

# Edinburgh Geological Society

## School Poster – Edinburgh’s Rocks and People

What makes Edinburgh special? Many different factors make a city, but one key feature that most visitors to Edinburgh notice is the dramatic scenery of the city centre. This is a landscape of rocky crags, cliffs and steep slopes surrounded by lower, flatter ground. It is derived from a mix of different kinds of rock – sedimentary and igneous.

People have used the landscape of Edinburgh and its underlying geology in different ways over the last 10,000 years: finding suitable sites for settlement, defence and agriculture, and quarrying sandstone for building, and coal for fuel. The character of today’s city, with the Old and New Towns designated as a World Heritage Site, derives greatly from the bedrock, and the way in which this has been eroded.

The Edinburgh geologist James Hutton (1726-1797), a key figure in the Scottish Enlightenment, used locations in Scotland to support his ‘Theory of the Earth’. He suggested that the Earth operated as a machine, where natural processes acted over immense time scales to erode the land and create new rocks. This was the beginning of our understanding of the rock cycle and the inter-relationships between sedimentary, metamorphic and igneous rocks.

The *Edinburgh’s Rocks and People* poster is supported by online resources, with suggested activities and further information that encourages learners to find out about local geology, and explore the ways in which Edinburgh’s geology has influenced people in the past and present.

The poster and resources are relevant to several Experiences and Outcomes within the Curriculum for Excellence in Sciences (SCN 2-17a, 3-17a) and Social Studies (SOC 2-07a, 3-07a). They also form a good basis for inter-disciplinary learning and project work that connects rock properties, Earth processes, landscape, resources and people.

### EDINBURGH’S ROCKS AND PEOPLE

**IGNEOUS ROCKS**  
Igneous rocks are tough rocks formed at volcanoes and underground reservoirs of magma. These rocks erode slowly, which is why Edinburgh's hills. In the past, people lived on the high ground. It was easier to defend, and the well-drained slopes were good for farming. Today, they are an important part of the city's landscape and green space.  
Igneous rocks are quarried for aggregate, which is used in a component of concrete.

**SEDIMENTARY ROCKS**  
Edinburgh's sedimentary rocks are mostly formed of sediments created by erosion of the mountains to the north. This sediment was transported south by rivers and deposited in the low ground and on the sea bed.  
One of these sedimentary rocks, sandstone, is ideal for building: strong and chemically stable but soft enough to be carved into blocks. Edinburgh's Old and New Towns are mostly built of sandstone from sources such as Craigleith.  
The city also used sedimentary rocks as a source of energy. For many centuries coal was extracted from the Pentlands Coalfield and used to heat Edinburgh's homes. Oil for lighting and transport came from oil shale in West Lothian.  
Coal, limestone and Conglian gneiss formed in the hills, then spread on the fields to reduce acidity and improve the soil. It was also used to create lime plaster for building.

**METAMORPHIC ROCKS**  
Metamorphic rocks are formed deep in the crust by the action of heat and pressure on existing rock. There are not found naturally in Edinburgh, but one particular rock, slate, has been brought to the city from the Highlands – it makes an ideal roofing material.

**HOW EDINBURGH'S ROCKS WERE FORMED**  
Central Scotland 350 million years ago  
The diagram shows the geological processes: erosion, deposition, sedimentary rocks, magma intrusion, stretching, and contraction. It labels the Highlands, Central Lowlands, and Southern Uplands.

**JAMES HUTTON**  
Hmmm...the Rock Cycle  
The Edinburgh geologist James Hutton (1726-1797) discovered the rock cycle! He proposed that the Earth operated as a machine, where natural processes acted over immense time scales to erode the land and create new rocks. He understood the connections between different rock types and the immense age of the Earth.

**DID YOU KNOW?**  
70,000 years ago Edinburgh was buried under a layer of ash.  
Craigleith Quarry was 300 metres deep. That's where most of the sandstone used to build the New Town came from.  
James Hutton worked at Glasgow University when he was just 16.  
Edinburgh Castle is built on the top of a volcano that erupted 340 million years ago.  
Historically, the last coal mine in Edinburgh closed in 1961.

Find out more ....  
[www.edinburghgeolsoc.org/learning](http://www.edinburghgeolsoc.org/learning)

This poster has been produced by Edinburgh Geological Society and is available for free in printed and online formats. It is designed for classroom use, to give an introduction to geology of Edinburgh and demonstrate the connections between rocks and people. We are keen to get feedback on these resources, and to develop them further. Please get in touch.

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**[www.edinburghgeolsoc.org/learning](http://www.edinburghgeolsoc.org/learning)**

## Online resources – [www.edinburghgeolsoc.org/learning](http://www.edinburghgeolsoc.org/learning)

Online resources include further information and suggested activities exploring these themes:

### Edinburgh's Rocks

What kind of rocks do we find in Edinburgh? How have they been used by people?

Explore Edinburgh's sedimentary and igneous rocks. Use the British Geological Survey's *Geology of Britain Viewer*, which can be used to find out what kind of rocks are found in your area.

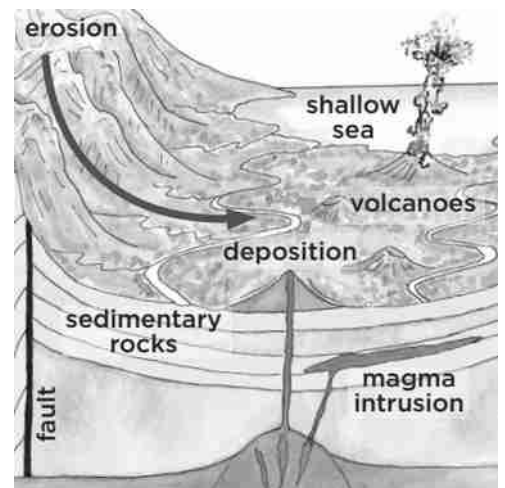
If you have rock samples in school, compare the properties of sedimentary and igneous rocks. Because of their crystalline structure, igneous rocks such as dolerite or granite tend to be much tougher than sedimentary rocks such as sandstone and coal.

Look for examples of rocks used by people: most of Edinburgh's older buildings are made of a light-coloured local sandstone, quarried at 20 locations within the city. Later, red desert sandstone was brought from the south-west of Scotland and used in prominent building such as the Caledonian Hotel. Igneous rock, especially local dolerite, is often used in paved streets and kerb stones.

### Evidence from the past

What do Edinburgh's rocks tell us about the past? Explore using the reconstruction of Central Scotland 350 million years ago. Sedimentary rocks contain fossils and evidence of the climate and environment when they were deposited. Igneous rocks record evidence of volcanic eruptions and magma intrusion in this area.

Use online resources to discover where Scotland was located when these rocks were being formed. What did the map of the world look like then?



### Making Edinburgh's Landscape

How has this landscape been formed? Slowly, over hundreds of millions of years. During the Ice Age, Edinburgh has been scraped by ice sheets several times, moving slowly eastwards and moulding the landscape. Softer rock has been scraped away, forming crag and tail features such as Castle Rock and the Royal Mile.

Explore changing sea levels and the formation of raised beaches as the last ice sheet melted.

### James Hutton (1726-1797) & the Rock Cycle

James Hutton was born in the city. He studied abroad, travelled widely and farmed in the Scottish Borders. A memorial garden at St John's Hill in Edinburgh marks the site of the house where he lived from 1770. Here, he wrote on a wide range of subjects and set out on expeditions around Scotland to sites such as Glen Tilt, Arran, and Siccar Point. Online resources help explore what Hutton saw in the rocks of Scotland, and how ideas developed in Edinburgh helped understand how the Earth works.



*The Edinburgh Geological Society is one of the UK's foremost geological societies and aims to promote public interest in geology and advance geological knowledge. We organise varied programmes of excursions and lectures that bring together everyone from complete beginners to professional geologists interested in exploring the geology of Scotland and beyond. We publish the Edinburgh Geologist and excursion guides. Our geoconservation groups promote sites of local interest, publish leaflets and make sure that local geodiversity is understood and protected.*

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