

# NATIONAL STONE CENTRE: KS3 THE FIRST LOCATION

## Introduction

Each small group of pupils will need:

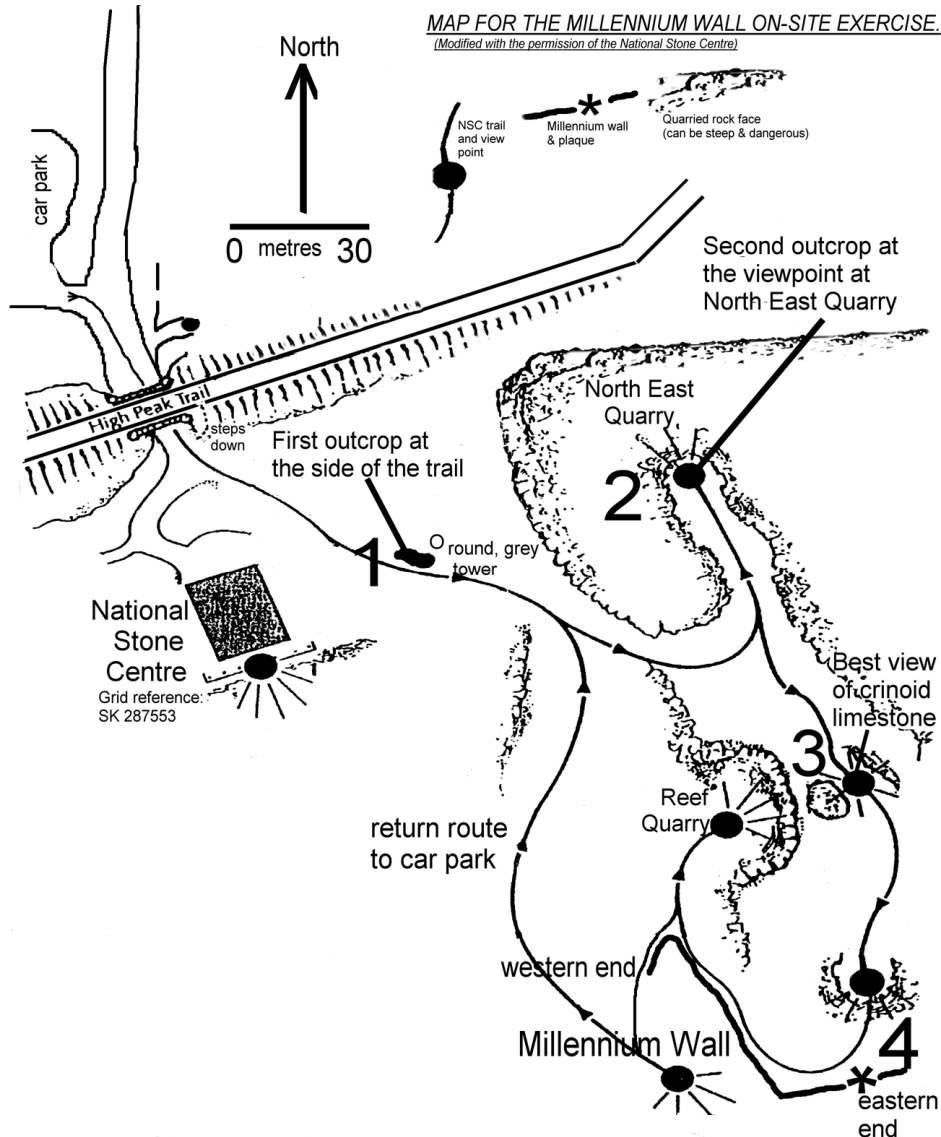
- a) a clipboard with relevant worksheets and maps;
  - b) a measuring tape, compass & clinometer
- Group leaders should have a plastic bottle of dilute HCl

**No material should be hammered, collected or removed from this protected site**

The first and second exposures allow an investigation of the underlying rock of the area, as well as the processes that have affected the rocks since their deposition (cementation, uplift, weathering, erosion and quarrying). Here the key ideas in preparation for the Millennium Wall, and the follow-up homework exercise can be rehearsed by posing the questions suggested below.

At the southern end of the National Stone Centre site (see **Figure 1.**) is, the site of the third exercise, the Millennium Wall. At over 100 metres in length, it is made up of nineteen sections which include different styles of dry stone walling from around the country. However, it also brings together a huge variety of rock types, most in fresh, un-weathered condition, in an area famed mainly for its limestone. Conveniently, each section has an information plinth at one end, providing some information about each rock type (and the dry stone walling technique).

**Figure 1. Map for the Millennium Wall Exercise.**



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Although the information boards provide a lot of information, it is important to stress that the point of these exercises is for the pupils to provide **evidence from observations** to back up the identification, not the identification itself: e.g. “*Why* is it a limestone?” “*Why* is it different from that other limestone?”

**Insist that there is no need to lean on, or climb on, the exposures, or walls. The exercise is one of observation.**

### 1. Conducting The Fieldwork At The First Exposure (About 30 minutes)






**Figure 2. View of the First Exposure.**

The first outcrop is below the round pointed tower, and just east of the Stone Centre. (See **Figures 1 & 2**).

Use the questioning to focus pupils' thoughts on the observations they need to make and the thought processes in drawing conclusions.

Afterwards the pupils will be invited to investigate the exposure in pairs use the following kinds of verbal questions to follow up the significant points with their observations.

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<p><b>“What observations can you make about the rock at this outcrop?”</b></p>	<p>[It is layered, contains fossils: (brachiopod) shellfish, a coral, and crinoids (See Figure 3 below for assistance); it is layered (bedded); it fizzes with dilute HCl]</p>
<p><b>Figure 3. Fossils from the First Exposure: coral, crinoid &amp; brachiopod (convex shell broken).</b></p>	
<div style="display: flex; justify-content: space-around; align-items: center;">    </div>	
<p>More information on the fossils can be found in <b>NSC8 Info fossils</b></p>	
<p><b>“What do the fossils contained in the rock tell us about its origin?”</b></p>	<p>[The shellfish (brachiopods) corals, and crinoids, are marine organisms. The rock was formed in a shallow sea]</p>
<p><b>“What kind of rock is this. Is it igneous sedimentary or metamorphic?”</b></p>	<p>[It is a sedimentary limestone, (of Carboniferous age, dated by the fossils it contains). It also fizzes in dilute HCl]</p>
	<p>[Died, washed around by currents leaving coral &amp; crinoids lying on their side, until buried. All soft parts decay leaving only the skeleton]</p>
<p><b>“What evidence can you see for weathering of this rock?”</b></p>	<p>[Staining of the joint faces. The thin soil is made up of the “impurities” in the limestone, after the calcium carbonate has been chemically weathered and removed in solution.]</p>
<p><b>“Which way would you walk to move onto younger rocks?”</b></p>	<p>[Uphill, as older beds of rock are deposited first, with younger rocks on top. (The exception to this principle is in areas where the beds have been over folded)]</p>
<p><b>EXTENSION QUESTIONS</b></p>	
<p><b>“What do you think the rock quarried from the National Stone Centre site was used for?”</b></p>	<p>[Roadstone for M1 (1960s); Agricultural lime (up to 1960s); As a polished decorative stone (up to 1930); Limeburning (from 1800s to 1940s); Building stone for local houses (from 1800)]</p>
<p><b>“Why is this exposure here?”</b></p>	<p>[It has actually been cleared recently for educational uses like yours]</p>

### RECORDING OBSERVATIONS.

Pupils should be given time to make notes and sketches of their observations and conclusions about the formation of this outcrop and the changes that have affected it since deposition using Pupil Worksheet 1.

**PUPIL RESPONSES ON THE RECORD SHEET ARE:** fossils; crinoid; brachiopod; corals; beds; crust; sea level; fizzed (effervesced); sedimentary; limestone; deposited; sea; decayed; skeletons; sides; broken;