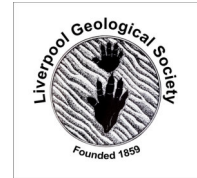




Rock around campus



4 Central Teaching Hub [Campus map location F6]

This fully accessible trail is one of a planned series of walks around the University of Liverpool. The aim is to introduce the rocks and man-made materials used in the buildings and paving around the campus.

To help you, in this leaflet you will also find:

- a map showing the names of buildings around University Square;
- a glossary of terms;
- a geological timechart.

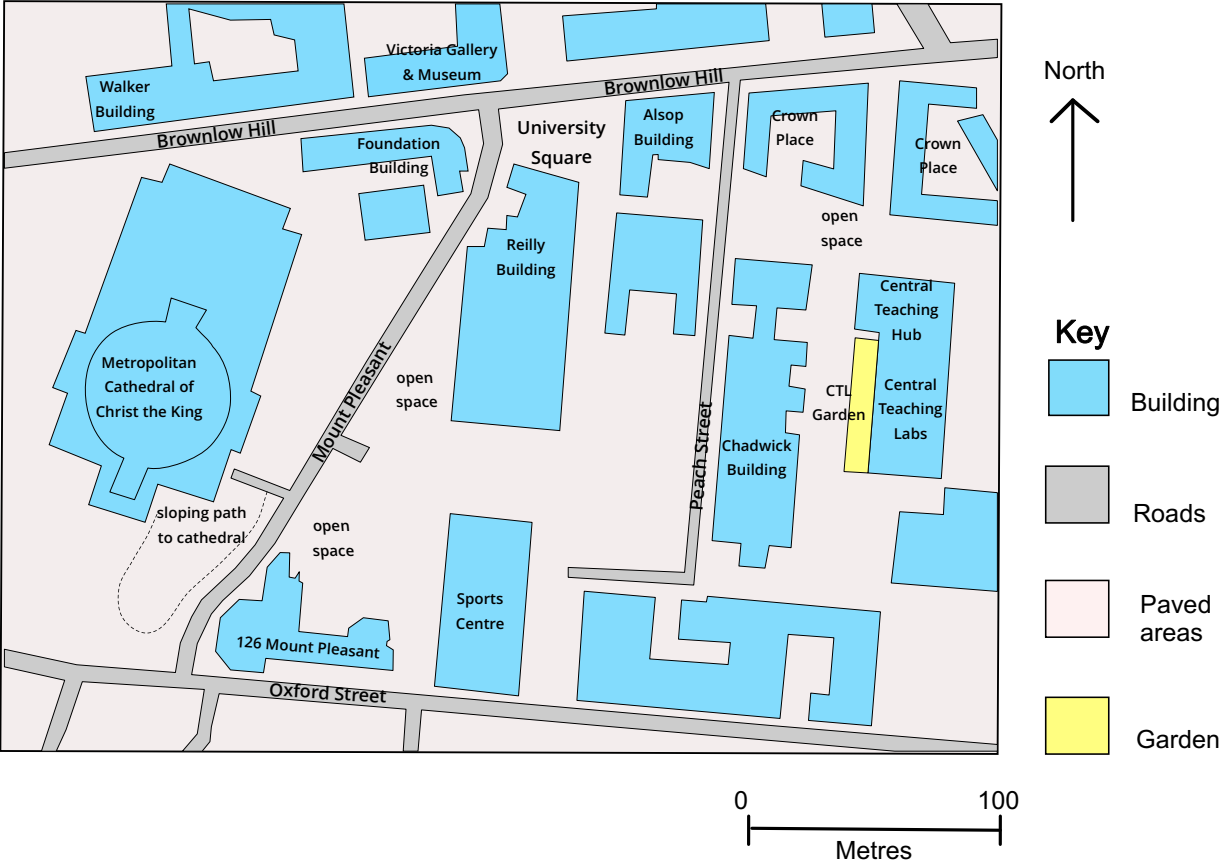
This is a self-led guide and you need to get close to the buildings so that you can see the fine details.

There are three types of rock: **igneous** (crystallized from molten rock); **sedimentary** (derived from the breakdown of other rocks) and **metamorphic** (rocks changed by heat and/or pressure). Man-made materials are also derived from Earth materials. Examples include **bricks** (baked clays); **concrete** (a mixture of sand, gravel and limestone); **glass** (a mixture of sand and limestone); mortar (a mixture of sand and limestone); **metals** (lead used in flashings, copper used in wires and lightening conductors, iron used in drain pipes and railings) and **alloys** (mixtures of metals for example bronze used in statues).



Era	Period	Date Millions of years
CENOZOIC	Quaternary	2.6
	Neogene	23
	Palaeogene	66
MESOZOIC	Cretaceous	145
	Jurassic	201
	Triassic	252
	Permian	299
PALAEOZOIC	Carboniferous	359
	Devonian	419
	Silurian	444
	Ordovician	485
	Cambrian	541
PRECAMBRIAN		

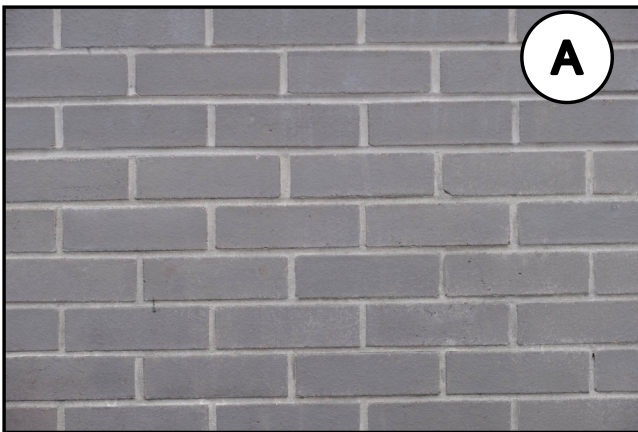
Map showing the names of the buildings near the Central Teaching Hub



Start near the entrance to *Crown Place* in Crown Place plaza.



Crown Place is a concrete building. At ground floor level it is faced with dark-coloured bricks bonded with a dark mortar (photo A). Most of the upper part of the building is faced with coloured glass fibre composite panels.



Look at the paving stones near the grassed area in front of the building. The paving is made of slabs of a pale-coloured sedimentary rock called sandstone. Some of the rock slabs show fine layers (photo B). These layers are a sedimentary structure called bedding. Lighter coloured beds (layers) are made of coarser (larger sized) grains than the smaller-grained darker coloured (beds).

Notice the orange/brown changes in colour in these rock slabs (photo C). The coloured bands or rings are called *liesegang* rings. If you look closely you will see that these coloured bands cut-across the bedding.



Now look towards the *Central Teaching Hub* (CTH). This building is mainly made of concrete and painted concrete (photo D). Running along the front of the building there is a sculpture named “Abstract Frieze”. This is made of pre-cast concrete panels and was created by Frederick Bushe.



To the right of the CTH there is a large sculpture (photo E) “Square with 2 Circles” by Barbara Hepworth. The sculpture is made of bronze (an alloy of copper and tin) and has a concrete base.



[Progress towards the CTH and follow the wide path to the right of this building.](#)

The wall of the building to your left shows how darker-coloured brick cladding has been used to cover the concrete. This cladding improves the look of the building and protects the concrete from the elements. Attached to this wall is a large sculpture by Hubert Dalwood. It was created in 1964 and made of cast aluminium (photo F).



On the right-hand side of the path there is a slope leading into a carparking area. Keep on the main path but look down at the sloping surface into the carpark (photo G). Here the sloping road is paved with setts (pieces of rectangular quarried stone).

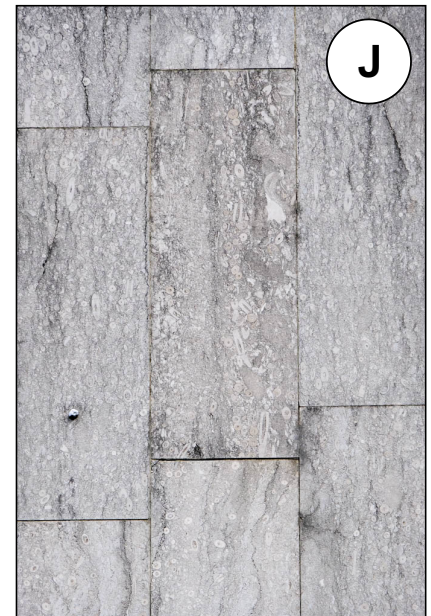
Setts (photo H) are usually made of hard wearing igneous rocks like granite and basalt. The setts here are made of different types of rock and you should be able to recognize at least six different colours indicating at least six different types of rock. The rock colours are produced by the minerals making the different rocks.



Look at the building at the back of the carparking area. Notice that the side of the building parallel to the main path is faced with glazed decorative tiles (photo I), but that the left-hand side of the building is faced with a grey Carboniferous limestone (a sedimentary rock). Look for fossils of crinoids (marine animals). They are easy to recognize because of they are paler in colour than the rock and look like polo mints (photo J).



Progress towards the path on the left that leads into the Central Teaching Laboratories (CTL) and continue along this path.



To the left of this path there is a green living wall (photo K).

This is a wall partially or completely covered with vegetation. The wall provides aesthetic benefits and acts as living insulation (both acoustic and thermal). Look at the rounded lumps of rock (cobbles) below the living wall (photo L). Cobbles are pieces of rock that were rounded and smoothed as they were moved along by flowing water.



In the path to the CTL the paving slabs are made of thin slabs of a purple-coloured rock called slate (a metamorphic rock). This rock was once shale (a sedimentary rock) and was altered to slate when it was affected by heat and pressure during a process called metamorphism. The word metamorphism means "change in form". Look at the slate slabs (photo M) and you will see the bedding that formed in the original sedimentary rock. The bedding is shown by the pale- green bands on some of the slabs (photo N).



To the right of the entrance to the CTL the building is faced with limestone (a sedimentary rock). Look carefully at the rock (photo O). It is made of highly spherical grains about 1mm across. These are oolites and are formed when calcium carbonate is deposited around a central nucleus while being washed around in shallow water. The oolites were later deposited in ripples which when cut through show inclined layers which are a sedimentary structure called cross-bedding. The facing or cladding stones have been placed on the building so that these layers are now vertical.



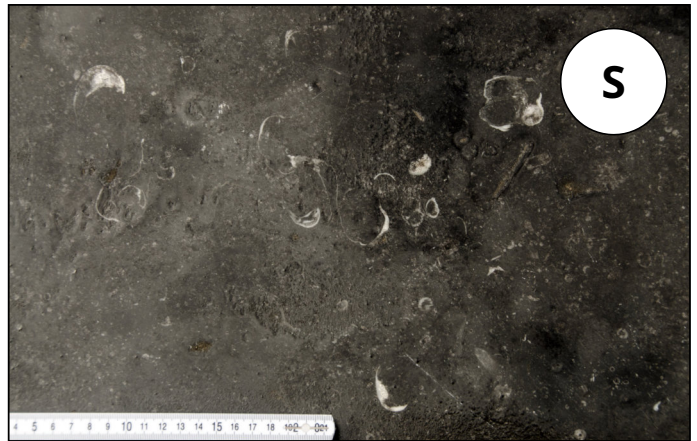
[Return to the main path and cross the path to the Chadwick Building.](#) The *Chadwick Building* is also faced with a grey Carboniferous limestone (photo P).

Look at the path leading into the *Chadwick Building*.

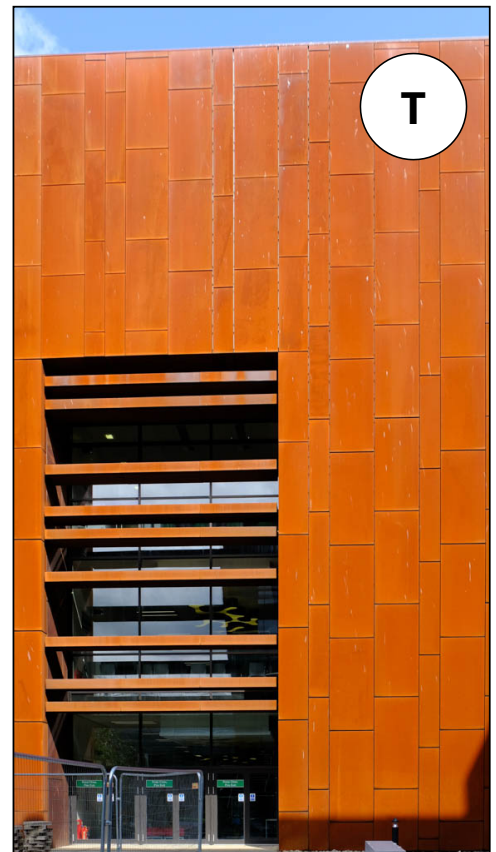
The path is surfaced with permeable resin-bound rounded gravel (photo Q) composed of many rock types as evidenced by the different colours of rock.



At the end of the CTL garden (photo R), look at “Three Uprights” a sculpture by Hubert Dalwood. This sculpture, cast in aluminium, rests on a block of black Carboniferous limestone. Look for the pieces of shell fossils in the limestone.



To the right of the sculpture notice the building which uses weathering steel sheets as cladding (photo T). Weathering steel, also known as low alloy steel, is steel with a low carbon content and to which various elements e.g. copper, chromium and nickel are added to allow early formation of a rust/iron oxide layer that will provide a weather protective coat to the steel and provide an unusual rusty appearance.



[Return along the path away from “Three Uprights” to reach the seating area near Crown Place plaza.](#) [Progress to Rock around Campus 5 University Square]

Glossary of terms

Basalt: dark coloured, crystalline igneous rock made up of small crystals of plagioclase and pyroxene that are difficult to see.

Bedding: term that describes the layering in sedimentary rocks.

Cladding: material that is attached onto another on a building to provide a skin or outer layer.

Feldspars: rock forming silicate minerals that are common in igneous rocks; includes plagioclase and orthoclase.

Fossil: any preserved remains, impression, or trace of any once-living thing from a past geological age. Examples include bones, shells, exoskeletons, leaf impressions, tracks and trails.

Granite: light coloured, crystalline igneous rock with large crystals of quartz, plagioclase, orthoclase and mica.

Limestone: a sedimentary rock composed primarily of calcium carbonate (CaCO_3) in the form of the mineral calcite.

Mica: a shiny silicate mineral with a layered structure.

Mineral: a natural solid material of fixed chemical composition with an orderly internal atomic structure.

Orthoclase: a type of feldspar mineral rich in potassium.

Paving slabs (or stones): naturally-occurring igneous, sedimentary, or metamorphic rocks which can be cut, shaped, or split into blocks or slabs for use as paving materials.

Permeable: allowing liquids or gases to pass through it.

Plagioclase: type of feldspar mineral.

Pyroxene: dark coloured silicate mineral generally containing calcium, magnesium and iron and found in many igneous and metamorphic rocks.

Quartz: a mineral composed of silicon and oxygen atoms.

Slate: a metamorphic rock formed from mudstone and which has small crystals and splits (or cleaves) into thin sheets.