.” and the opportunity to “be stretched by someone other than their teachers.”

CHaOS charges schools a contribution towards the cost of our visits, with the majority of the cost met by external sponsorship. All teachers who responded thought that the charge was good value for money.

The schools we visited thought that most CHaOS experiments fitted well with the curriculum. Of the few demonstrations less relevant to the curriculum, one teacher commented “The students liked them because they were different, they were made to think.”
Where did we go in 2009?

This year, we went to many primary and secondary schools and towns in the North of England, as well as some closer to Cambridge.

1 - 29th June - Kingsfield Primary School, Chatteris, Cambridgeshire
2 - 30th June - Jack Hunt School, Peterborough, Cambridgeshire
3 - 1st July - Sawston Village College, Cambridgeshire
4 - 3rd July - Congleton High School, Cheshire
5 - 4th/5th July - Manchester Museum of Science and Industry
5 - 7th July - Eaton Bank School, Cheshire
5 - 8th July - Havannah and Marton Primary Schools, Congleton, Cheshire
6 - 10th July - Wimbledon College, London
7 - 11th/12th July - Home Educator’s Summer Festival, Whetsted, Kent
8 - 14th July - Priory Sports and Technology College, Preston (cancelled due to swine flu)
8 - 15th July - All Hallows Catholic High School, Preston
8 - 16th July - St Aidan’s Primary School, Preston
9 - 18th July - Ashby Community Centre, Scunthorpe
10 - 19th July - Grimsby Central Hall, Grimsby
11 - 21st July - Longtown Memorial Hall Community Centre, Longtown, Carlisle
11 - 22nd July - Brampton Community Centre, Brampton
11 - 23rd July - Harraby Community Centre, Carlisle
12 - 25th/26th July - Heckington Show, Lincolnshire
Cambridgeshire

The roadshow started close to home at Kingsfield Primary School in Chatteris. Pupils tested their engineering skills by building our arch bridge, discovered what uninvited pests might be living in their house, and finished the day by testing the firing range of our vacuum bazooka.

Jack Hunt School in Peterborough was our second venue, where we gave pupils a chance to understand why everything looks different under street lights, what happens to your heart rate when you exercise and how aeroplanes fly.

Our final day in Cambridgeshire was spent at Sawston Village College. Here we made good use of their vast outside space and the wonderful weather to show off our full range of bridges. We also introduced the pupils to Boris, our life-size skeleton, and showed them what the world would look like in infra-red light.

Great fun – I’m sure it will encourage more children into science - it’s good fun! And everyone was very nice.

Looking inside the skull.

It was really cool with all the different activities. Also the people and organisers were really friendly. Thanks!

Explaining how the larynx works.

Understanding tendons with our giant hand model.
Manchester and Cheshire

Our first venue in the North of England was Congleton High School. Here, the students were excited to have us visit, making demonstrating really enjoyable. Heavy rain forced us to abandon our outside activities just as the day began. Fortunately, our wide range of experiments enabled us to adapt rapidly and we still had an busy day, demonstrating the power of vacuums, how electricity is made and what life is like on a microscopic scale.

The following Tuesday found us at Eaton Bank School, where rain again prompted us to remain indoors. Here we split water molecules into hydrogen and oxygen, extracted DNA from kiwi fruit, and even had time to talk to the 6th form about university life.

For our final day in Cheshire the roadshow divided into two, with half of the group going to Marton Primary School and the remainder to Havannah Primary School. At Marton we spent the afternoon helping pupils discover how a generator works and how an ice-skater pirouettes, whilst at Havannah one ten-year-old was able to formulate and test his own theory about what would happen if you put Magdeburg hemispheres in a vacuum chamber.

Our first weekend was spent at the Manchester Museum of Science and Industry. The CHaOS Roadshow had not visited a science museum before, and we were pleased to be heaving with visitors throughout the day. Our own highly personal approach complemented the museum’s permanent exhibits as we explained the molecular make-up of water, the science behind sound and how shape affects the strength of structures.
Finding a camp site in central London was just one of the challenges faced as CHaOS took its roadshow to Wimbledon College. Here we showed pupils how to determine whether bank notes are forgeries under UV light, why the sky changes colour at sunset and how to build a cantilever bridge.

For the second weekend of the roadshow we visited the Home Educator’s Summer Festival (HESFES). This was a new and exciting type of event for CHaOS, in which we were able to share a wide range of experiments with home-schooled children who may not previously have participated in practical science. Activities included investigating fluid dynamics using our bubble column, and the good weather and spacious location enabled us to set up our suspension bridge. The children kept the demonstrators on their toes with no end of inquisitive questions; the adults were also very interested in how to teach their children about how things work in the world around them.
Preston

Returning to the North of England, our visit to Priory Sports and Technology College was sadly cancelled due to swine flu so the demonstrators instead took the opportunity to tinker with experiments and carry out research into the science behind 3D cinema.

On Wednesday we visited All Hallows Catholic High School, where we turned one classroom into a darkroom. This allowed us to use polarised light to explain 3D cinema, demonstrate how glasses correct your vision and show pupils the world’s earliest design of camera.

Scunthorpe and Grimsby

At Ashby Community Centre in Scunthorpe we were pleased to see some familiar faces from Kent, who had followed us up the country and were eager to see more of our experiments! Highlights included demonstrating how a gyroscope works, explaining the applications of medical x-rays and the return of the vacuum bazooka.

On Sunday we ran a popular event in Grimsby Central Hall, where an interview by a local TV station added to the excitement - go to www.chaossscience.org.uk/nunnytv to find out more!
Carlisle

For the Carlisle events, we were joined by a visiting lecturer from India who was keen to see how CHaOS works, and who has a view to taking the CHaOS model further afield.

Our visit to Longtown Community Centre on Tuesday was quiet, but this enabled our demonstrators to spend plenty of time talking to small groups, and some visitors stayed for the whole afternoon!

On Wednesday we visited Brampton Community centre where mini-explosions with lemon juice and bicarbonate and learning about non-Newtonian fluids using cornflour proved very popular. The event was so well-liked that many of our visitors were keen to come and see us again the next day.

The event on Thursday at Harraby Community Centre was well-attended, and our suspension bridge and water rockets outside drew in the crowds from the neighbouring playground.

Heckington Village Show

Heckington Show has become a favourite ending to the roadshow, where it is great to see some of the same children coming back every year to see our new experiments, and to learn more about those they remember from previous years. This year we also ran several short talks to large groups of children and their parents, which allowed us to show off some of our more explosive and high voltage experiments!
CHaOS – the future...

We have shown consistently that the ChaOS model is a successful and cost effective way of communicating the relevance and excitement of science to the general public. We always receive more requests for visits than we can fulfil each year, often from people who have seen us in action.

Planning for the 2010 roadshow is already in progress: if you are a part of, or know of, an organisation that could help provide CHaOS with the funding it needs to continue the roadshows, please get in touch. Contact us on: contact@chaossience.org.uk

One of the best places I’ve ever been to!

It was brilliant, I’m coming again next time it’s on! Thank you!

I thought it was amazing!

If you can suggest a suitable venue for a CHaOS event, be it a school, festival or public venue, we’d love to hear from you too.

www.ChaosScience.org.uk
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