

## Evaluation of the ENTHUSE Partnership programme (2014-17)

### Case Study: Mary Elton Group

#### Background

The Mary Elton partnership is a group of 6 primary schools based in North Somerset. The partnership is led by Mary Elton Primary School and is connected to the South West Science Learning Partnership.

The schools have a long history of collaboration in science and, from the outset, had considerable expertise in teaching STEM subjects to draw upon.

The school partnership became involved with the ENTHUSE project in September 2014 in the first cohort. They aimed to share the benefits of their STEM expertise more widely and run STEM projects and professional development on a larger scale and involving many more nearby schools and pupils.



#### Context

The partnership began having already created a range of business, university, scientific and industry links. These relationships had been nurtured over time and were actively pursued by staff. However, with little funding available, it was hard to run STEM projects on a larger scale, involving collaboration between children and staff from across the partnership and other nearby schools.

A key vehicle for such collaborative learning was an annual project and competition, which took place during Science Week. This project-based model for creating real, engaging and cross-curricular STEM learning had been developed prior to the ENTHUSE award. The partnership now aimed to develop it to drive collaboration, professional learning and pupil engagement and achievement in STEM subjects.

#### Science week starts with a bang!

Each year, the Mary Elton partnership run a STEM project during Science Week. The scale and ambition of these has grown with the ENTHUSE Partnership Award.

In 2017, pupils arrived at school in the morning to find spacecraft debris covering the field and the area being guarded by police and the fire service. This led to the 2017 Stomp Rockets competition.

#### Annual STEM competitions:

- 2013 – Land Yachts
- 2014 – Catapults
- 2015 – Shelters
- 2016 – Wheelchairs
- 2017 – Stomp Rockets

*“We want to undertake future science challenges that involve stronger ties with industry... We will work with a science and engineering company and shadow them through the design, production and delivery phases, in a real life situation with the children involved at different steps.”*

*Partnership Action plan*

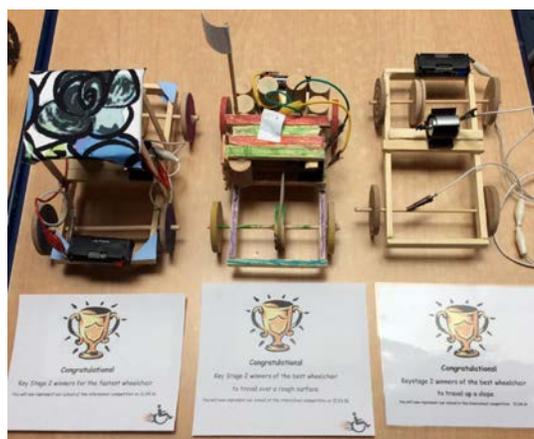
## Impact on pupils

A key impact for the partnership was to improve engagement and attainment of girls in science. The partnership aimed to increase levels to 10% above LEA standards in 2 years. After the first year of the programme, there were 11.5% girls above national science achievement levels across the partnership, up from 8.8% prior to the programme. Increases in the numbers above (and decreases for pupils below) were observed for all pupils, with 26.5% above national expectations after one year on the programme, up from 17.7% prior to the start of the programme.

Pupils from across the partnership spoke with great enthusiasm and understanding about practical work such as dissecting plants and adding food colouring to their water, making and testing shelters, testing the strength of eggs, seeing how exercise changes their pulse and much more besides.

*“We had to make rockets that would fly. We learnt about gravity... it was extremely fun!”*

*Year 6 Children*



Annual projects and competitions across the partnership and many other nearby schools allows the children to grapple with real-life design problems. Supported by external STEM experts, their teachers and other pupils, the children can see the practical value and application of STEM subjects. Pupils use STEM ideas (such as aerodynamics and gravity for bottle rockets and friction, electricity and materials for wheelchairs) in a practical and exciting context. They meet and work with pupils from other schools and learn about the wider issues linked to each project. As part of the wheelchairs project in 2016, children worked with a grass-roots wheel chair manufacturer and a school in Tanzania.

The children's inventions were tested using criteria such as speed, performance on rough surfaces or on a slope.



Children from across the 6 partnership schools and 11 other nearby schools participated in the 2017 British Science Week stomp bottle competition.

This practical, fun and cross-curricular approach to science is part of the culture across the partnership, including in their everyday science lessons. During CUREE's visit, pupils were learning about plate tectonics using models with play dough earth layers and having earthquake alarm drills!

There are regular visits from STEM experts, clubs and trips aimed at inspiring the children and helping them see the applicability of science. Examples include a scientist from the local water works to talk about water pollution, the 'Fizz pop' science after school club, a hovercraft demonstration in assembly and involvement in the Hypatia project and a visit from a female medical student to engage girls in science.

### Key Partnership Professional Development Activities:

- Network meetings
- Autonomously delivered peer-to-peer work between schools/colleges (quality assured)
- Face to Face CPD Courses
- Facilitated resource or CPD development
- Teaching and learning diagnostic services
- One-to-one tutoring sessions

To ensure the project stayed on track science Coordinators held meetings 3 times per year to discuss science and to monitor and plan progress against their aims.

### Impact on teachers

Teachers report developing the confidence and the technical skills and vocabulary required to set practical science challenges related to robotics, electronics, synclastic and anticlastic modelling and frame building for powered models. The evaluation data from CPD activities (see left) have been resoundingly positive.

Drawing on both external and internal expertise has been integral to the success of the partnership. The partnership leader, Steve Thurgur, for example, taught other staff in the partnership about the use and teaching of electronics as part of the wheelchair challenge.

It has been possible to develop existing and new links with external STEM experts to support professional learning. One existing link was with the engineer, Benedict Whybrow, who was involved in the construction of the Wimbledon centre court retractable roof. Previously Benedict supported in judging the annual competitions, the ENTHUSE funding supported him taking a wider role to demonstrate engineering techniques and concepts to both teachers and pupils as part of the annual competitions.

*“The teachers were very scientifically minded... My particular situation was that it was a very specialist field and I had a lot of backup material I could bring to that, but once the teachers had done their little workshop with me they were away then, they had it”*

*Benedict Whybrow interview*

### Impact on partnership schools

Since beginning the ENTHUSE partnership schools have noted a higher profile for science in their schools. Teachers have seen this leading to increased enthusiasm and understanding amongst pupils.

Across the partnership there have been links and engagement with a wide variety of STEM experts. This includes STEM Learning’s STEM ambassadors, the local Science Learning Partnership, visits from university students and 6<sup>th</sup> formers, from members of the local community, from business and industry and STEM experts.

One notable aspect of the partnership is its willingness and success in involving nearby schools outside of the partnership. A total of 17 schools were involved in a rockets project. This outward looking approach extends to holding INSET days and outreach CPD for many nearby schools.

*“It has developed a shared understanding and enabled the children in school to see that what we do in the classroom impacts other children in other schools, has application in the real world and enables friendly competition and cooperation and therefore allows children to stretch their learning.”*

*Science leader and teacher*

## Key successes

### Harnessing annual science competitions as a vehicle for pupil and professional learning

Mary Elton Partnership's approach exemplifies a model for engaging large numbers of pupils and staff in rich, immersive and cross-curricular learning. The partnership has a clear vision of real-life applicability and value of STEM subjects; how to combine science, design and technology and maths learning into projects which involve all year groups and partnerships; and how to draw on the skills of STEM experts such as engineers like Benedict Whybrow who have been a position to support both teachers and children's learning.

Common aspects to the annual projects include joint planning across the partnership; linking the project to Science week and other engaging activities; situating the project into a wider context; giving children space and support to design, make and test their projects; the utilisation of expertise and skills across the partnership and from external STEM experts; sponsorship by local business; planning for links with the curriculum; opportunities for pupil collaboration and sourcing of funding such as sponsorship from business and industry.

## Ongoing and future plans and aspirations

The Mary Elton Partnership's STEM funding finished in June 2016. Through links that were maintained and sourced during the award period, the partnership has been able to sustain its activities and approach to science (see below for details of this year's annual science competition and its funding).

The partnership plans to fund ongoing continuing professional development and learning (CPDL) by inviting in non-partnership schools to attend the sessions that they run. This will share the benefits widely in a sustainable model of partnership and professional development. The school is developing a website hub to manage this and have plans to be a regional hub for school STEM collaboration and CPDL. Events such as their annual science conferences and summits, along with plans for national events, will all enable the partnership to keep its momentum and continue to share and develop expertise and enthusiasm in teaching and learning for STEM subjects in the longer term.



This year's STEM project as part of 2017 British Science Week has involved children designing pump rockets. These were tested against the criteria of distance and accuracy. The rocketeers then went to the South West finals held at Clevedon School's sports hall. They competed against 17 schools and came back with a certificate for a winning design. The competition was judged by a long term supporting engineer - Benedict Whybrow. The project was organised through outreach work, via STEM (Science, Technology, Engineering, Maths) funding from industry. It enabled 4000 children to access this science project in the 17 schools for just £1000, or 25p per pupil.