



**Louise Robinson** talks about giving children the bigger picture around science and STEM and making it relevant

# Making STEM relevant

## A changing landscape

I've been working at St Julian's for 10 years and have been Science Co-ordinator since 2014. It's a really exciting time to be teaching in Wales and we are embracing the new Curriculum for Wales (LINK), which puts STEM high on the agenda. It's been fantastic that, during the development of the new curriculum, teachers in Wales have had the opportunity to mould and shape the curriculum, working alongside other professionals and academics as it's gone through the consultation process. The last curriculum (from 2008) was heavily based around skills, but this new proposal gives a happy medium between skills, knowledge and experiences, focusing on big ideas (Harlen, 2010, 2015).

I'm trying to ensure, here, that we maintain good progression in science so that the knowledge and understanding are formed around a big picture. It's not enough, during a thematic unit on WWII, to look at parachutes, for example, without the children understanding how that sits within the bigger picture of forces. I want the staff to have this big picture too and that's where Explorify really helps. Teachers can pick an activity and run with it and it'll support the big ideas behind the topic or theme that they're exploring. It's vital that we show children the big picture in primary because, when they move to secondary school and science is split into 3 strands (chemistry, biology and physics), we want them to understand how they all fit together

and be able to relate them back to those big ideas.

## Establishing an engaging topic

A great example of this is a topic we have been doing based around renewable energy. We have taken part in a project run by Greenpower, a UK charity that aims to enthuse children in STEM. It's for ages 9-11, so we did this with our Year 6 (age 10/11) classes. We are a 3-form entry school with three Year 6 classes. Each class formed a 'team' and had a car to engineer and build. It's a topic that has enthused the boys and girls equally, but it was wonderful to welcome a female engineer from Greenpower who came in to help us with it. Senior leaders were supportive of the project, because

it covered a few important topics, such as sustainable energy, electric power, etc. There are four purposes at the heart of the new curriculum, two of those being: to develop 'Ethical, informed citizens' and 'Enterprising, creative contributors'. As a school, we felt that this project would provide many opportunities for our children to develop as such citizens. The theme starts with the kart engineering, but the project allows us to research and find out about electric energy, fossil fuels, how and why they are becoming problematic and the issues around that.

Building the car is complicated and quite a time-consuming task, so we started building in the autumn term – and the race was in June! We have had some help from parents and organisations in our local community; for example, a team of engineers from the Intellectual Property Office came to support the children in building and wiring the circuits to power the karts. At the same time, children developed their problem-solving skills when deciphering the instructions – they saw it much more as a puzzle to be linked together than we, as adults, did. They were great at it.

It's a long topic, introduced in the autumn term when we started talking about cars, forces and electric energy, then continued in the spring/summer term. We were able to link it to geography and sustainability. We've found that the children are so engaged and enthused that it doesn't lose momentum. Having said that,

you could do it intensively in a few weeks in the summer term and we are considering that when we do it again next year.

### Using a range of skills

Once the cars are built, the children start to look at the other aspects of the challenge, which incorporate many different subjects and skills:

- They use various types of software to design a logo for their race team;
- They take part in time trials on the playground, calculating average times and speeds, and working out who the quickest drivers were. They also use this opportunity to see how cars are performing and if anything can be optimised;
- Each team needs to get a sponsor for their car and race equipment, so they write letters to local businesses to explain what they're doing and ask for sponsorship in exchange for advertising space on their car bodywork. We have a big focus on engaging boys with literacy here; it's something we've been developing for a while. When a genuine purpose and audience is provided for a writing task, rather than a fictional event or activity, the quality of writing really improves and the level of effort and engagement from the pupils greatly increases; and
- It's a team challenge, so it's great for their communication, collaboration,

### Building the cars

oracy and presentation skills. They work out how to collaborate effectively, assigning roles for each other, all with a shared goal and agreed outcome. On race day, they have to present their process and tell some rather official-looking people all about their car and race team.

They get vital scientific thinking skills. It's a genuine design-build-evaluate cycle at every stage of the building, time trials and even in the race itself. We have participated in the rally for 2 years now – in the first year the cars did really well, but this year they didn't perform so well. But that failure is so important – not just to build resilience but also to show them that life and learning is all about trying something and then trying again. During the race this year, in the pit stop between laps, the children were recognising that the cars weren't going as fast as they could and were running around checking all the variables that could be letting the car down. They're developing really excellent scientific thinking skills, without really thinking about it. When you can introduce those skills in a natural way through a topic and project that the children are enthused about, that's when they really stick.

You could easily take this cross-curricular topic challenge approach with many different resources. We use activities from the Intellectual Property Office (<https://crackingideas.com/>) to promote creative thinking and teamwork, for example. There are plenty of free resources, such as Polar Explorer, Explorify, Mission X or CREST awards that build to a big topic or theme, which would lend themselves to a similar sort of challenge and are really easy to pick up and run with. The key is to find a subject or theme that your children are interested in and then sit down and identify all the cross-curricular links.

### References

Harlen, W. (2010) *Principles and Big Ideas of Science Education*. Hatfield ASE and Harlen, W. (2015) *Working with the Big Ideas of Science Education*. Hatfield: ASE. <https://www.ase.org.uk/bigideas>

**Louise Robinson** is Science Co-ordinator at St Julian's Primary School in Newport, Wales. She has taught throughout the school.

