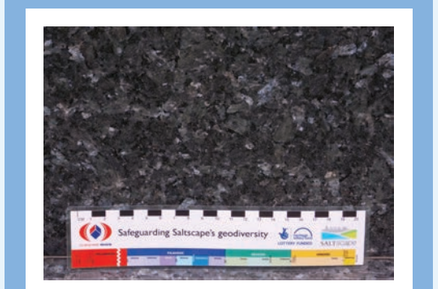
Middlewich Cemetery Geodiversity

walking through the past

What does the Cheshire RIGS group do?

Cheshire RIGS recommends sites to local authorities for designation as Regionally Important Geodiversity Sites. It also works in partnership with other community groups and businesses as part of the Cheshire region LGAP (Local Geodiversity Action Plan) to maintain geodiversity in Cheshire.

For more information about Cheshire RIGS or if you are interested in becoming involved with RIGS please contact Cheshire RIGS at either the Grosvenor Museum, Chester, or via the website www.cheshireRIGS.co.uk or email c.burek@chester.ac.uk



Written by Cynthia Burek & Ian Drew

Rock types found in Middlewich Cemetery

The rock types you will see while walking around the cemetery are igneous, sedimentary and metamorphic. They have different characters and were carefully chosen by each generation, depending on their availability at the time.

Igneous

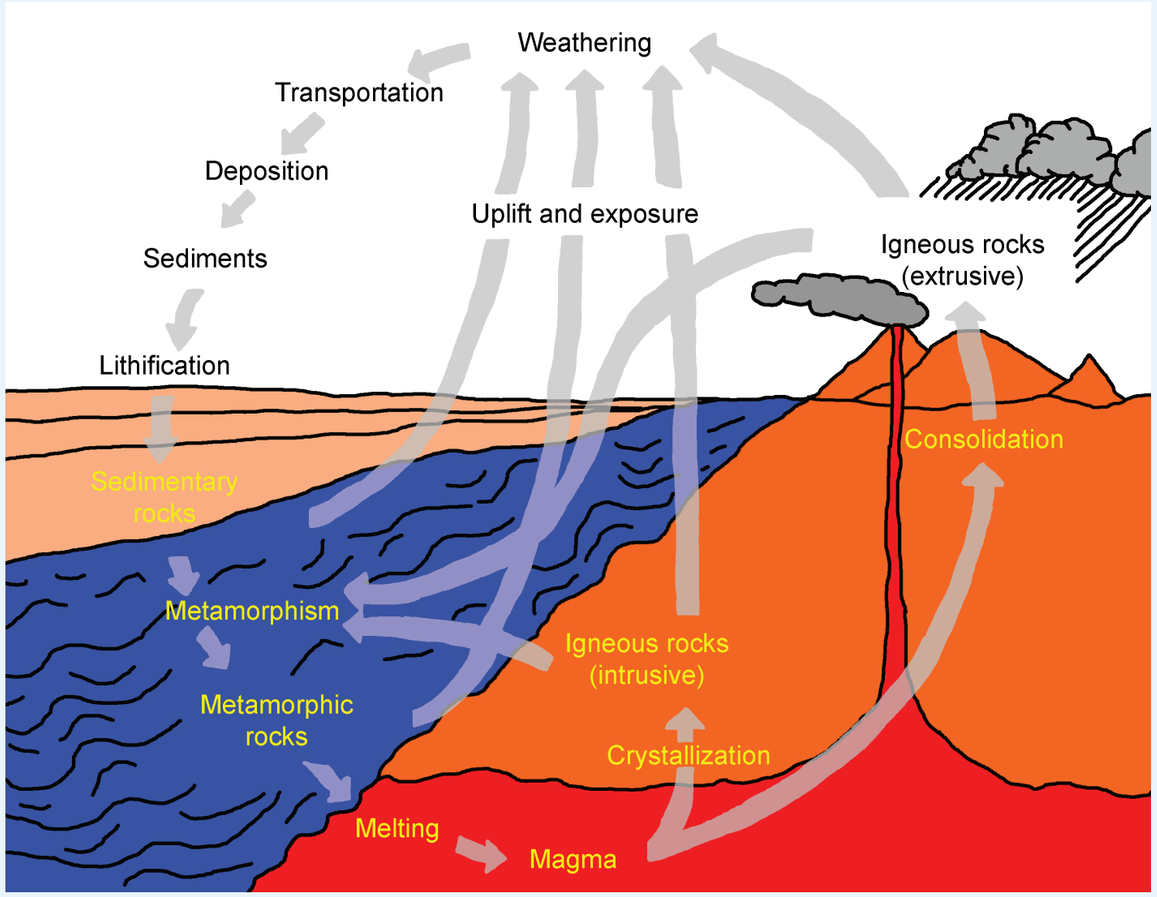
These form when hot magma rises near, or onto, the Earth's surface. The varied cooling rates, and chemical composition, of the magma causes it to crystallize into different types of igneous rock.

Sedimentary

A rock formed by the build-up of weathered rocks and fragments of plants and animals (which become fossils). Often deposited in layers in deserts, and by the sea and rivers; they are then compressed and stuck together.

Metamorphic

These are rocks that have been altered by heat and/or pressure into a new, much harder rock with the same chemical composition.



The rock cycle

Rocks form part of a continuous cycle called the rock cycle.

Igneous rocks form when hot magma solidifies.

When they are exposed at the surface they are worn down into tiny pieces by physical or chemical weathering.

These fragments are carried by wind or water out to the sea, where they settle in layers; sometimes they may settle in deserts or rivers.

As these layers are buried and compressed, they are stuck together with minerals and turned into rocks. These are sedimentary rocks.

Sedimentary rocks are either worn away to form new sedimentary rocks or altered into metamorphic rocks.

Metamorphic rocks are rocks that have been altered by heat and/or pressure into a new, much harder rock, with the same chemical composition.

Exposed metamorphic rocks are weathered into sedimentary rocks while those that are altered by enough heat and/or pressure become hot magma, and the cycle begins again.

How does geodiversity link to biodiversity?

Geodiversity – the rich variety of rocks, fossils, minerals, and natural processes forming our landscapes and soils – underpins the variety of life. The massive richness of the planet's ecosystem derives in part from its rocks and soils and the natural processes affecting them.

Geological resources impact on people's lives by shaping the landscape in which they live, how land is used, and the materials that buildings and structures are built from.

For many people the conservation of geodiversity may seem unnecessary. It can be difficult to imagine threats to landscapes which have been there a long time, and to natural and urban geological heritage sites. However, landfill and major construction work (roads, buildings etc.) can all be threats.

Awareness of geodiversity and the Earth's finite resources is essential for the future. If we safeguard our physical environment and well-being then our health and the health of our planet will not suffer.

The cemetery opened in Mid-Victorian times with the first burial for Edward Brooks taking place on 6th September 1867. The two chapels were designed by Bellamy and Hardy, two architects from Lincoln. The buildings are made of basalt and sandstone, an unusual combination as the nearest basalt is in the Peak District (quarries at Tideswell Dale, Taddington and Peak Forest).

Geological trail of Middlewich Cemetery – About 1 hour.

Start at the Entrance to the cemetery on Chester Road with Wrought Iron gates and take the first path on the right.

Headstones for Oswald and Cicely Sant (Balmoral red granite), William and Mary Thompson (black gabbro), Clifford Wakefield (white granite) and Henrietta Hough (pink granite).

These are all good examples of igneous rocks. They have a coarse texture with large crystals telling us that they cooled and crystallised slowly from molten magma deep in the Earth's crust. However, the varying chemical composition means that they are different colours. Gabbro is a basic igneous rock which means that it is darker in colour. Granite is a lighter coloured acid igneous rock containing the minerals: Quartz, feldspar and mica. Basic igneous rocks have much more iron and magnesium and less silica in them and are heavier typically containing minerals feldspar, pyroxene, and sometimes olivine.

A little further along the same path there is a headstone for John James Morris. This headstone is made of Shap Granite and is very distinctive. There are several other gravestones made of this rock type. (Thomas Hill Webb further along this path in the corner). See if you can find them in this section of the cemetery. Shap granite has rectangular phenocrysts of pink feldspar and comes from the Lake District. (The word Pheno means shiny and cryst means crystal and the term is used to described large, conspicuous crystals). There are two different colours of feldspar, one pink and one cream. The Pink feldspar is called Orthoclase and the cream is called Plagioclase. They represent different chemical compositions and cooling methods.

On the right hand side of the path the headstone for Henry Hope is a sedimentary sandstone covered in lichens. Many headstones in cemeteries are home to lichens as they are undisturbed. Lichens grow very slowly, many only 1-2mm a year while some may reach 150mm a year. Lichens are a combination of two simple organisms: a fungus and one or more algae growing together as partners to their mutual advantage. There are lots of different types of lichens and a variety can be seen on the headstones in Middlewich Cemetery.

Carry on along the path to where it starts to curve.

The Gravestone of John Bradbury is a sugary type of marble. Marble is a metamorphic rock that used to be a limestone but was transformed when it became heated at a high temperature. It can be dissolved in weakly acidic rain. This rock is a freestone and easy to carve as it contains no bedding or cleavage plains.

The war grave of RAF air mechanic Clarke shows zigzag markings called stylolites. These are pressure solution features formed after lithification, when sediments compact under pressure, expel fluids, and become solid rock.

This is the end of the guided trail. If you explore further there are many other headstones showing the features we have described. We hope you enjoyed the excursion around Middlewich Cemetery.

Middlewich Cemetery

Opening and closing times

March 25th – September 29th 8am – 8pm, September 30th – March 24th 8am – 4pm

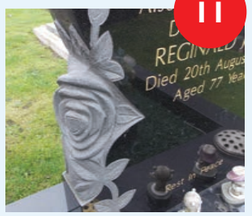
On the left hand side of the path is a Shap granite headstone for Florence Broad which is difficult to read against the coarse background.

Here are four sandstones close together. The local red Triassic sandstone for John Powell contains iron which gives it its distinctive red colour contrasting with the buff coloured headstone of Frances Charlotte Hulme.

Look here on the top of the headstone for the lichens mentioned at stop number 3.

There are many military graves in this section of the cemetery. When the headstones were first chosen after WWI (Feb 1918), 'Equality' was the underlying principle behind the design. All war grave head stones have slightly curved tops. They only bear a national emblem or regimental badge with rank, name, unit date of death and age of each casualty above an appropriate religious symbol plus a more personal dedication chosen by the relatives. This has been the guiding principle for all war casualties. Therefore, a key requirement was to use a stone that was easy to care for and which could easily hold a carved inscription. Thus the headstones of British service personnel were always identical and made from Portland Stone, a durable and affordable, fine, oolitic limestone from Dorset, formed in the Jurassic age. An oolith is a small round grain formed in shallow tropical seas as layers of calcium carbonate are deposited around a nucleus of a shell fragment or grain of sand. If you look closely at the rock surface, particularly with the aid of a hand lens, you will see the pellet like structure as well as fossils. The headstones of Privates Hatton and Kirk both show a vast array of fossils.

The Headstone of Enid Joyce shows the differences in appearance between polished and rough rock surfaces. This is a medium grained volcanic igneous rock called dolerite.



The headstones of Lucy Latham and Winifred Thompson are made of Larvikite. This is an igneous rock that is only found in the Larvik region of Norway. It is very attractive when polished and is frequently used in modern headstones. Some of the large phenocrysts are iridescent and change colour when you look at them from different angles. The rock was formed 30km underground by the cooling of magma from the breakup of the supercontinent Pangea around 295 million years ago during the Permian and Carboniferous periods. The blue shimmer on the crystals is due to microscopic changes in the unstable crystal structure due to the pressure changes as it was pushed to the surface. It takes real skill to extract the stone and cut it to show of the beautiful blue shimmering crystals.

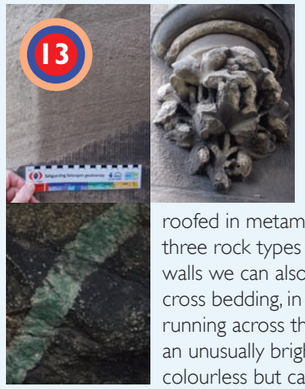
Turn around and walk straight ahead towards the Mortuary building. Turn left at the circle to 11.

Continue along this path until you reach a T junction. Turn right past the chapel of rest and take the second right. Continue across the circle and look to your left at number 8.

Alice Buckley has a headstone of marble. This variety has a streaked patter (flowage) formed by the minerals and impurities reacting to the limestone being exposed to increased heat and pressure.

Proceed along the path keeping to the right.

Half way up this path on the right is a headstone to Mary Jane Henshaw. This is polished basalt. The crystals are not easily seen with the naked eye due to their small size. It is a finely crystalline iron rich igneous rock which was erupted onto the Earth's surface and cooled quickly hence the small crystals. Consider the contrast between the dressed (polished) and undressed (rough) surfaces.



The Chapels are made of basalt with sandstone plinths and corner stones. The sandstone is badly weathered in places showing the difference in weathering properties between a solid crystalline igneous rock and a sedimentary sandstone which is porous, fragmentary and permeable to water. The chapel is roofed in metamorphic slates so is a good example of all three rock types present on one building. In the chapel walls we can also see sedimentary structures such as cross bedding, in the sandstones and quartz mineral veins running across the basalt bricks. Some of these veins are an unusually bright turquoise green quartz is normally colourless but can be many colours with the addition of impurities such as the semi-precious stone amethyst.

Stanway shows the use of contrasting ornamental granite columns on a sandstone headstone. This is seen in a number of the older headstones in the cemetery. It is probably related to historical transportation costs of the rock types with sandstone being the cheaper local rock.

Proceed along the path towards the Chapels. Turn right and go under the Chapel arch to 13.

There is an example of the mineral epidote at 14.

Walk down the central path back towards the entrance. After the convergence of the paths on the right and the left, continue forward and look to your right for 15.

The next headstone for Margaret Robinson is an excellent gneiss (pronounced 'nice'). Gneiss is a high grade metamorphic rock showing a series of light and dark bands. These bands of flowing, aligned minerals are created by the effects of direct very intense heat or high pressure. The rock was close to melting but didn't. Metamorphic rocks showing these bands are described as foliated.

Turn around and take the next right on the roundabout. Carry on along until you reach the next circle and turn right to 10.