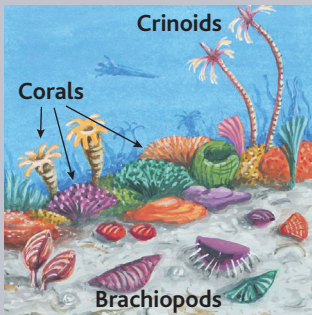


ROCKY FOUNDATIONS

The landscape of the Westmorland Dales has its foundation in the underlying rocks and is the result of millions of years of Earth history. The stunning limestone country around Orton tells a story of tropical seas, the action of ice and water, and the shaping of the landscape by people.

SUN, SEA AND SAND

The Westmorland Dales is largely made up of layers of limestone, sandstone and mudstone which formed between 350 and 320 million years ago in the Carboniferous Period. Northern England lay near the Equator and was periodically covered in shallow tropical seas and swampy river deltas. Limy, shelly mud on the sea floor hardened into layers of fossil-rich limestone, which we see today as pale crags and gleaming pavements. Layers of sandstone and mudstone were originally sand and mud deposited in deltas that built out into the seas.



A Carboniferous tropical sea, full of creatures now preserved as fossils. Below are corals and brachiopod shells (curved shapes) in the old limestone quarries near Knott Lane.



ICE AND WATER

In the more recent geological past the landscape has been sculpted by ice and water. The area's dramatic limestone pavements are the result of limestone gradually dissolving in rainwater, combined with the action of glaciers which scraped the rock bare. At the height of the last ice age, around 26,000 years ago, there would have been hundreds of metres of ice above you here, and glaciers and torrential meltwater scoured the fells and dales.

Water continues to shape the landscape. Rainwater is gradually dissolving the limestone, and becks and rivers are constantly eroding, transporting and depositing material.

EXPLORING THE WESTMORLAND DALES

This lovely part of east Cumbria forms the north-western corner of the Yorkshire Dales National Park. With support from the National Lottery Heritage Fund, the Westmorland Dales Landscape Partnership is working with Cumbria GeoConservation and other partners to reveal and celebrate the area's rich natural and cultural heritage, including its superb geology and landscape.

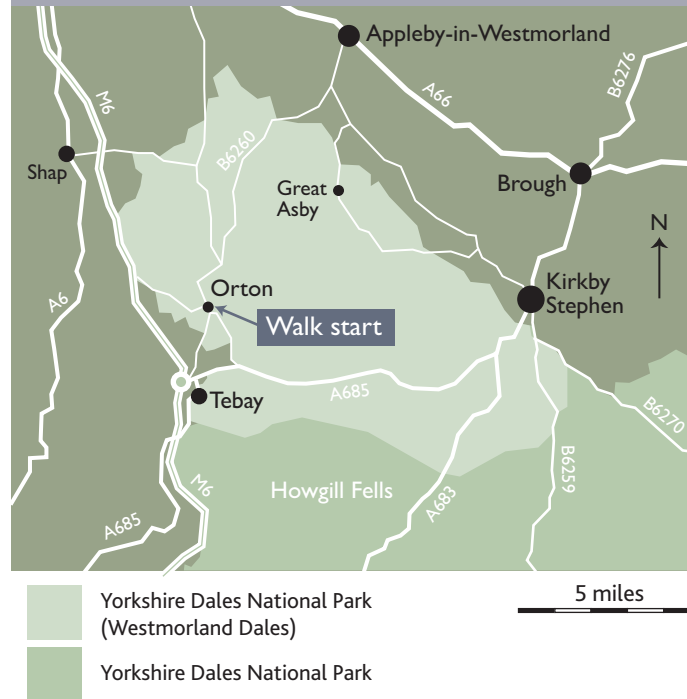
Walk length/time: 5¼ miles / 8.4km, 2.5 - 3 hours

Start: Orton NY622082. Please park considerately.

Terrain: Public rights of way and Access Land, with gates, stiles and short road sections. Fairly strenuous with a sustained climb. Grassy paths and tracks, with exposed rock on the fells.

Facilities: Refreshments and toilets in Orton

OS map: Explorer OL19 Howgill Fells & Upper Eden Valley



Cumbria
Wildlife Trust

www.cbdc.org.uk/cumbria_geoconservation_home/
www.cumbriawildlifetrust.org.uk
www.yorkshiredales.org.uk • www.friendsofthelakedistrict.org.uk
thewestmorlanddales.org.uk • dalesrocks.org.uk



WESTMORLAND DALES

A geology walk around ORTON SCAR & KNOTT

5¼ miles / 8.4km



Made possible with

Heritage
Fund

Look out for these features along the way!

A Look out for pinky grey boulders. These are **glacial erratics** of Shap Granite. They were transported here by ice from their source south of Shap (4 miles west of here) during the last ice age. You'll see more later on this walk. Shap Granite's colour comes from its distinctive large feldspar crystals.

B This spring marks the boundary between **Ashfell Sandstone** and the overlying **Ashfell Limestone**. Rainwater gradually dissolves limestone and flows underground until it meets a layer of impermeable rock such as sandstone, and emerges at the surface.

C Old **limekilns** like this date from the 18th or 19th centuries and were used to make lime by burning local limestone with coal as fuel. Lime was spread on fields to improve acid upland soils, and was also used to make traditional lime mortar.

D From here there are superb views on a clear day. South across the upper Lune Valley are the Howgill Fells. The Howgills are made of Silurian slates, which are around 420 million years old. The contrast between their rounded shapes and the layered limestone landscape on this walk reflects their very different geology.

E **Limestone pavements** are an iconic feature of the Westmorland Dales. They have formed as a result of limestone dissolving, combined with the action of glaciers in the ice age. Fissures known as **grykes** separate blocks or **clints**. The sheltered grykes provide an important habitat for specialised plants.

F This small disused **quarry** in Ashfell Limestone and another one a short walk uphill from here contain excellent **fossils** of corals and brachiopod shells. Limestone from these quarries would have been burnt in the old limekiln at the top of Knott Lane.

G **Gamelands Stone Circle** is thought to date from between 4,400 and 3,000 years ago. All the boulders but one are glacial erratics of Shap Granite. Spot the odd stone out! (Clue: it's the main rock type in this landscape.)



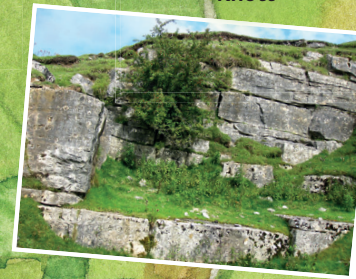
Shap Granite erratic north of Orton



Spring north of Broadfell



Herb robert and maidenhair spleenwort on limestone pavement



Old limestone quarry below Knott



Gamelands Stone Circle



1 From the centre of Orton, walk north on the B6260 (Appleby road), pass Mostyn House on left and turn right over a small road bridge.

2 Just before next bridge, turn left into the no-through road, signed 'Public brideway Orton Scar'. At next brideway sign ('Broadfell'), turn left into a narrow lane beside houses. Follow lane as it turns right and becomes a stony path. Follow the brideway through fields [A] to Broadfell Farm.

3 Follow waymarkers through farmyard, keeping to left of main farm buildings. Continue uphill past a wood [B] and towards a stone structure (limekiln) [C].

4 Bear left past limekiln, following the track up to join the B6260. On road turn right, then right again to follow grassy path beside fell wall, eventually climbing to a monument.

5 From the monument, continue following wall. Go through the second gate and follow a brideway ahead and then downhill. Keep straight on at the crossing of brideways.

6 Follow the grassy track downhill to a gate [F]. Go through gate onto Knott Lane. Look for a wicket gate in wall on left to access Gamelands Stone Circle [G].

7 At the road turn right and after about 1/4 mile take footpath on right signed 'Street Lane'. Follow the footpath through fields to a lane, turn right and take next footpath on left. This takes you back to Orton village.