

**© UKRIGS Education Project: Earth Science On-Site**

Funded by Defra's Aggregates Levy Sustainability Fund, administered by English Nature.

This website and all of its contents are the copyright of UKRIGS and reproduction is only permitted in accordance with the following terms:

You may view, download and print any material for non-commercial educational use, research or study.

Any commercial use requires the prior written permission of UKRIGS.

Contact: [info@ukrigs.org.uk](mailto:info@ukrigs.org.uk)

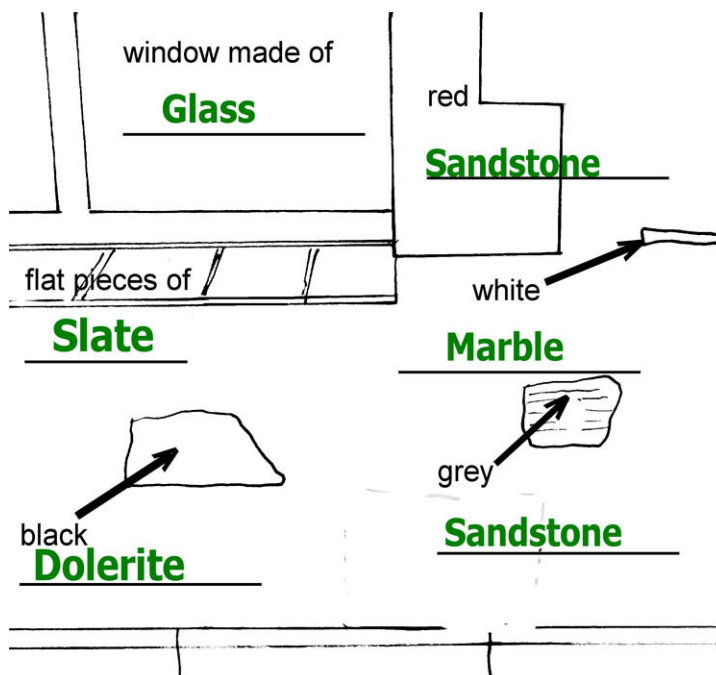
**PUPIL WORKSHEET 1**

**Pupil Name.....**

**Site A: Mungrisdale Recreation Hall – Looking at building stones.**

Ask your teacher to show you which part of the building to look at. Find the stones marked on the sketch below. Try to label the rocks on the sketch below with their correct names, using this Rock Reference Sheet and the list of names below.

| Rock description   | Name         | Group        |
|--|--------------|--------------|
| Sand grains, red, rusty or cream colour. Often shows layers. | Sandstone    | Sedimentary  |
| Medium pinkish & white crystals.                             | Microgranite | Igneous      |
| White sugary crystals, fizz with acid.                       | Marble       | Metamorphic  |
| Small crystals mostly dark green/black.                      | Dolerite     | Igneous      |
| Large crystals, mostly dark green/black.                     | Gabbro       | Igneous </td |
| Creamy/white lime mud & shells. Often shows layers.          | Limestone    | Sedimentary  |
| Splits into layers. Often dark in colour: grey/purple/green. | Slate        | Metamorphic  |



On the sketch some stones have been marked with their colour.

On the correct line on the sketch write in the **name** the material used in the window and for each stone marked in the wall. Chose words from the list below. (Sandstone is used twice).

- Sandstone**
- Sandstone**
- Marble**
- Slate**
- Dolerite**
- Glass**

**PUPIL WORKSHEET 2**

**Pupil Name.....**

**Rock Description (alternative sheet)**

| Rock description & formation  | Type & other details  |
|---|---|
| <p>I am made of grains of sand – I feel rough.<br/>They are mostly bits of a glassy mineral called quartz.<br/>They are stuck together with quartz cement, which makes me quite hard.<br/>Sometimes I am creamy in colour, sometimes I contain iron and am red.<br/>You may be able to see layering.<br/>I was formed in layers under water.</p>      | <p>Rock type: <b>sandstone</b>.<br/>Rock group: <b>sedimentary</b>.</p> <p>Sometimes I am porous.<br/>I do not fizz with acid.<br/>If I am soft my grains easily wear away.</p>                                       |
| <p>I am made of medium sized crystals of minerals.<br/>My pink, cream or white crystals are feldspar.<br/>I also have shiny black crystals.<br/>My minerals interlock because they crystallised together from molten magma.<br/>Larger crystals indicate slower cooling at greater depth in the Earth’s crust.<br/>I am very hard and feel rough.</p> | <p>Rock type: <b>microgranite [like granite]</b>.<br/>Rock group: <b>igneous</b>.</p> <p>I am not porous.<br/>I do not fizz with acid.</p>  |
| <p>I am made of small crystals locked together.<br/>My crystals are white and sugary.<br/>I am made of the mineral called calcite.<br/>I was once a limestone, but have since been buried and heated at great depth in the Earth’s crust causing me to re-crystallise.</p>  | <p>Rock type: <b>marble</b>.<br/>Rock group: <b>metamorphic</b>.</p> <p>I am not local.<br/>I am not usually porous.<br/>I fizz when acid is put on me.</p>   |
| <p>I am mostly made of black or dark green crystals of minerals, including augite. and a sparkling white mineral called feldspar.<br/>My minerals interlock because they crystallised together from molten magma.<br/>Larger crystals indicate slower cooling at greater depth in the Earth’s crust.<br/>I am very hard and feel rough.</p>           | <p>Rock type: <b>gabbro</b> [large crystals]<br/><b>dolerite</b> [smaller crystals]<br/><b>basalt</b> [microscopic crystals]<br/>Rock group: <b>igneous</b>.</p> <p>I am not porous.<br/>I do not fizz with acid.</p> |
| <p>I am made of bits of shell fossils with lime mud and the mineral calcite sticking them together.<br/>I can vary in colour – grey/cream/white.<br/>You may be able to see layering in me.<br/>I was formed in layers under water.</p>   | <p>Rock type: <b>limestone</b>.<br/>Rock group: <b>sedimentary</b>.</p> <p>Sometimes I am porous.<br/>I fizz when acid is put on me.</p>  |
| <p>I am made of microscopic minerals.<br/>I may be grey, purple or green in colour.<br/>I am quite hard and can often be split into thin sheets because I have been squeezed that way. I was originally mud.</p>  | <p>Rock type: <b>slate</b>.<br/>Rock group: <b>metamorphic</b>.</p> <p>I am not porous.<br/>I do not fizz with acid.</p>  |

**PUPIL WORKSHEET 3**

Pupil Name.....

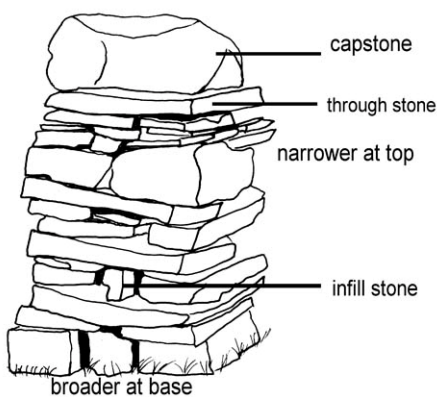
**Site B – Mungrisdale Lime Kiln**

Use the information board by the kiln to help you answer these questions.

| QUESTION  | ANSWER  |
|---|---|
| Describe the shapes of the stones used to build the limekiln.                                 | <b>Many are large slabs, some are round, of different rock types. The archway has thinner slabs, probably of slate.</b> |
| Use the display board to help to answer these questions.<br>What fuels were used in the kiln? | <b>Charcoal or coal.</b>  |
| How long did it take to burn the limestone in the kiln?                                       | <b>Several days.</b>  |
| What was produced in the kiln?  | <b>Quicklime.</b>   |
| What was the burn limestone used for?   | <b>Plaster, mortar, whitewash, antiseptic and spread on fields to neutralise acid soils.</b>                            |

**Site C: Drystone Walling at St. Mungo’s House.**

Listen whilst your teacher is explaining about building a dry stone wall, and write the 5 labels in the correct places on the sketch of a dry stone wall below.



**Narrower at the top,  
broader at the base,  
capstone,  
through stone,  
infill stone**

Using the Rock Reference Sheet see how many different rock types you can recognise making up the wall. Write their names below.

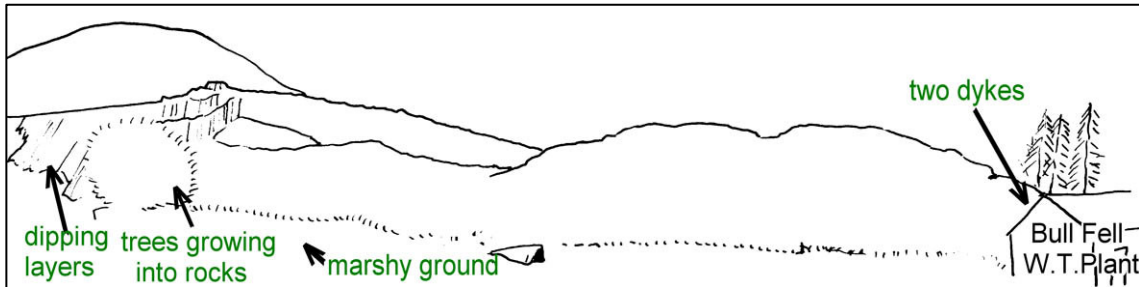
**Several types: long flats are slates, larger blocks may include limestone, whilst the more rounded ones are likely to be dolerite & micro granite. The coping stones on the wall to the School House, behind the post box down the road are red sandstone, covered in moss!**

**PUPIL WORKSHEET 4**

Pupil Name.....

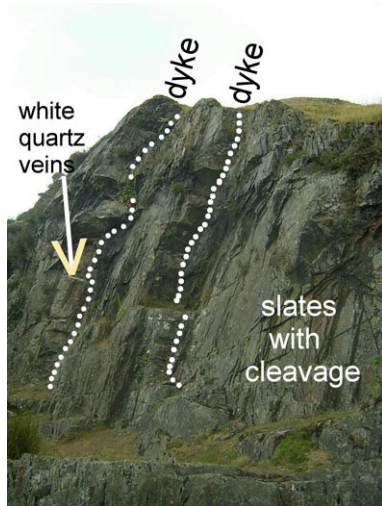
**Site D. School House Quarry**

On the correct arrows on the sketch below write the following labels:  
**marshy ground; dipping layers; trees growing into rocks; two dykes**



Explain how you can tell this is a quarry and not a natural cliff.

**It has a steep face, nearly vertical, clean rock, not weathered much, and a flat floor.**



There are two dykes. The white dotted line shows you the edge of the right hand dyke.

Can you see the other one with the white quartz veins?

**Use a pencil to draw in the edge of that dyke as a dotted line on the photograph.** Use the first one as a rough guide.

Make sure you can also see it in the quarry face for yourself.

Describe the two dykes:

Width: **They are 25-50 cm wide**

Colour: **dark / black**

Joints: **cooling joints with quartz, run across them** Rock Name: **Dolerite**

Explain how the dykes were formed: **Molten rock pushed through cracks in the rock and then crystallised to a solid rock**

**PUPIL WORKSHEET 5**

Pupil Name.....

**Sites E & F: Naming Rocks at Mosedale and Stone Ends.**



Use the Rock Reference Sheet and the photograph to help you describe the rocks.

Some answers below can just be circled, but others you will have to write in.

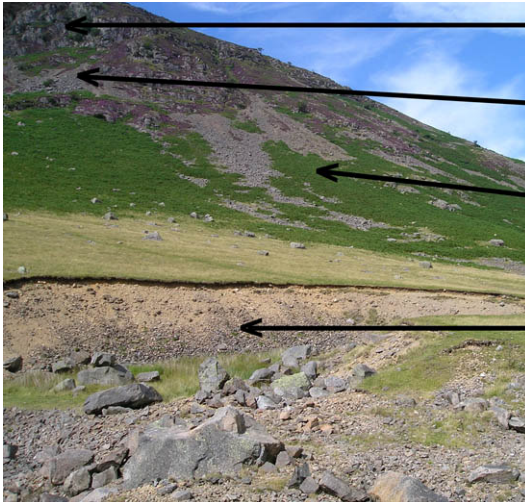
|   |   |            |
|---|---|------------|
| <b>Site E: Mosedale Quarry:</b>   |   | <b>Sit</b> |
| Rock Colour: <b>Black &amp; white</b>                                     | Crystal Size: ( <b>coarse</b> , medium, fine) | Ro         |
| Are the <b>grains interlocking</b> or stuck together?                     |   | Are        |
| Rock Type: ( <b>Igneous</b> , Metamorphic or Sedimentary?)                |   | Ro         |
| How was this rock formed? <b>Molten rock solidifying deep underground</b> |   | Ho         |
| Rock Name: ( <b>Gabbro</b> or Microgranite?)                              |   | Ro         |
| <b>Site F: Stone Ends Quarry:</b>   |   | <b>Sit</b> |
| Rock Colour: <b>Red and black</b>   | Crystal Size: (coarse, <b>medium</b> , fine)  | Ro         |
| Are the <b>grains interlocking</b> or stuck together?                     |   | Are        |
| Rock Type: ( <b>Igneous</b> , Metamorphic or Sedimentary?)                |   | Ro         |
| How was this rock formed? <b>Molten rock solidifying deep underground</b> |   | Ho         |
| Rock Name: (Gabbro or <b>Microgranite</b> ?)                              |   | Ro         |



**PUPIL WORKSHEET 6**

Pupil Name.....

**Site F: Investigating Scree Slopes at Stone Ends.**



**Freeze-thaw breaks off angular rock pieces from cliff.**

**Rocks fall by gravity to form scree slopes.**

**Old screes let plants grow on them.**

**Scree is quarried by humans for road stone.**

Look up the slope of the hill and match the view with the photograph above.

**Label the four boxes on the photograph correctly with the labels below:**

1. Freeze-thaw breaks off angular rock pieces from cliff.
2. Rocks fall by gravity to form scree slopes.
3. Old screes let plants grow on them.
4. Scree is quarried by humans for aggregates.

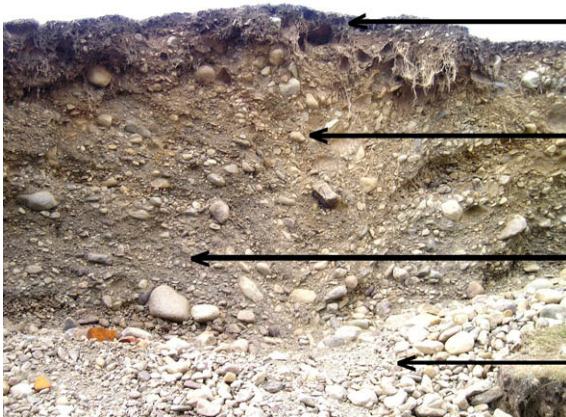
|   |  |
|---|--|
| Describe the size and shape of the rock pieces found in this scree slope. | <b>Very angular boulders a metre across to small pebbles and sand.</b> |
| Why do you think the rock pieces are angular and not rounded?             | <b>Not travelled far [unlike river and seashore pebbles].</b>          |
| What type of severe climate conditions has Britain suffered in the past?  | <b>Ice ages/glaciations.</b>   |
| In which season do we still get freeze-thaw?                              | <b>Winter.</b>   |
| Try to identify two types of plant growing on the hill slopes.            | <b>Grass and bracken.</b>  |

**PUPIL WORKSHEET 7**

Pupil Name.....

**Site G: Studying Pebbles At Long Hill.**

These gravels were brought here at the end of the last ice age by water from melting ice. The ice and the water are now nowhere to be seen.



**Soil forms at the surface and plants grow.**

**Rounded pebbles, gravel and sand.**

**Layers tell us it formed in water.**

**Pebbles weathered from the quarry face.**

**Label the boxes by the photograph with the correct label from below:**

1. Rounded pebbles, gravel and sand.
2. Layers tell us it formed in water.
3. Soil forms at the surface and plants grow.
4. Pebbles weathered from the quarry face.

|   |  |
|---|--|
| Describe the shape of Long Hill.  | <b>Long, narrow ridge.</b>   |
| Describe the shape of most of the rocks.  | <b>Mostly rounded to some extent [not as rounded as beach pebbles!]</b>  |
| Suggest a reason why they have become that shape.   | <b>Travelled some way in water, perhaps by a river flow.</b>   |
| Suggest why it is drier than the surrounding area. Your teacher may wish to collect two soil samples from here. | <b>It dries because sands &amp; gravels are porous, and rainwater soaks in. (The surrounding area is not porous and has different plants.)</b> |
| What do you think the rock is used for?   | <b>Aggregates – local, small scale.</b>  |