

## Rolls Royce Science Prize- November Diary

It has been another busy month at Castleview with our STEM work!

*Each item in our diary links to at least one of our three aims: Pupil engagement in building their STEM capital, Community engagement in STEM and teacher confidence in teaching STEM.*



Figure 1 Families use Bronze Age style tools and methods to make jewellery.

**Events** (Pupil and Community Engagement) *Kate Carter P7 and Ruth Pearson P6*

Our **Archaeology, Community All Teach All Learn**, in partnership with Edinburgh Archaeology Outreach Project (EAOP), was on Saturday and was a great success. It built on our 'All Teach, All Learn' (ATAL) format which is where the parents join their pupils in class for a focus activity on a particular curricular area. The aim of our ATALs is to share the learning with parents, increasing their confidence and enthusiasm so they feel able to support their children. In this instance, we hoped to inspire interest and excitement in STEM through

Archaeology- lots of scientific process and a career many may not have considered! This was the first weekend ATAL and the first time we have extended the invite to the wider community. There was such a lovely buzz and great conversations happening, and we saw families who do not make it to weekday events. We will definitely plan more weekend STEM ATALs. The EAOP were great to work with and made it hassle free for us!

*'this is a great event, he's (son) always been interested in investigating, he was so excited to come' Parent*



Figure 2 P6 built strong structures in the woods

On the 1<sup>st</sup> November we took part in **Outdoor Learning Day**- all learning was outside. This included lots of exciting STEM challenges, with class teachers and visiting specialists. P6a were lucky to have Ben McCallum, Craigmillar Woodland Engagement Officer from the Edinburgh & Lothians Greenspace Trust, take them up the local woods to set them a technical challenge to build a shelter out of sticks and leaves. They had to think about a strong structure and discuss the properties of different materials. P4a focused more on Biology and carried out a Bug Hunt with our outdoor learning expert Emily Sanderson.

**Clubs** (Pupil Engagement and Teacher Confidence)

*Katie Maxwell P3 Class Teacher and Emma McGrory P4 Class Teacher*

We have started our Science Clubs for both P4/5 and P6/7 pupils. It is fantastic to have so many young, enthusiastic earners eager to know more about how the world works around them. They are also very excited to start working towards our Crest Awards and to learn new scientific skills in different contexts. This week we have been learning about floatation, building their own rafts with basic materials and using scientific language to record their results. All the teachers involved are already learning new skills and we are excited to be supported by a student from the University of Edinburgh. Working with real science students, who study near us, is so inspiring for our pupils. This is the beginning of a very exciting project!!



Figure 3 Teachers have a go at our SSERC online link

**SSERC CPD** (Teacher Confidence) *Hannah Bootland P2 Class Teacher*

I have been organising various CPD sessions for school staff. One of these sessions was delivered through Scottish Schools Education Research Centre (SSERC). This very practical session covered the topic of materials with a focus on Early and First Level and teaching STEM through stories. Since this session, various teachers have tried these activities with their classes and have plans to extend this learning further.

**Newspaper** (Pupil, Parent and Community Engagement) *Kate Carter*

We have distributed our first edition around the school and community. Pupils in the team loved taking it in to our community groups and talking with people about their passions in STEM. We took the newspaper to the

local library, the church café, the Whitehouse Community Café, Sandy's Community Centre and Bridgend Allotments. The children suggested we also took it to the local supermarkets. This is a great idea and we will contact them for next edition. We also sent digital copies to our local councillors, who were amazed by the quality and level of engagement.

*'It looks like you are doing loads of amazing science work, which is so crucial for our future' Mary Campbell, local Councillor.*

We have also been getting ready for the next edition with roving reporters visiting classes to interview pupils and report on STEM activities throughout the school.

**STEM in the core curriculum** (Pupils' STEM Capital) *Hannah Bootland, Kate Carter and Ruth Pearson*

As teachers gain confidence in incorporating problem solving, and scientific language and thought, into pupils learning, we are seeing more STEM related learning occurring around the school. This is often happening naturally as children ask questions and teachers support them to investigate further, such as in P2 where a child's curiosity about what was in a box sparked lots of investigative learning. In this example the children led the learning and the teachers scaffolded their learning, expanding their scientific vocabulary.



Figure 4 First Edition of the paper!



Figure 5 A P2 investigating what is in the box- this was the start of an exciting piece of Child Led learning.

\*Since October P2 have been exploring STEM and Science concepts through exploration and play. They made bubble solution and tried out different kinds of bubble wands to see which one would make the best bubbles. We used the 'measure, change, keep the same' concept (covered in our Peer CPD) to help the children understand what we were investigating. This gave a fantastic opportunity for discussion amongst the children. They were also able to debate with each other. Here is a little snippet of a conversation: "Numicon is the best wand because there are lots of holes and you get lots of bubbles" whilst another child thought the "pipe cleaner wand was the best because it had the biggest bit for blowing so your bubbles were bigger". This is just an example of one of the many activities the children have carried out. P2 have also engaged in child led, explorative play using cardboard to make car ramps so the cars would go faster and making bridges using different materials to see how many cars it would hold. The children have been so engaged and excited.

*'This purposeful and high quality play has calmed some more challenging behaviour within the class.' P2 Class Teacher, (the secondary benefits to STEM learning, what happens when kids are engaged)*

\*P7 are learning about data interpretation in Maths and so they are conducting investigations into topics that interest them, such as comparing their fitness levels. As they are fully engaged they are gaining a deeper understanding of data interpretation and analysis. They are also now starting to use EXCEL to further examine data, this is key skill for many aspects of Higher Education and

careers. The pupils see the purpose in this learning and are motivated to challenge themselves.

\*Following on from Kate's terrific CPD on a simple method to stimulate thinking and record science experiments, our P6 classes looked at what might happen if we make a saturated solution of bicarbonate of soda and put a piece of wool in it, crossing to another solution of just plain water. Thinking about the hypothesis of what might happen stimulated some really deep thinking from the children.



Figure 6 Watching apple juice being made

#### Trips (Pupil Inspiration) Kate Carter

In the last month, Castleview Pupils have been on several trips, to not only build their science capital, but also inspire and spark their interest in STEM careers. P2 went on a steam engine train journey and loved learning about the engine. P7 went to a Food and Farming event hosted by the Royal Highland Educational Trust (RHET). They met people from real companies involved in these industries. There were hands on activities, including going on traditional and futuristic (driverless) tractors and trying out the processes for food production such as apple juice and rapeseed oil. The children were fascinated by how these machines worked and asked interesting questions such as 'what happens to the leftover bits of apple inside the press?'

(They were impressed when the answer that it is fed to the pigs!) The children were also part of a taste test by Mackie's ice-cream who are trialling an egg-free range. It was inspiring for them to be a part of a real life science experiment, and to see the scale and rigorous checking process required to carry out such a study. It is interesting to note that the class's behaviour was exceptional despite this being a long day out. They also left eager to think of practical solutions to problems in their own lives, for example some now want to build 'Learning Pods' in our classroom for quiet, focussed learning. I think this all indicates the value of such engaging, and hands on, learning.

#### Academies (Pupil and Community engagement) Kate Carter

P7s are attending their transition academies at our local high school (Castlebrae Community High School). Every P7 pupil in the cluster attends an academy each Tuesday afternoon for the whole year. Pupils chose their academy and two of the academies are STEM focussed. One centres on the traditional sciences whilst the other offers a more practical approach centring on Cooking and Craft, Design, Technology. These are being organised and run through a partnership with all the schools. It is brilliant to work collaboratively to create pupils such a long running project, offering deep learning in a subject of interest for the pupils. This also links with the High School's long-term plan to become a specialist science academy, when the new school is built.

#### Community Festival (Community and Pupils Interest and Capital) Cathy Southworth CRM and Kate Carter

We had our second meeting to plan the Community Science Festival in March and the plans are taking shape. We are now hoping to have Space Launch on the Thursday night to start the festival. This will be a community night time walk in Craigmillar Castle park with an number of STEM activities including 'rockets' and star watching (in partnership with the Royal Observatory). The next day will be the main festival; during the school day there will be visiting specialists running STEM activities in the cluster schools. After school (half day) there will be a range of STEM activity stands at the Whitehouse Community Café, run by both experts and pupils. We will also have the awards ceremony for our cluster STEM challenge. Following the meeting I met with a teacher from a cluster primary school to plan a time for them to visit our school to see how we are developing science through play. This is an exciting development in our sharing of practise around the cluster.

#### London (Teacher confidence) Kate Carter

Ms Langley and myself went to Derby and London to see last years finalists and to meet all the new finalists. It was a very informative, and enjoyable, trip. We loved seeing the 2017/18 projects and feel much better informed about how to proceed with ours. It was also great to meet the other finalists; it's so lovely to be a part of such an enthusiastic and supportive team of finalists. The visit left us both energised and motivated to make our project amazing!