**Exploration and Discovery: Bancroft's Science Fair 2018**

It was a pleasure and a privilege to be invited to the March 2018 Bancroft’s Science Fair and to be asked to judge the displays. Eleven L6 groups provided an excellent set of displays for the primary-school pupils who attended the event - and deciding on the winner was not easy.

All the teams are to be commended for the energy and enthusiasm that they put into the event. Throughout a busy and demanding day, they were clearly keen to engage with the visitors who clustered excitedly around all the stands, eager to see what was going on and to take part. There was a real sense of excitement amongst visitors and sixth formers alike.

The theme for the day was *Exploration and Discovery*. All the displays connected well with this theme, with the visitors exploring and discovering a wide range of topics, which in turn related to scientific exploration and discovery. There were several criteria for judging the winning display, and every display did well according to at least some of the following criteria.

**Complexity**

I looked for both depth and variety as indicators of complexity, and it was good to see the sixth formers challenging themselves to introduce difficult topics to a young audience. Particularly complex topic areas included polarization, non-Newtonian fluids and thixotropy (all very difficult phenomena to understand and explain), Outbreak (a complicated process testing for disease antibodies), Biodigester and The Heart (both complex systems), and Newton’s Laws (an advanced physics topic).

**Clarity of explanation**

Choosing a complex topic inevitably leads to challenges when it comes to explaining it. It is really hard! To explain something clearly, you need not only to have a good understanding yourself but also to appreciate how someone else might be thinking. It can be difficult to put yourself in the position of a young pupil who has not yet developed any knowledge of topics that sixthformers might find very familiar, such as molecules, bonds, forces, lenses, viruses … But thinking about how to explain a demanding topic can help you to clarify your own ideas. One good approach is to relate the topic to more familiar experiences, using models, diagrams and analogies (‘it’s a bit like …’).

There were some good attempts to do this. In particular, the Newton’s Laws team had some good hands-on demonstrations to illustrate ideas about forces, which they communicated clearly and accurately, and the Heart team made excellent use of models and a dissected sheep’s heart.

**Poster**

Posters are all about visual communication. An effective poster is eye-catching with a clear heading announcing the display topic, conveys relevant information using a mixture of images, diagrams and words - and is easy to read from the front of the display stand.

The Newton’s Laws team deserves special mention here, as their posters met all three criteria. The Heart and Biodigester poster displays had lots of interesting well-researched facts, and the Heart also had some lovely artwork. Invisible Ink had a well-designed board which was enhanced during the day as visitors provided their own samples of ‘invisible’ writing and drawing for display. The poster for The Magic of Refraction (amazing disappearing waterballs) was also good, with its main lettering carefully drawn and well designed. The slogan ‘Van der Graaff - having a laugh’ was apt, and enhanced that team’s poster.

**Table displays and demonstrations**

The table displays and demonstrations are what the young visitors will probably find the most engaging and memorable aspect of the day. A good display has something to catch people’s attention and draw them in, something for visitors to do as well as to look at, and something that will help them to learn a bit about the topic as well as having fun.
There were many good aspects to many of the displays. The Bull’s Eye team’s dissection of actual bull’s eyes was both ‘yucky’ and fascinating - as was the Heart team's sheep’s heart that visitors were encouraged to handle. Polarization, too, had a simple but eye-catching demonstration ('you've got to see this!'). The Van der Graaff and Newton’s Laws displays both made good use of dramatic demonstrations that could be seen from across the hall. The Heart team produced a home-made model that visitors could operate.

There was no separate judging criterion for the appearance of the sixthformers themselves, but a special mention must go to the Outbreak team, who donned protective clothing and face-masks to add to the drama of the situation that they were portraying.

**Engagement**
Without exception, every display stand drew a good crowd of visitors who were clearly intrigued by what they were seeing, hearing and doing. It was good to see the sixthformers being genuinely keen to communicate with their young audience, crouching down to their level rather than towering over them, and talking to, rather than at, them.

The Thixotropy and Non-Newtonian Fluids stands encouraged some wonderfully messy hands-on exploration. Invisible Ink provided not just one but several examples of techniques for visitors to have a go at. And the Magic of Refraction stand incorporated a pleasing element of surprise as visitors fished out 'invisible' water balls and saw a test-tube disappear before their eyes.

There were some very good, imaginative and effective ways of engaging with the audience. Outbreak carried out a role play where their visitors were lab workers adding liquids to test-tubes. The team drew their visitors in, gave them face-masks, and finished by saying that ‘thanks to you, we now know ...' and high-fiving. Newton’s Laws '5, 4, 3, ...' countdown added to a sense of excitement. Visitors were asked to predict what would happen next in the dramatic Van der Graaff demonstrations. After engaging their visitors with a hands-on squeezy heart model and encouraging them to handle a real sheep’s heart, the Heart team literally made their mark with read face-painted hearts on visitors’ cheeks.

It was also good to see that some teams had carefully planned and rehearsed who would say what; the teams for Outbreak, Biodigester, Heart, Newton’s Laws and Van der Graaff were particularly strong on this aspect.

**The verdict**
To help reach a conclusion I drew up a shortlist - quite a long shortlist... In no particular order, the short-listed teams were:

Outbreak - particularly for their costumes, their well rehearsed routine, and their enthusiastic engagement with visitors

Newton’s laws - for their poster, the simple but dramatic and effective demonstrations and quality of explanations

Heart - for their poster, their detailed preparation, and their use of models and real hearts - and face paint

Invisible Ink - not just one but several hands-on activities, and the build-up of the display during the day

Making the final decision was difficult!

The overall winner was The Heart. Many congratulations to the team who put together such an interesting and well-thought-out display, and who used a variety of approaches to engage effectively with their audience.

And indeed, congratulations to all the teams for an excellent and very worthwhile day.

*Elizabeth Swinbank, Honorary Fellow in Science Education, University of York*