Evolving landscapes mini field trip Teachers notes

A geology field trip to find out more about the rocks used in the architecture local to Eddington.

This mini field trip links geography and science topics and can be expanded into a cross curricular project. You need very few resources and it can be done in an hour. The area is flat and has step free access. Everything can be found outside the Storey's Field Centre in Eddington, Eddington Avenue, West Cambridge, CB3 1AA.

Curriculum links: KS2

- Properties and changes of materials
- Rocks
- Human and physical geography
- Geographical skills and fieldwork

Resources

- Evolving landscapes mini field trip guide
- Hand lenses or magnifiers
- Ruler or tape measure
- A way to take notes, make field sketches
- Map of the area
- Camera
- Appropriate clothing

Before you leave the classroom

This activity assumes a bit of background knowledge about the three major rock types; sedimentary, igneous and metamorphic. ‘Rock Detectives’ is a fun activity to recap those rock types https://www.earthlearningidea.com/PDF/Rock_detective.pdf

Activity ideas	
Think about your environment	List all the places you might find stone used in the built environment. Investigate the school building. Is natural stone used anywhere? Why might natural stone be chosen over another building material?
Plan your field trip	What will you need to take with you for a successful field trip? Plan your journey to Eddington.Think about safety, time and transport. Plan your route on a map.
Predicting shapes	When a rock is cut and polished the fossils will be visible in a cross section which can make them difficult to interpret. Predict what shapes you get if you cut a toilet roll tube vertically, horizontally or at angle.

Practice your observation skills	Spend time looking closely at an object, put it away then try drawing what you remember. Sit back to back, have one person describe an object and the other draw it.

In the field

When you arrive outside the Storey's Field Centre take a moment to look around. There are three main rock types used in the architecture of the building and the landscaping.

Use the Mini Field Trip Guide to locate the three main rock types and encourage students to get up close and look at details with a hand lense. Describe each rock using the general questions on the sheet, take notes and make field sketches. Remember to put something in your photos for scale (pen, ruler etc). It can be very difficult to judge the scale in a photo without something for reference.

Activity ideas	
Descriptive words	How many descriptive words can you come up with for each rock type? What are the unique words that describe each rock type?
Thinking about language	Although geologists use 'hardness' to describe rocks it can be difficult to understand in the field without mechanical testing, like scratching with an iron nail. You cannot use this method on public property! Discuss why just using 'hard' might not be a good enough description. Hard enough for what?
Make a field sketch	Field sketches don't need to be beautifully artistic but they should include labels and a scale bar. What is the most interesting/unusual feature?
Mapping	Mark the different rock types on a base map of the area.
Measuring	Don't have a ruler with you? Use hands, feet or a fingernail as a size guide.

Additional notes for each rock type

Caithness flagstone

- The Eddington flagstones have mud cracks, suggesting they formed at shallow depths, where the lake fringe sporadically dried out.

Purbeck limestone

- The bivalves (shells) are freshwater animals so we know it must have been laid down in a fresh or brackish water environment.
- The fossils are broken not in their life positions so something dramatic happened, possibly a powerful storm.
- The veins cross cut the fossils showing that a stretching event happened after the rock had formed.

Granite

- The variety of the manmade tooling on the granite changes the look of the stone making identifying the characteristics difficult, just like natural weathering changes the surface of a rock. This is why geologists like to use a rock hammer to chip away a fresh surface. Please don't use hammers on any public architecture!
- The three main minerals are: white mineral = feldspar, grey mineral = quartz, black mineral = pyroxene. On a sunny day you will see the light reflected off of the faces of the crystals making it sparkle.

Igneous rocks around the trees

- There are several different rock types used around the base of the trees and the central reservation. It is hard to know from field observations if they are from the same geographical area.
- Liquid rock erupted at the surface as lava cools quickly to form fine grained rocks like basalt or rhyolite with small crystals. Magma squeezed into the cracks in shallow surface rocks cools slowly to form rocks like dolerite or microgranite with medium sized crystals. Magma that cools very slowly deep underground forms rocks like gabbro or granite with large crystals.

Back in the classroom

Activity ideas	
Uses for stone	Compare your original list of uses to the actual uses of rocks. Are there any surprises? What had you walked past before and not realised it was made of rock?
Cracking the clues	What do mud cracks tell us about the environment a rock was laid down in? Do your own mud crack experiment. https://www.earthlearningidea.com/PDF/47_Mudcracks.pdf
Durability of building stones	Design some experiments to test the durability of rocks. Think about porosity and hardness and why they might be important in a building stone.
Economics	Before the 1800s, building stones in Cambridge town centre were unlikely to have come from more than 100km (60miles) away. Today's architects chose stone from Scotland and Dorset because being sourced in the UK is 'local'. What has changed to allow architects to choose stone from much further away?
Building project	Your brief is to build an extension to the school, what rocks would you use where and why? Think about decorative window surrounds and steps as well as the body of the building. Write about your ideas, draw plans and include results of your durability experiments to back up your choices.
Design a rocky play park	What rocks would you use to create a beautiful and educational play park? https://www.earthlearningidea.com/PDF/239_Rocky_play_park.pdf

Classroom experiments	You can find lots of rock experiments for the classroom and geology drawing activities on the University of Cambridge Museums website. Refine your search to ‘Sedgwick Museum’ to find them easily. https://www.museums.cam.ac.uk/school-sessions

Why was natural stone used by the architects of Eddington?

- Prestige of the University. Natural stone is considered more valuable and can even add value to a property.
- Granite is highly resistant to chemical erosion like acid rain, making it a good choice for flooring.
- Aesthetics. Natural stone colours are subtle and more varied.

Why not concrete?

- The process of quarrying natural stone is more environmentally friendly than the concrete manufacturing process. The concrete manufacture involves incredibly high temperatures, which pump out a large amount of CO2 into the atmosphere. This is a growing and important realisation; that stone has the lowest carbon footprint of almost all construction materials, even compared with engineered timber.
- Natural stone is more frost resistant than concrete and easier to clean.