

Mission To Mars : Year 6 travel 100,000,000 km from the comfort of the classroom - Sacred Heart RC Comprehensive School

Leading space education programme

Key actions

One of the most enjoyable space activities that we developed was our two day 'Mission to Mars' event, organised for ten feeder primaries (encompassing 60 students plus accompanying teaching assistants). It allowed students working in groups of six to explore the possibilities of life on Mars. through designing, building and testing a pneumatic rocket as a means of transport to the planet. They then designed a Mars lander and a Martian base, before testing samples of sand from Mars to identify their mineral content. Finally, students used a dichotomous key to identify potential Martian life forms. The two day event encompassed both engineering and scientific investigative skills - as well as being a lot of fun!

The event ran on the 28th and 29th June 2010. It was decided to hold an event for primaries because our main initiative of cosmic ray detection and analysis in conjunction with Durham University had encountered problems sourcing the necessary electronic equipment.

We decided that the story of day would focus on problem solving: how would we get to Mars, land on Mars, live on Mars and what resources would be available for potential inhabitants. In other words, students would answer the question 'why go there in the first place?' We tried to make sure our event covered the three sciences as well as engineering.

The day started off with students discussing the use of mission badges by space agencies. They were given a synopsis of historical missions and were required to match the mission badge to the appropriate mission. They then designed their own mission badges which were worn throughout the day.

Once students had developed their mission identities they worked in groups to design a card rocket that could be fired from a pneumatic trigger. Once designed and built, these rockets were tested. Students were then allowed a 15 minute 'tweak time' before a final test flight, after which the rocket which flew the highest (and therefore had the longest flight time) was deemed the winning design.

Then, a Martian lander was designed using a raw egg as an astronaut. Students were provided with a limited amount of supplies (plastic bags, art straws, balloons, string) and had a time limit of 25 minutes to design a lander. The only design criterion stipulated was that the lander had a door to place the egg inside. This was to prevent the students simply wrapping the egg in bubble wrap! The landers were dropped from a first floor balcony before being hastily checked to establish whether their 'astronaut' was still intact. Unfortunately more than half the eggs did crack, some eggs smashed completely and one team's egg fell out of the lander in a free-fall, before smashing completely in a soggy mess on the floor.

As an epilogue to this task, it was pointed out to the students that those who had been successful had perhaps showed more creativity in their design than NASA! Showing the footage of the simulation of the landing of the Mars Rover, it was clear that NASA had simply wrapped their lander in huge bubble wrap! The lander bounced three or four times on the Martian sands and came to a gentle stop.

Students had to design a Martian base primarily constructed from a limited number of art straws. The bases had to meet a certain height yet be sturdy enough to withstand a Martian hurricane (provided by a powerful desk fan). Each base also had to be strong enough to withstand a certain weight applied to its roof.

Once the students had travelled to, landed on and were successfully inhabiting Mars, they began analysing Martian minerals for potential resources. This comprised flame tests to identify the elements in 'Martian' sand.

Finally, students also identified potential Martian life forms using a dichotomous key.

Students thoroughly enjoyed travelling the 100 million kms to Mars from the relative comfort of Sacred Heart School!

The following primary schools participated in the event: Newcommen School, St. Bede's School, Lakes School, Riverdale School, Coatham School, St. Paulinus' School, St. Mary's School, St. Benedict's School, St. Margaret Clitherow School, St. Joseph's School.

Each school had a team of six students and a school teaching assistant.

Evaluation sheets from the students expressed how much they had enjoyed the day. The students especially enjoyed the firing of the rockets, the anticipation of the fate of their egg in their lander and using the Bunsen burners during the "Martian sand" flame tests.

As luck would have it, as we were concluding the preparation of the event in the preceding week, we received notice that technology department would have an Ofsted Aspect Inspection on the second day of the event! The inspector, observed the conclusion of the Mars base tests and the Martian sand flame tests. He said it was 'terrific' to see students involved so enthusiastically and expressing their genuine awe when observing the colour changes during the flame tests.

The activities during the day were design to meet the STEM agenda, especially engineering and science. A difficulty students have is seeing the links between different areas of the curriculum and how they come together in projects in the outside world. It was hoped that students had an insight into this process. Students were encouraged to be team players and to be actively involved in the design/evaluation stages of their constructions and scientific investigations.

Impact on lead and partners schools

- Developed the knowledge and understanding of space related issues.
- Greater understanding of the KS2 curriculum and teaching methods.
- Forged links between departments.
- Increased uptake on further enrichment activities

Impact on specialism

- The event introduced students from different primary schools to Sacred Heart School and forged links with the wider school community.
- The event also aids transition between KS2 and KS3.
- Develops links between the STEM subjects within the school. Embedding the specialism.

Top tips

The preparation of the actual activities in school was relatively straight forward. It was particularly rewarding, though time consuming, designing the students' Mission packs that accompanied the day.

The main barrier was the logistics of contacting all the primary schools, ensuring their attendance with complete parental consent forms and arranging transport to and from Sacred Heart. In this regard we were very fortunate to enlist the help of the Redcar & Cleveland Gifted and Talented Co-ordinator. After a number of meetings with her outlining the aims and content of the day, she volunteered to organise this aspect of the event.

Advice for other schools would be to remember your target audience. The tasks should be defined as simply as possible with minimum teacher input. Build into each activity time for the students to reflect and evaluate. The use of "tweak time" during the rockets activity developed their engineering skills but also tapped directly into their competitive veins as well. The enthusiasm the students showed modifying their rockets was quite intense.

Finally, try to have activities that result in objects the students can take back to their schools. Not only can they then be used as a learning resource by the primary teachers, they also help promote interest in the event next year.

The future

After such an enjoyable experience, it has been decided to hold this event every year. Some new ideas are already beginning to be discussed as potential activities. It is also hoped to take this event "on the road" and visit other primary schools in the area and deliver the "Mission to Mars" within their schools.