

Educational Outreach Grant from the Biochemical Society supporting a Science Summer Camp – August 2011

The Biochemical Society kindly aided in the funding of a Science Summer Camp through the Educational Outreach Grants that they bestow. The camp was a week-long series of activities aimed at primary school children from the West Swindon area. The camp was facilitated by staff from Energise7* and teachers from Shaw Ridge Primary School – where the camp took place.

Participants on the camp could attend for just one day, several days or indeed for the duration of the week. The camp was attended by an average 20 children per day, with a total of 36 different children, from 5 different local primary schools and they varied in age from 9 years to eleven years old.

The activities were all STEM related and topics covered included Biology, Chemistry, Physics and Engineering. The camp activities were designed to be interactive, engaging and above all fun for the participants and each day was structured with recap sessions aimed to highlight the topics covered throughout the day.



Picture showing some of the activities and equipment used on the camp

Each day on the camp followed a similar format. The day started with the participants being asked a science and/or engineering themed question which they had to answer either by depicting their thoughts or coming up with a series of associated words. One question asked was: 'What does a scientist look like?' On the right is Manasa's interpretation of what she felt a scientist looks like:

Other questions included: 'What equipment do scientists or engineers use?', 'How many words can you think of which are related to science?', 'How many famous scientists and engineers can you name?' and 'What jobs do scientists and engineers do?'



As a group we would then explore the answers the participants had come up with and discuss other possible areas that the participants may not have thought of. The reason behind this activity was to try and highlight that there are many preconceptions, formed when we are very young, about science and engineering and that actually not everyone who is a scientist works in a laboratory and has crazy hair.

Each day then progressed into a series of interactive experiments and activities related to the STEM subjects.

Biology:

Some of the biology related activities included growing cress heads, examining plant material under microscopes (which the children then had to try and draw), specimen identification (including insects in resin), and a series of activities related to Darwin's theory of evolution.



Artist 'Sue Mason' has kindly bestowed a piece of artwork, depicting her take on Darwin's Theory of Evolution, to the Biochemical Society. We were lucky enough to have use of this piece of artwork, now printed on a 4.5m long polyvinyl banner, during the science camp. We used it to explore evolution and adaptation and the participants had to find a number of specimens on the time line (shown in the picture above on the left). We then set the children a challenge of imagining how current day species may evolve if the environment was to change very significantly. One change of environment was to say that the world had become completely flooded – the picture above and on the right shows two of the science camp participants explaining how their chosen animal (a lion) had adapted and evolved to survive purely in water. They had imagined the lion developing gills, and its tail becoming much larger to act as propulsion in the water. They explained their reasoning behind these changes by showing pictures of their adapted lion and giving a short presentation.

Chemistry:

On the very first morning of the camp we set about building 'Papier Mache' volcanoes. This activity, although very messy, involved the children building their volcanoes out of wall paper paste and newspaper. The children were incredibly excited about the activity and about then using simple chemistry to make their volcanoes erupt!! – Unfortunately this had to wait until later in the week, as over exuberance in the making stage led to the excessive use of paste and thus a bit of a wait as the volcanoes dried out, before being painted. Once it came to making the fake eruptions the children added vinegar to bicarbonate of soda into the centre of the volcano (an old plastic bottle). The chemical reaction between the vinegar and the bicarbonate of soda causes a large amount of bubbles or 'froth' to stream out of the confined space to which the chemicals had been added. With the

addition of a little yellow food colouring the effect was fantastic and thoroughly enjoyed by the children. Below are some pictures of the activity:



The children enjoyed the activity so much we decided to treat them at the end of the week to another similar chemistry demonstration – This time we dropped several Mentos into a bottle of Diet Coke – The following picture shows the result:



Physics and Engineering:

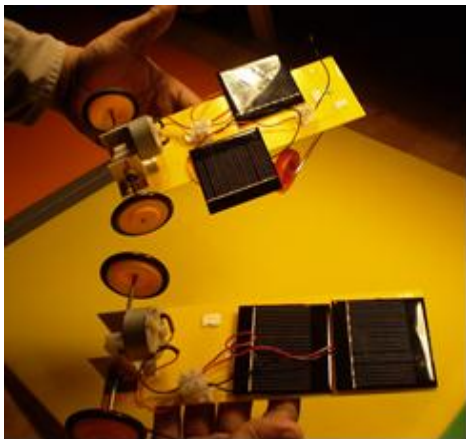
Many of the experiments and activities also covered physical science. By this we mean concepts like friction, up-thrust, air resistance, gravity, and strength in structural shapes. We used a friction ramp to explore friction and noticed that different surfaces provided more or less friction and once we completed the experiment side of the activity we then had a game of indoor curling – relating friction to a fun activity. Needless to say the children consistently beat the staff. We also explored up-thrust and gravity using a Bernoulli's Fan, and we explored gravity, air resistance and aerodynamics with the use of paper aeroplanes.

Swindon, where the camp was based, has strong historic links with Isambard Kingdom Brunel, famous for his work on railways. He is of course also famous for his structural engineering and in particular his pioneering work on bridges and we incorporated this local link into our camp. The children learnt about keystone bridges by building some table top examples before teaming up to build a bridge which they could walk across. We then set a challenge to the children to design and make a bridge, which spanned a 45cm gap, out of nothing but spaghetti and marshmallows. The bridges strengths were then tested by adding weight to the centre of the bridges – the weight being pieces of chocolate. The bridge builders then received the amount of chocolate their bridges could hold as a prize!

The pictures below display some of their efforts and the bridge they built to walk across:



Another theme of the week was energy – both the transfer of energy between its nine different states and also sources of energy, especially renewable energy. To explore this topic the children had the chance to build solar powered buggies and wind turbines. A LED display voltmeter was then used to test the voltage output of the wind turbines and the children discovered that the pitch of the blades on the wind turbines had significant effects on the voltage output their models could achieve. The solar buggies were tested under high wattage lights and the children discovered that their buggies produced different amounts of torque or speed dependent on whether the solar cells on their models had been set up in a series or parallel circuit. Below are a few pictures associated with the activity.



To conclude, the camp was viewed as extremely successful by both the organisers and the attendees and we have been asked by many of the parents of the children who participated, if and when we will run similar camps at the school in the future. We would like to take this opportunity to thank the Biochemical Society for supporting the science camp through the Educational Grant they bestowed without which the camp would not have been able to take place.

*Energise7 – Energise7 specialise in interactive education and public engagement activities. For further information on some of the services we provide and projects in which we have been involved please visit www.energise7.co.uk