WHAT LIES BENEATH?

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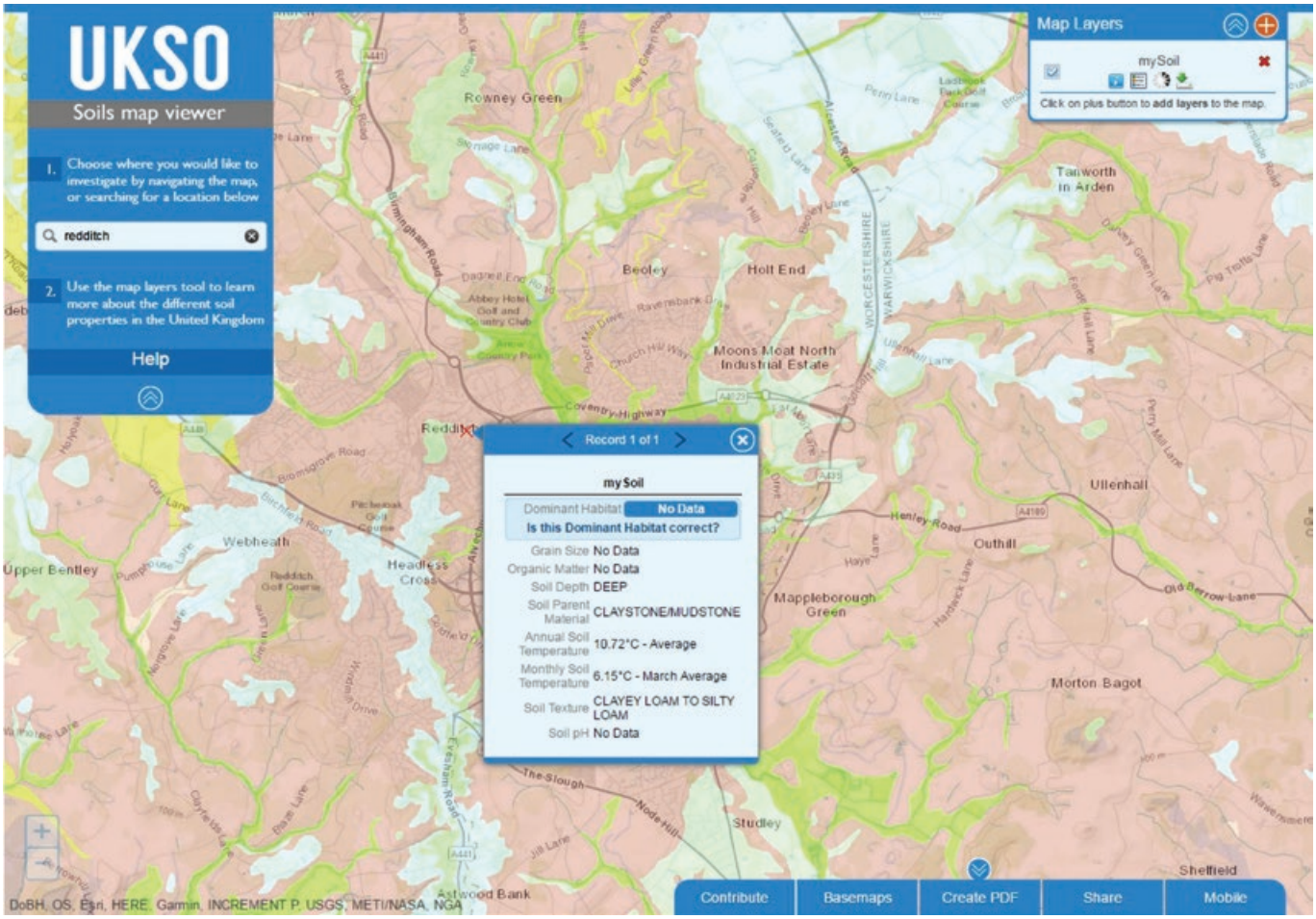

A quick investigation on the UK Soil Observatory website indicated much of the town is built on claystone/mudstone.

Rupert reports on a project carried out with Woodrow First School in Redditch, Worcestershire, specifically aimed at developing closer links between science and a wider cross-curricular commitment to learning for sustainability through clay and soils.

Introduction

Writing in the fifth century BC, Heraclitus identified change as a constant feature of the universe. However, the current rate of change in our material culture and in our environment is unprecedented. It is not surprising that many of the processes involved in creating our world seem further and further from our direct experience. This alienation is a real challenge for educators.

The project

In late June 2015, I was invited to carry out the project with Woodrow First School. The school is a wonderful creative place of learning, with a focus on delivering a rich and varied curriculum through Mantle of the Expert – a 'dramatic-enquiry based' approach to teaching and learning. It also has an innovative, reciprocal partnership with the A M Qattan Foundation teacher exchange programme based in Ramallah, Palestine.

The school decided that they would like to develop one of the potential lines of enquiry introduced during an initial meeting with the staff: an investigation of the red clay on which the school and town of Redditch stands. The two year 3 class teachers agreed to take up the challenge in the early autumn, and committed themselves to feeding back to the rest of the school by sharing some of the skills and knowledge learned.

The school's curriculum development team decided to use the forthcoming investigations to develop the pupils' knowledge and understanding of place as well as of clay as a material. This was part of a science project that would:

- incorporate a strong sensory, haptic experience (i.e. one developing a closer connection or understanding of something through touch) of the soil/earth beneath our feet
- link to the wider theme of shelter, and through this promote discussion around choices we need to make as a society concerning our core needs. This included sourcing raw materials and the processes involved (e.g. extraction, transport, manufacture, links to energy sources) – i.e. a series of links to sustainability.

An immediate direct connection (and a logical starting point) was the name of the town – Redditch, or red ditch – and

the opportunity to develop the pupils' sense of place by looking at place names and their possible meanings (Redditch has some great local place names – Woodrow, Headless Cross and Moons Moat, to name a few). A quick investigation on the UK Soil Observatory (UKSO) website or mySoil app reinforces this link (see web panel). This indicated that the school and much of the surrounding town are built on claystone/mudstone. Indeed, many buildings in the older part of town have been constructed using red bricks.

The theme of shelter can be such a powerful and exciting one to work on with this age group, it can be used to build recognition and identification of the similarities and differences between the vast array of structures that we call home (i.e. exploring the human characteristics of place – as specified in the National Curriculum Place Knowledge at key stage 2). There are also some great picture books (highly appropriate for years 1-4) that link to this theme, such as the beautiful *Home* (Ellis, 2015). The project, therefore, had strong elements of science and geography and lent itself to other aspects of the curriculum such as English (both oral and written), mathematics (weighing the clay into equal portions and measuring the difference in weight and size before and after drying and firing), history and design and technology.

The outcome was to be a series of tiles, fired in a sawdust kiln (an old dustbin with holes around the bottom edge), which would echo not only the red roofing tiles of the historic buildings of the town, but a primary building material used across much of Palestine and the Middle East.

An additional outcome would be that I would turn our clay pit excavation site into a pond, thus providing shelter for wildlife. The outcome would provide opportunities for building:

- pupils' locational knowledge – where is the Middle East and Palestine?
- an understanding of physical and human geography – the building materials commonly used both in Redditch and the Middle East in ancient/biblical/Roman/Viking/Victorian periods and in the present day. How are these similar to/different from the materials used in buildings around us?
- an understanding of physical geography with links to science – focusing on habitat and the needs other living things have for shelter.

Digging in

On my first visit to the school, I dug a few trial pits; initially the results did not seem too promising. The clay material I reached (between 15 and 60cm deep beneath a compacted stony layer) was very hard, dry and crumbly. It would not pass the vital 'ring test' – for this you make a 1cm-thick sausage of clay and twist it around a finger to see whether it will not crack (this method is a rough indication of plasticity that helps potters identify whether a clay offers suitable potential/workability). However, the pupils were full of questions about 'treasure' (had I found any?), worms (ditto) and the soil itself. We retired to the classroom with some samples. Things began to look up: as we added a little water to the samples they became stickier and more plastic.

I took the samples back to my workshop and sieved them through a standard kitchen sieve. The result, after drying, was a wonderful plastic material that fired well up to 1000°C in my kiln. This gave me the confidence to move forward with a planned week-long project. We began with an assembly to capture the interest of the whole school: we used the framework of 'The Three Little Pigs' to explore the properties of straw, sticks and clay bricks for use as building materials (with a lot of huffing and puffing!) and introduce the concepts the pupils would be investigating.

The outcome

The project was successful in generating a lot of interest across key stages and in engaging the two classes of year 3 pupils. It built scientific and geographical knowledge around the nature of raw materials and the processes involved in transforming these into something useful. The pupils were involved directly throughout the process. They helped to test the clay I dug from the school grounds, mixed it with water and stirred/agitated the clay to create a slip (a process called blunging), sieved the clay before drying (to make a useable clay), then made and decorated their tiles by printing key words linked to the theme of shelter (Figure 1). They also helped prepare and light the kiln (the tiles were fired in it over a weekend). Although the ground was too hard to involve them in much digging, the pupils were active witnesses and commentators! Finally, the pupils helped to remove the beautiful, partially blackened (reduced) and oxidised terracotta coloured tiles from the kiln.

Figure 1: The clay tiles were decorated with key words linked to the theme of the shelter. Photo © Rupert Brakspear.

The pupils decided to use their tiles to protect the roof of a hedgehog house they had made for their wildlife area (Figure 2). This fitted well with the environmental work across the school grounds and with their Eco-Schools work on creating and enhancing woodland/pond/rough grass habitats. In addition, at the Monday morning assembly after the weekend kiln firing, the pupils gave some of the tiles to a group of teachers who were visiting the school from Palestine, which led to a series of fascinating discussions. The Palestinian teachers recognised the oxidised terracotta tiles, but not the blackened ones produced where the tiles were buried by the ash. Here oxygen was restricted during the firing process. We could have extended the work to a comparison of traditional 'clamp' firings or modern industrial brick/tile kilns and the different impact of firing with different materials and in different conditions.

Perhaps one of the most profound moments for the teaching staff was the pupils' response to the watching of a film from 1965: Isaac Button Country Potter (see web panel). This beautiful, silent, black-and-white film captures the work of one of the last country potters working in England. It demonstrates the powerful connections between man and materials, place and economy. We thought we might show a clip of about 4–5 minutes, but the pupils immediately recognised the processes they had been in engaged in, and were spellbound for the full running time. One pupil commented, 'He makes it look so easy' in rather an awestruck tone. After watching the film the pupils talked about how important it was for Isaac Button to be close to his clay source, to be able to dig it and prepare it himself, given that he had to carry out all of the processes of manufacture on his own.

Again, this aspect could have been extended to looking at where most clay (or timber, stone, cement or raw materials) comes from and the skills and processes necessary for turning raw materials into building materials (or other items). Furthermore, looking at how this all becomes part of local culture/economy is a key element for understanding human geography.

Finally, the class teachers noted the way that the project had inspired the pupils. It had successfully and unexpectedly, stimulated and developed their usage of specific, descriptive language. There was, too, approximately 10kg of clay left over, which would allow other pupils in the school to explore ideas generated from the assembly and tied in with curriculum priorities for the following term. For example, year 4 investigated soils, looking at what makes them different (e.g. pH, colour, organic content).

Although this project was a one-off, it could be replicated elsewhere, as Seb Benney, the Science and Eco-Schools Co-ordinator in the school commented:

'Working on this project really gave the pupils a unique experience that would normally not have been possible within the constraints of the school environment. Being a part of a whole process from conception to completion, sourcing their own materials and turning them into high-quality finished items, has given pupils a far-reaching understanding of our planet and how we use it.'.

Figure 2: Some of the finished tiles were used to roof the hedgehog house in the school wildlife area. Photo © Rupert Brakspear.

Conclusion

We are increasingly good at working with pupils in identifying where our food comes from, exploring food miles, fair trade, the route from field to fork, and so on. However, I would argue that we need to explore with pupils the fascinating connections between an object and:

- the material it is made from
- the environmental impact associated with sourcing/extracting it
- its design and its function
- its manufacture and its carbon footprint
- the people involved in the various stages of its creation.

Gaining the full picture and sense of perspective is vital if we are develop pupils' awareness of the building blocks that underpin our rapidly changing material culture, and if we are to build with them a vision of a more sustainable future.

Acknowledgement

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Reference

Ellis, C. (2015) *Home*. Somerville, MA: Candlewick Press.

WEB RESOURCES

A M Qattan Foundation: *www.qattanfoundation.org/en*
Isaac Button Country Potter Part 1: *www.youtube.com/watch?v=fmG5NOmQy_4*
Isaac Button Country Potter Part 2: *www.youtube.com/watch?v=rMWXVWsW7no*
Isaac Button Country Potter Part 3: *www.youtube.com/watch?v=E55-Wx_Ihbo*
Isaac Button Country Potter Part 4: *www.youtube.com/watch?v=J6a9coGC-ts*
Mantle of the Expert: *www.mantleoftheexpert.com/about-moe/introduction/what-is-moe/*
mySoil app: *www.bgs.ac.uk/mysoil/*
UKSO Soils map viewer: *http://mapapps2.bgs.ac.uk/ukso/home.html*

Rupert Brakspear works as a freelance educator and ceramic artist based in the West Midlands with a particular focus on the themes of sustainability, a sense of place and the connection between people, material, culture, landscape and the natural world.