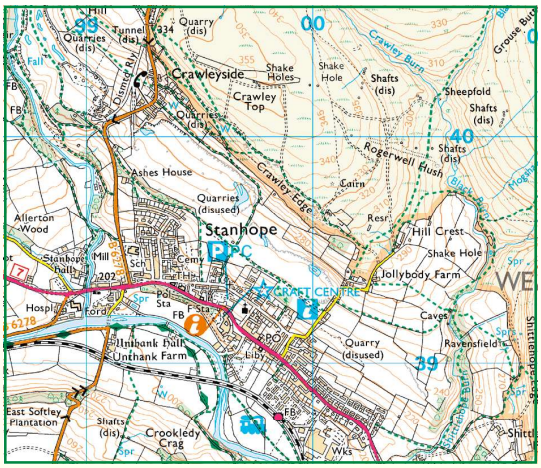
Stanhope, Weardale, County Durham

Contrasting Locality: Quarrying

INTRODUCTION

The main fieldwork element of this day involves a walk to the north of Stanhope to look at the extent of limestone quarrying in the area and the impact it has had on the landscape. The walk finishes in Stanhope and looks at the use of the local rock types in the buildings and architecture of the area. The second half of the day provides the opportunity to view a working limestone quarry and to look at an example of quarry reclamation.

All the resources required for pupils to carry out a day of fieldwork are included, as well as all the resources required for the introductory and follow-up activities. The table below summarises the activities.



Stanhope, Weardale, County Durham

Contrasting locality: Quarrying

SUMMARY OF ACTIVITIES

Activity name	Details of activity
Introductory Activity 1	Detective map work
Introductory Activity 2	Rock types and quarrying
Fieldwork Outline	Rock types and quarrying around Stanhope A working limestone quarry and an example of reclamation
Follow-up activity 1	Limestone
Follow-up activity 2	Landscape impact assessment
Follow-up activity 3	How would you reclaim Harehope Quarry?
Follow-up activity 4	Plans to extend quarrying

DETECTIVE MAP WORK

It is suggested that this map work should be done before the visit and then comparisons can be made during the visit. Some introduction to O.S. maps will be needed to get the most from this work. This could be done using the map extract used here but it would be more exciting for the children to prepare with a different map and then present this as a challenge!

Key idea – 'Detective Work'

- Look at the map and discuss together
- Collect as many clues from the map as possible about what the area is like
- Encourage the children to imagine what the place they are going to visit is like?
- In small groups describe what they would expect to find on their visit. Make a note of this description
- Compare their description with what they actually see when they get there

Introduction to map work

Before starting the map work the children will need to know a little about contours, scale, direction, map symbols and grid references. Below is a reminder about grid references.

- O.S. maps have a grid system.
- Each vertical and horizontal line has a number.
- To place 'My house' using a 4-figure grid reference take the numbers from the bottom left hand corner of the square with 'My house' in it, giving the vertical line number first and then the horizontal line number. In this example it is 2131. The most common way to remember which figure comes first is by the saying "Along the corridor and up the stairs".
- 6-figure grid references pinpoint features within the squares. This requires the map reader to imagine the grid square is divided in tenths along the horizontal and vertical scale. So 'My house' becomes 215315.

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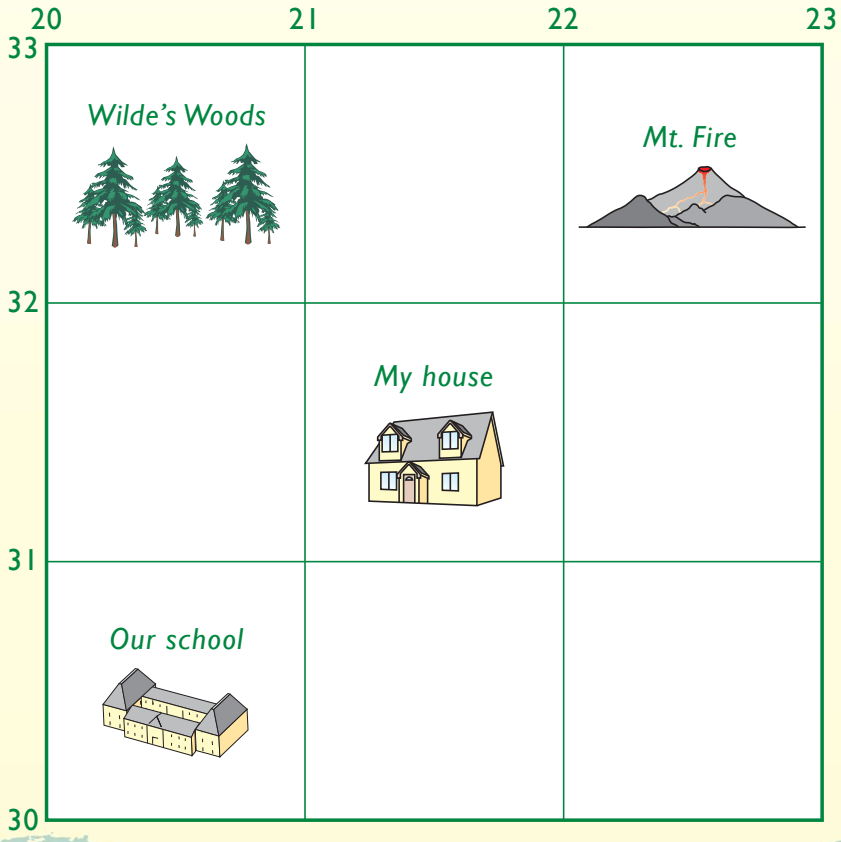
Introductory Activity 1 - Teacher Resource Sheet



Stanhope, Weardale, County Durham

Introductory Activity 1 - Pupil Resource Sheet 1

DETECTIVE MAP WORK

Use the O.S. map extract and the symbols for this site and in small groups complete the following:

1. Which of these do you think you would find in Stanhope? Some you can tell from the map and for some your group will have to make a guess, based upon the sort of pace and size of place! Complete the grid below:

Feature	Yes / No	Evidence (map or guess)
Church		
Tourist Information Office		
Post Office		
Caravan site		
Industry		
Public house		
Bank		

2. Stanhope map detective work

- Look at the main road, the rialway line and the river. What do you notice about them? Why are they like this?
- Can you use the map to try and estimate how many people might live in Stanhope? (A tip: Count 3 people for every house and estimate the number of houses. Check on the internet to see how close you came to the answer!
- How many bridges – road, rail or footbridges cross the River Wear on the section of map you have?
- How does the minor road cross the River Wear near Unthank Hall (Grid square 9939).
- If you started at Crag Nook (Grid square 9839), plan an interesting circular walk of about 5 miles. Trace it with your finger and then jot down the directions and places passed. For example from Crag Nook go south west on a small road to Snow Field and then continue on the same road to Aller House etc)

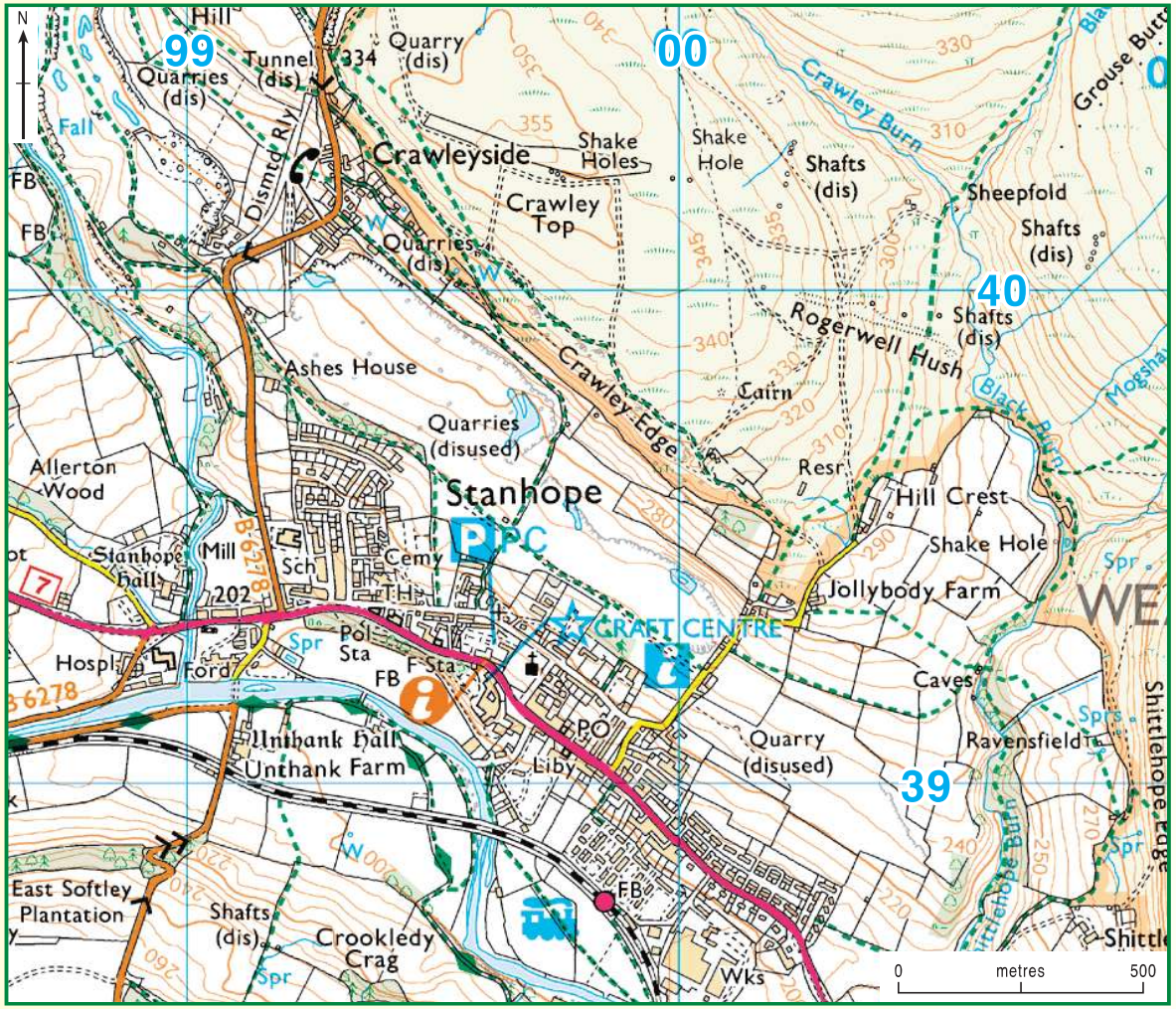
3. Grid references

As a group complete the grid below:.

Grid reference	What is there?
	Greenfoot caravan site
0036	
0236	Name the place -
	Stanhope School







O.S. Map of Stanhope





Ordnance Survey Map Symbols

Pupil Resource Sheet

ROADS AND PATHS

M1 or A6 (M) — Motorway

A35 — Dual carriageway

A30 — Main road

B3074 — Secondary road

Narrow road with passing places

Road under construction

Road generally more than 4m wide

Road generally less than 4m wide

Other road, drive or track, fenced and unfenced

Path

RAILWAYS

Multiple track

Single track

PUBLIC RIGHTS OF WAY

Footpath

Bridleway

BOUNDARIES

National

County (England)

Civil Parish (CP)

National Park boundary

SELECTED TOURIST AND LEISURE INFORMATION

P — Parking

Information centre

PC — Public convenience

Telephone

Campsite / caravan site

Golf course or links

Public house

Walks

Viewpoint

Picnic site

Country park

GENERAL FEATURES

\+ — Place of worship

Building

Bus or coach station

Triangulation pillar

Windmill

BP/BS — Boundary post / stone

CH — Clubhouse

FB — Footbridge

Mon — Monument

PO — Post Office

Pol Sta — Police station

Sch — School

TH — Town hall

PURPOSE AND AIMS OF THE VISIT

The main aims of the fieldwork are:

- To use Stanhope as a contrasting locailty for study
- To look at the rock types found around Stanhope and their uses
- To look at the impact of quarrying and attempts at reclamation

Background Information:

As villages and towns grow they develop specific functions. The function or functions of a village or town relate to its main activities, for example a market town or a mining town. A town's function can change with time.

Stanhope originally grew as a result of lead mining and later limestone quarrying. It has always served as the market town for Weardale and still does so today. It is its function as a quarrying town that will form the basis of this visit.

Around Stanhope there are 3 main rock types that you will see on the visit – limestone, shale and sandstone.

Limestone – Limestone was formed in a shallow, tropical sea from the shells and skeletons of marine animals. It is grey in colour and may contain fossils. The limestone is in layers or beds. One bed in the limestone around Stanhope is rich in coral fossils and is known locally as Frosterley Marble.

Shale – Shale is made from mud and silt washed into the sea by rivers. The layers of sediment build up and are compacted to form shale. Shale is made up of very small grains of sediment laid in fine layers. It is a very soft and crumbly rock.

Sandstone – Sandstone is made from sand grains washed into the sea by rivers. The layers of sediment build up and are compacted to form sandstone. The sand grains can be seen in the light brown sandstone and the rock is in layers or beds.

Both limestone and sandstone have been quarried around Stanhope; the limestone for the iron and steel industries at Consett and Teesside and the sandstone for building. There are no working quarries left around Stanhope now.

Stanhope, Weardale, County Durham

Introductory Activity 2 - Teacher Resource Sheet

INTRODUCING THE FIELDWORK

a) Using Pupil Resource Sheet 2, introduce the idea that villages and towns have a function. Complete Activity 1 on Pupil Resource Sheet 2.

b) In groups give the pupils samples of limestone (sample 7), shale (sample 13) and sandstone (sample 11) and hand lenses from the North Pennines Rock Boxes. Cut up the cards on Pupil Information Sheet 1 and give a copy to each group. Use the cards to decide the rock type of each sample. Complete Activity 2 on Pupil Resource Sheet 2.

c) Encourage the pupils to look at and feel the rocks. Complete Activity 3 on Pupil Resource Sheet 2.

d) Discuss how rocks are used around us – buildings, road stone, walls, sculptures, cement making etc. Get the pupils to use the internet and other school resources to research the uses of the rocks they will see around Stanhope. Complete Activity 4 on Pupil Resource Sheet 2.

e) The following is an activity to introduce quarrying:

• Give each pupil a chocolate chip cookie, or something similar, and a cocktail stick. They are going to quarry out the chocolate chips from the cookie. The quarrying of the chocolate chip is like the quarrying of limestone, which is between layers of sandstone and shale.

• Leave the pupils to get the chocolate chips out in whatever way they think is best. Some will take time to carefully pick out the chocolate chips and some will crush the whole biscuits but get the chocolate chips out quickly!

• As a class discuss the different methods and relate them to quarrying limestone and the impact it would have on a place if no care was taken to extract it.

• Introduce the idea that after quarrying has taken place work can be done to reclaim quarries to make them better for people, wildlife and enjoying geology.

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Introductory Activity 2 - Pupil Resource Sheet 2

STANHOPE ROCKS!

1. As villages and towns grow they develop functions. The functions of a town relate to its main activities, for example a market town or a mining town. Functions change with time – Stanhope's main activities were once lead mining and limestone quarrying but now it is a market town for Weardale. What is the function of the town or village where you live?

2. The 3 rocks you have been given are from around Stanhope – but what 3 rocks are they? Use the rock cards to decide what rocks you have and write your answers in the table below:

Rock Sample Number	Rock Type

3. Look carefully at each of your rock samples and feel them. Which of the rocks do you think is the hardest? Which is the softest? In the table below rank the rocks according to their hardness, 1 being the hardest and 3 the softest.

Rock Type	Hardness
Shale	
Sandstone	
Limestone	

4. Use the internet and any other school resources to find out what these rocks may be used for:

Rock Type	Shale	Sandstone	Limestone
Uses:			

WHICH ROCK TYPE?

Instructions:
Print onto thin card and cut each out

LIMESTONE

Characteristics:

- *Light to dark grey in colour*
- *May contain fossils - brachiopods, crinoids, corals*
- *Found in layers or beds*

SHALE

Characteristics:

- *Dark brown or dark grey grey in colour*
- *Made of very fine grains*
- *Made up of fine layers*
- *Very soft and crumbly*

SANDSTONE

Characteristics:

- *Light brown in colour*
- *Made of rounded sand-like grains*
- *Rough to touch*
- *Found in layers or beds*

DOLERITE

Characteristics:

- *Made of dark grey / black crystals*
- *Crystals are small and can be seen with a hand lens*
- *Often looks as though it is made of columns*

HORNFELS

Characteristics:

- *Very dark grey to black*
- *Often with dark brown spots all over*
- *Very fine grained*
- *Very thin layers in rock*
- *Very tough and can be splintery when broken*

ORGANISATIONAL DETAILS

Aim

To look at Stanhope as a contrasting locality with a focus on limestone.

Target Group

Key Stage 2

Location

This fieldwork day is based around Stanhope in Weardale. The first part of the day involves a walk from the Durham Dales Centre (GR: NY 995393) through Ashes Quarry to the north of Stanhope and back through the town centre.The second part of the fieldwork involves viewing a working and reclaimed quarry to the east of Frosterley (GR: NZ 037369).

Practical Details

- Parking – There is parking for coaches at the Durham Dales Centre in the centre of Stanhope (GR: NZ 995393) but places are not designated so please ring before hand (01388 527650). Coaches can drop students off just to the east of Frosterley where there is a lorry park. It may be possible to park here as long as the road into the lorry park is not blocked, but permission should be sought first (GR: NY 034369). There is also a lay-by on the north side of the A 689 (GR: NY 044370) where coaches can park.
- Toilet facilities - The nearest public toilets are close to the Market Place in Wolsingham and at the Durham Dales Centre in Stanhope.
- Useful maps – Ordnance Survey 1:25 000 Explorer OL31 North Pennines Teesdale and Weardale.

Safety Issues:

- The area can be very exposed and the weather changeable, so sensible clothing and footwear should be worn.
- Refer to the Hazard Identification Sheet.

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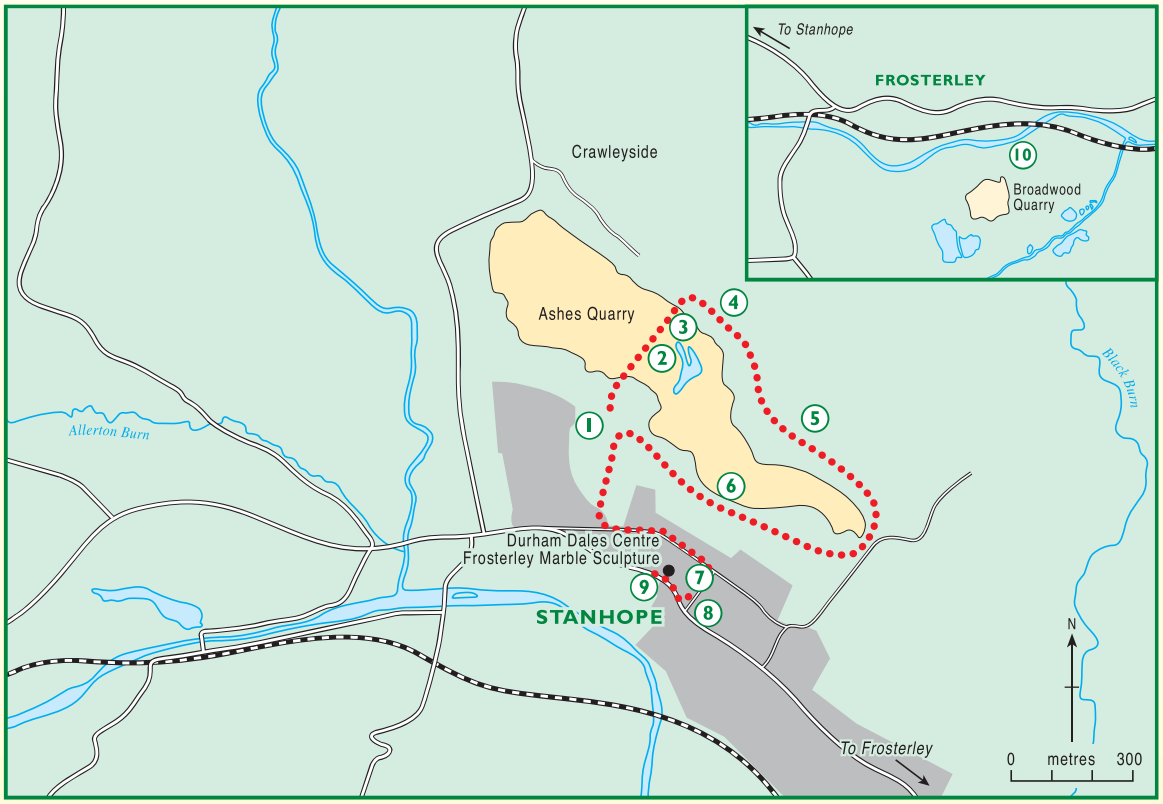
Fieldwork Outline - Teacher Resource Sheet



HAZARDS IDENTIFICATION SHEET

The following notes will help teachers conduct their own risk assessments. This is not a risk assessment and teachers should follow guidelines from the Department of Children, Schools and Families.

Hazard Identified	Risk and to whom	Control measures
Vehicles in the car park	Caution needed when getting off the coach or minibus in the car park as the parking area is narrow and vehicles may by passing. All students and staff.	Supervise students getting off the coach or minibus and gather in a safe place.
Vehicles on the road	Caution needed when walking through the town. One quiet stretch of road does not have a footpath. All students and staff.	Supervise students along the road.
Uneven paths	Paths are uneven and may be slippery in wet weather. Students may slip and fall. All students and staff.	Warn about conditions.
Quarry faces	There are steep quarry faces around Ashes Quarry. Risk of falling. All students and staff.	Warn about conditions and keep students away from the quarry edges.
Gravestones in St. Thomas' Church	Many of the gravestones are very old and can be unstable. All students and staff.	Supervise students and do not allow them to climb on or push the gravestones.
Vehicles on Broadwood Bridge	Broadwood Bridge is narrow and quarry vehicles use it. All students and staff.	Warn about conditions and supervise students across the bridge.

UNDERTAKING THE FIELDWORK

1. The rocks around Stanhope

This walk will take you around Ashes Quarry, a quarry in the Great Limestone, and on to Crawley Edge to provide a view of the extent of quarrying between Stanhope and Frosterley. Please ensure you stay on the footpaths. The route returns to Stanhope and provides the opportunity to look at how local stone is used in the town. The table below provides information about each stop on the circular walk and pupils can record the information on Pupil Resource Sheet 3.

Stop and grid reference	Background Information
1. The heaps and dismantled railway (GR: NY 996395)	From the Durham Dales Centre walk towards the centre of Stanhope passing St. Thomas' Church on the left hand side. Turn immediately left after the church up a side road and then left again. Continue along this road until the Methodist Church and then a marked footpath to the right takes you up to Ashes Quarry. Follow this path to the point where another footpath crosses it. The footpath that crosses marks the route of an old railway that took the limestone from the quarry to Consett and Teesside, where it was used in the iron and steel industries. The mounds that you have just walked through are heaps made from the stone in the quarry that the quarrymen did not want. Part of the quarry face is just visible. Complete activity 1 on Pupil Resource 3.
2. Ashes Quarry (GR: NY 997396)	Continue up the footpath stop just after the footbridge. From here there is a good view of the quarry face. Describe the changing layers from the bottom (the oldest rocks) to the top (the youngest rocks). The Great Limestone is the bottom section of the face and is a dark grey, blocky rock. Above this are layers of shale that are very crumbly and from a distance resemble soil. Above the shale is another thin layer of limestone. Above this are more layers of shale. Close to the top of the quarry face there is a layer of sandstone, a sandy brown rock showing layers or beds. The top of the quarry face is shale again. The limestone was quarried for the iron and steel industries. Complete activity 2 on Pupil Resource Sheet 3.
3. Fell wall (GR: NY 998398)	Continue up the path to the fell wall. Look at the old photograph of Ashes Quarry. Discuss what the photograph shows, what the conditions must have been like when working in the quarry and what changes have taken place. Complete activity 3 on Pupil Resource Sheet 3
4. The Sandstone quarry on Crawley Edge (GR: NY 998398)	Follow the path through the fell wall and skirt along the top of the quarry face. The path bears to the right towards Crawley Edge. Go through the gate in the wall and follow the track immediately to the right that goes up to Crawley Edge. Follow the path in a south-easterly direction along Crawley Edge. There is a small sandstone quarry on your left. The small sandstone quarries along Crawley Edge are easily accessible and safe and enable pupils to touch and handle the rocks. Use the rock identification key on Pupil Information Sheet 2 to identify the rock in this quarry. You will also need small bottles of vinegar or concentrated lemon juice to enable the key to be used. Complete activity 4 on Pupil Resource Sheet 3.
5. Crawley Edge (GR: NY 999396)	Continue along Crawley Edge until you can find a good viewing point that allows you to see up and down Weardale. The Great Limestone between Stanhope and Frosterley has been heavily quarried as there are great thicknesses of limestone here. Use the O.S. map extract and the view in front of you to find and name as many limestone quarries as you can. There at least 5! Complete activity 5 on Pupil Resource Sheet 3.

Stop and grid reference	Background Information
6. Bottom of Ashes Quarry (GR: NY 997394)	Continue along Crawley Edge. Where the path meets the fell wall again, follow the path south-west through the field and between the houses to the road. A footpath is signed from the right-hand side of the road. Follow this path through the bottom of Ashes Quarry. Ashes Quarry has been closed since 1944 And since then has been left for nature to reclaim. Discuss what wildlife habitats exist in the quarry now. Complete activity 6 on Pupil Resource Sheet 3. Continue along this path until it meets the path you began on. Continue back to St. Thomas' Church.
7. In front of St. Thomas' Church, the wall. (GR: NY 996392)	Use the Rock identification Key on Pupil Information Sheet 2 to identify what rock type the wall is made of. Discuss what other things around you are made from the same stone. Complete activity 7 on Pupil Resource Sheet 3.
8. In front of St. Thomas' Church, the fossil tree. (GR: NY 996392)	Discuss how this fossil was formed and what it is made of. Complete activity 8 on Pupil Resource Sheet 3.
9. Sculpture at the Durham Dales Centre (GR: NY 996393)	Examine the sculpture behind the main building. This is an important local rock. It is limestone like that in Ashes Quarry but it is rich in fossils. The fossils are solitary corals. Complete activity 9 on Pupil Resource Sheet 3.

2. *Quarrying and quarry reclamation*

The second part of the fieldwork involves looking at a working and reclaimed quarry to the east of Frosterley (GR: NZ 037369). The fieldwork involves a short circular walk past Broadwood Quarry and around the perimeter of Harehope Quarry. Landscape Impact Assessments will be completed to compare how much we like a view of Weardale compared to a view of a working and reclaimed quarry. The table below provides information about each stop on the circular walk and pupils can record the information on Pupil Resource Sheet 4.

Stop and grid reference	Background Information
10a. Broadwood Quarry (GR: NZ 036366)	From the dropping off point at Broadwood Bridge, walk over the bridge and over the railway line. After the railway line bear left and follow the track. A footpath is marked on your right-hand side. Walk up the footpath to a gate that provides a good view of Broadwood Quarry. Broadwood Quarry is a working limestone quarry. The limestone can be clearly seen at the bottom of the quarry face. The material above was deposited by a glacier during the last ice age and has to be removed before the limestone can be quarried. This is called the 'over burden'. Complete activity 1 on Pupil Resource Sheet 4. Discuss how the quarry has changed the landscape. Introduce the Landscape Impact Assessment exercise. Completing the Landscape Impact Assessment will give an idea of how each person feels about the landscape they are looking at. Complete activity 2 on Pupil Resource Sheet 4.
b. Top of Broadwood Quarry (GR: NZ 036365)	Continue along the path to the top of Broadwood Quarry. Turn and look south-east down Weardale. This gives a good view of the dale. Complete a Landscape Impact Assessment of this view. Complete activity 3 on Pupil Resource Sheet 4.
c. Frosterley Marble Bridge (GR: NZ 034362)	Follow the footpath south to Bollihope Burn. Once through the gate at the bottom turn immediately left over a stile onto a permissive footpath into Harehope Quarry. Follow this path to the footbridge. Discuss the rock that can be seen in the water under the foot bridge. This is Frosterley Marble again and the fossils can be seen as the river has polished the rock. Complete activity 4 on Pupil Information Sheet 4.
d. The viewing circle (GR: NZ 036362)	Cross the bridge and bear left through the gate that takes you to the viewing circle. This gives a good view across Harehope Quarry. Harehope Quarry was once a working limestone quarry like Broadwood Quarry. There has not been any quarrying here for more than 30 years and work is being completed to make the quarry a nicer place – it is being reclaimed. Complete another Landscape Impact Assessment to see if you like or dislike this view more than the view of Broadwood Quarry. Complete activity 5 on Pupil Resource Sheet 4.
e. Interpretation panel (GR: NZ 039365)	Re-trace the path to the gate and then go up the steps to your left. At the stile re-join the main footpath and follow it to the left to skirt the southern side of Harehope quarry. Join the road and follow it to the interpretation panel. Harehope Quarry has been reclaimed over the last 10 years. It has a small fish farm and a smallholding to produce food, a classroom that has been built using environmentally-friendly techniques (energy from the wind and sun, local wood for the building, composting toilets, wood-burning stove and a living roof) and a nature reserve with public access. Discuss some of the features you can see. Complete activity 6 on Pupil Resource Sheet 4.

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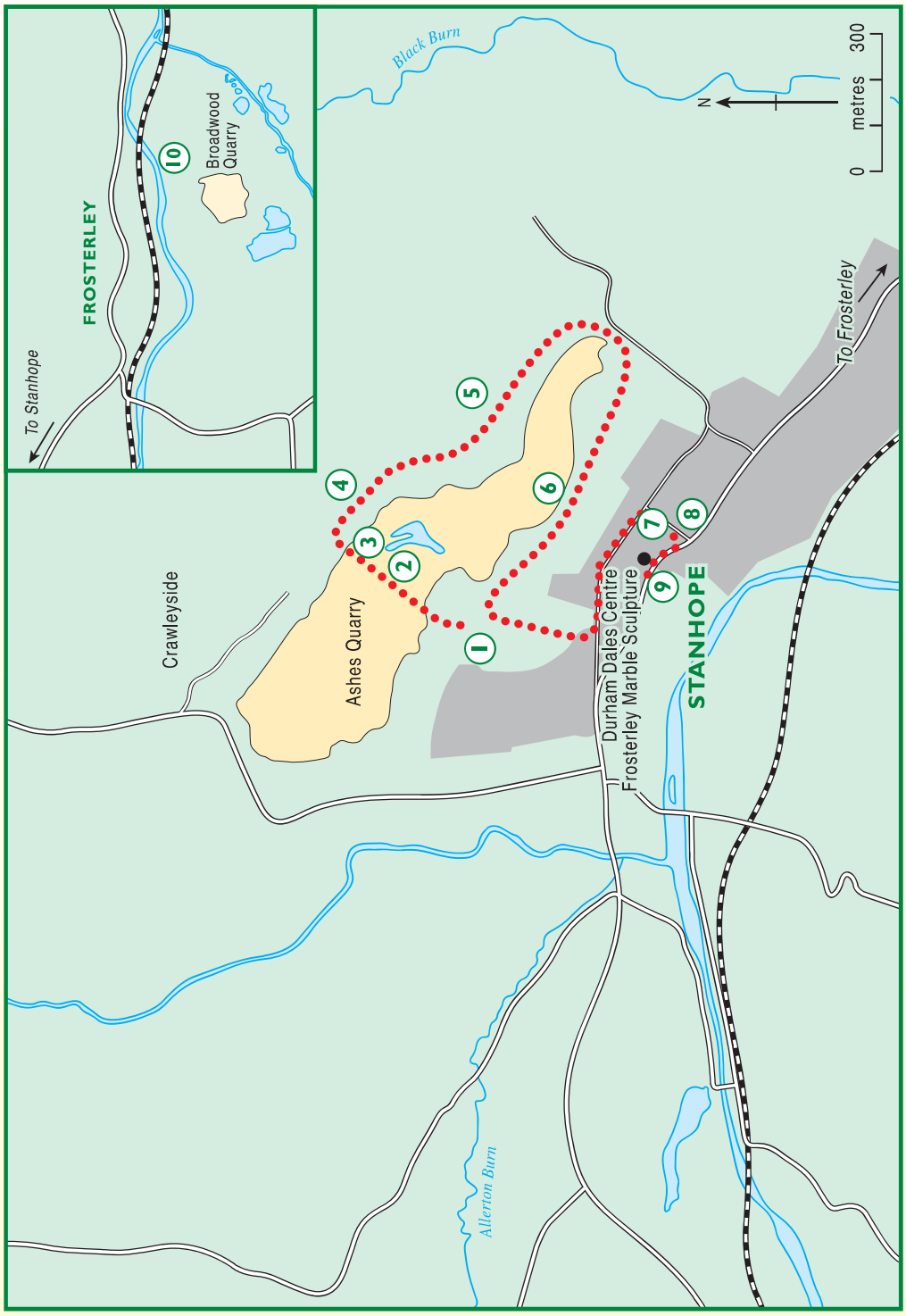
Pupil Information Sheet



Stanhope, Weardale, County Durham

Quarrying - Pupil Resource Sheet 3

THE ROCKS AROUND STANHOPE

STOP 1

a) What signs are there that quarrying has taken place here?

_____

_____

_____

_____

b) How do we know that the small hills or heaps around you are made by people and are not natural?

_____

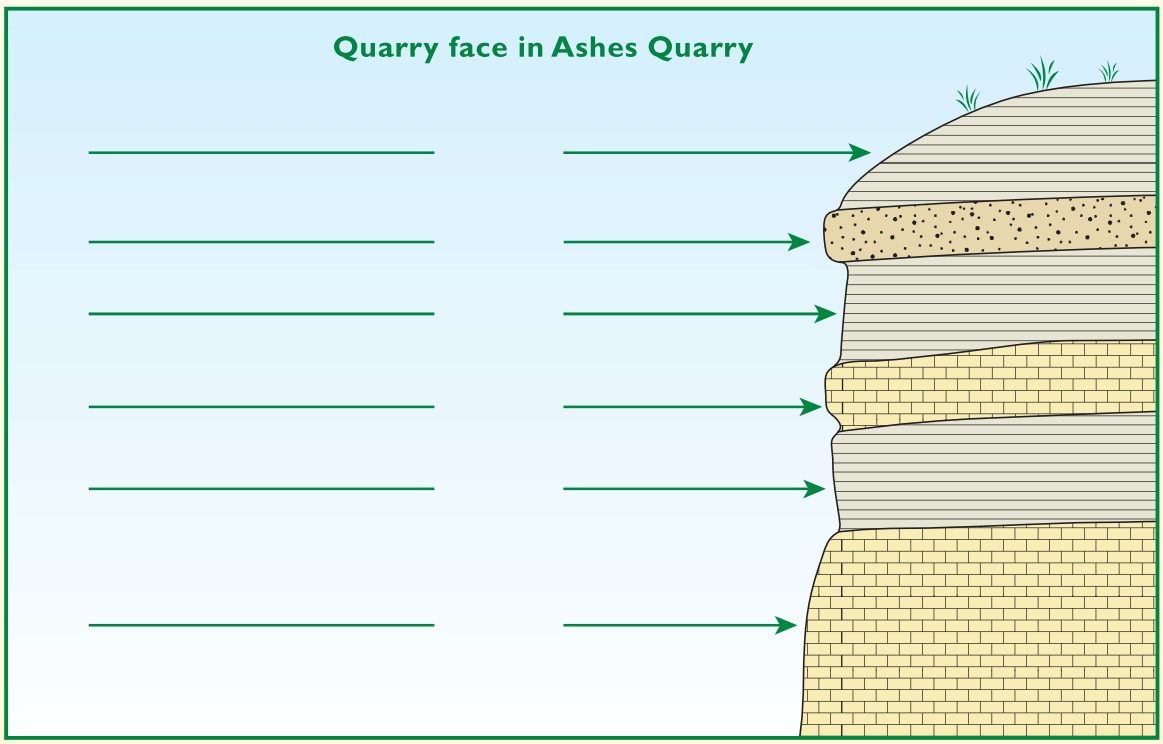
_____

_____

_____

STOP 2

a) On the sketch below name each layer of rock (use the rock identification key):



b) What did the quarrymen want?

c) Which rocks would they have thrown onto the heaps?

d) What was the quarried stone used for?

STOP 3. The photograph below is of an old quarry in Weardale.

a) What do you think the quarry was like when it was working?

b) What do you think it was like to work there?

c) How has the quarry changed?

STOP 4: Crawley Edge

What rock has been quarried in this small quarry?

STOP 5:View from Crawley Edge

Look across the valley. Can you see any other quarries?

STOP 6

Habitats are places where plants and animals live. Now that Ashes Quarry is no longer used it provides a habitat for plants and animals. List some of the habitats in the quarry where plants and animals may live:

STOP 7: St. Thomas Church Stanhope - the front wall

a) Use the Rock Identification Key on Pupil Information Sheet 2 to find out what rock type the wall in front of the church is made of. Write your answer below:

b) How many other things around you are made of this rock type? List them below:

STOP 8: The Fossil Tree

The tree was found at a local quarry in 1915, but is actually many hundreds of millions of years older!! The tree comes from a time in Earth history known as the Carboniferous, some 320 million years ago.

The North Pennines in the Carboniferous was a very different place to today. It was dominated by a vast tropical swamp, that contained some of the earliest large land plants.

This tree became fossilised when the original stump became buried in layers of sediment. Sediment filled the space left by the rotting wood, and eventually hardened into a sedimentary rock. The sedimentary now forms a perfect cast of the original tree. Some detail is lost in the process, but patterns of bark can be seen on this fossil.

a) What sedimentary rock type is the fossil made from?

STOP 9: Frosterley Marble Sculpture, The Dales Centre

a) The sculpture is made from a rock called Frosterley Marble. It is a limestone but this one is full of fossil corals. Draw a section of the rock below and add the following labels:

FOSSIL CORAL

BLACK BODY OF THE ROCK:

b) In what sort of environment do you think the corals in the Frosterley Marble use to live? (Hint –where do corals live today?)

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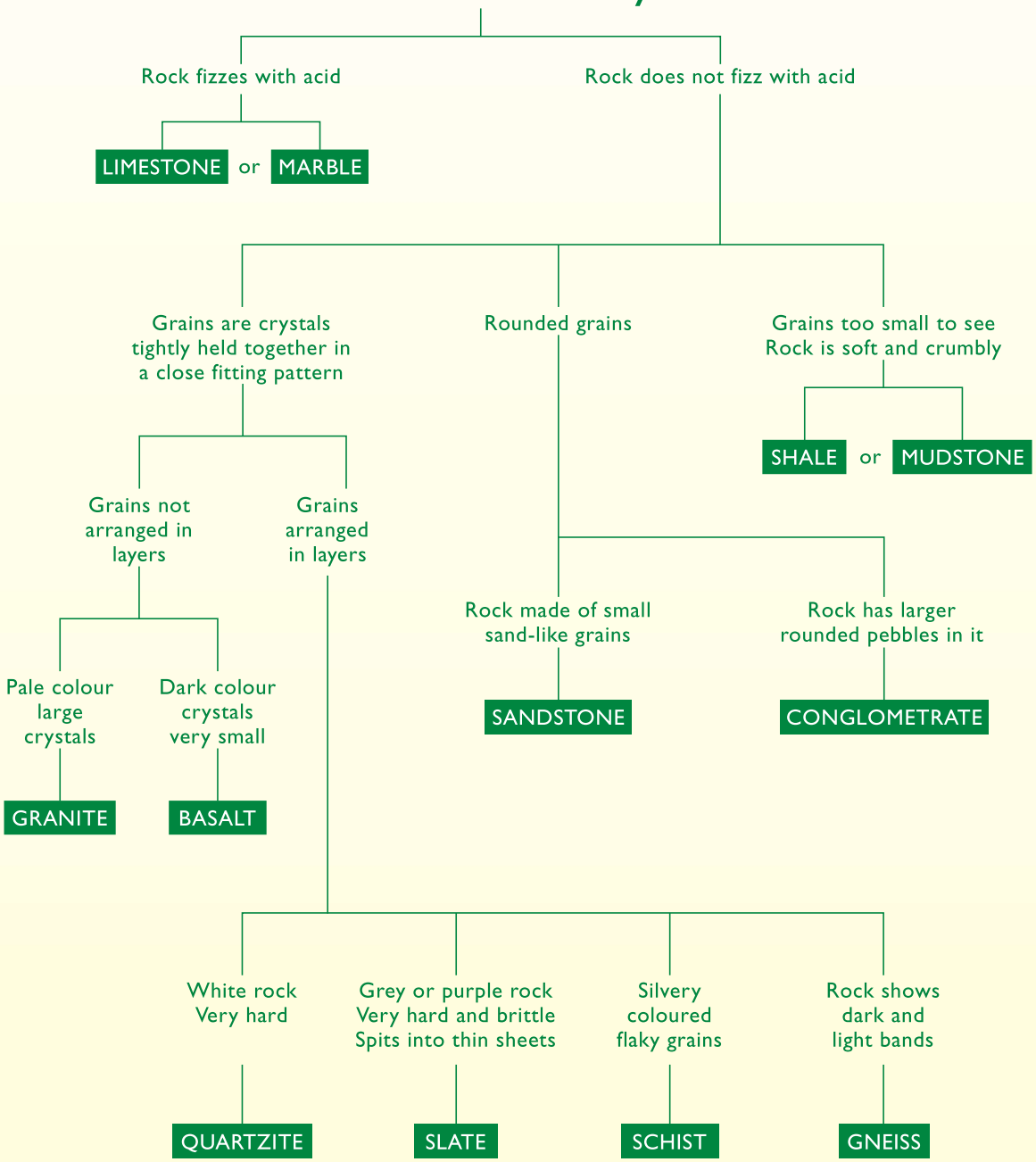
Pupil Information Sheet 2

Rock Identification Key





QUARRYING LIMESTONE AT BROADWOOD QUARRY (FROSTERLEY)

STOP 10

a) Draw a sketch of Broadwood Quarry and add the following labels:

Great limestone beds ***Over burden*** ***Working face***

Track to the quarry ***Earth screen around quarry***

STOP 10 *a) Complete a Landscape Impact Assessment for the working area of Broadwood Quarry. The purpose of the assessment is to see how much you like the view. A calculation will be made back in school and the higher the number the better you like the view! On the grid below circle a number between 1 and 7 for each pair of words to indicate how strongly you feel these words describe the view. Go down the list in order; do not leave any blank*

View of the working area of Broadwood Quarry								
Wet	1	2	3	4	5	6	7	Dry
Unemotional	1	2	3	4	5	6	7	Emotional
Ugly	1	2	3	4	5	6	7	Beautiful
Interesting	1	2	3	4	5	6	7	Boring
Bright	1	2	3	4	5	6	7	Dull
Obvious	1	2	3	4	5	6	7	Mysterious
Harmony	1	2	3	4	5	6	7	Discord
Cold	1	2	3	4	5	6	7	Warm
Soft	1	2	3	4	5	6	7	Hard
Frustrating	1	2	3	4	5	6	7	Satisfying
Private	1	2	3	4	5	6	7	Public
Static	1	2	3	4	5	6	7	Dynamic
Dislike	1	2	3	4	5	6	7	Like
Unstimulating	1	2	3	4	5	6	7	Stimulating
Full	1	2	3	4	5	6	7	Empty
Pleasant	1	2	3	4	5	6	7	Unpleasant
Weak	1	2	3	4	5	6	7	Strong
Disruptive	1	2	3	4	5	6	7	Peaceful
Colourful	1	2	3	4	5	6	7	Colourless
Disordered	1	2	3	4	5	6	7	Ordered
Simple	1	2	3	4	5	6	7	Complex

b) Complete a Landscape Impact Assessment for the view of Weardale.

View of the working area of Weardale to the south-east								
Wet	1	2	3	4	5	6	7	Dry
Unemotional	1	2	3	4	5	6	7	Emotional
Ugly	1	2	3	4	5	6	7	Beautiful
Interesting	1	2	3	4	5	6	7	Boring
Bright	1	2	3	4	5	6	7	Dull
Obvious	1	2	3	4	5	6	7	Mysterious
Harmony	1	2	3	4	5	6	7	Discord
Cold	1	2	3	4	5	6	7	Warm
Soft	1	2	3	4	5	6	7	Hard
Frustrating	1	2	3	4	5	6	7	Satisfying
Private	1	2	3	4	5	6	7	Public
Static	1	2	3	4	5	6	7	Dynamic
Dislike	1	2	3	4	5	6	7	Like
Unstimulating	1	2	3	4	5	6	7	Stimulating
Full	1	2	3	4	5	6	7	Empty
Pleasant	1	2	3	4	5	6	7	Unpleasant
Weak	1	2	3	4	5	6	7	Strong
Disruptive	1	2	3	4	5	6	7	Peaceful
Colourful	1	2	3	4	5	6	7	Colourless
Disordered	1	2	3	4	5	6	7	Ordered
Simple	1	2	3	4	5	6	7	Complex

c) The rock that you can see in the bed of the stream was quarried here to make the pillars for the Chapel of the Nine Altars in Durham Cathedral. What rock is it?

_____

_____

s) Complete a Landscape Impact Assessment for Harehope Quarry - a reclaimed quarry.

View of Harehope Quarry - a reclaimed quarry								
Wet	1	2	3	4	5	6	7	Dry
Unemotional	1	2	3	4	5	6	7	Emotional
Ugly	1	2	3	4	5	6	7	Beautiful
Interesting	1	2	3	4	5	6	7	Boring
Bright	1	2	3	4	5	6	7	Dull
Obvious	1	2	3	4	5	6	7	Mysterious
Harmony	1	2	3	4	5	6	7	Discord
Cold	1	2	3	4	5	6	7	Warm
Soft	1	2	3	4	5	6	7	Hard
Frustrating	1	2	3	4	5	6	7	Satisfying
Private	1	2	3	4	5	6	7	Public
Static	1	2	3	4	5	6	7	Dynamic
Dislike	1	2	3	4	5	6	7	Like
Unstimulating	1	2	3	4	5	6	7	Stimulating
Full	1	2	3	4	5	6	7	Empty
Pleasant	1	2	3	4	5	6	7	Unpleasant
Weak	1	2	3	4	5	6	7	Strong
Disruptive	1	2	3	4	5	6	7	Peaceful
Colourful	1	2	3	4	5	6	7	Colourless
Disordered	1	2	3	4	5	6	7	Ordered
Simple	1	2	3	4	5	6	7	Complex

e) Take a good look at Harehope Quarry. If you had to reclaim this quarry what would you like to see? Note down some suggestions below:





Stanhope, Weardale, County Durham

Follow-up Activity 1 - Pupil Information Sheet 3

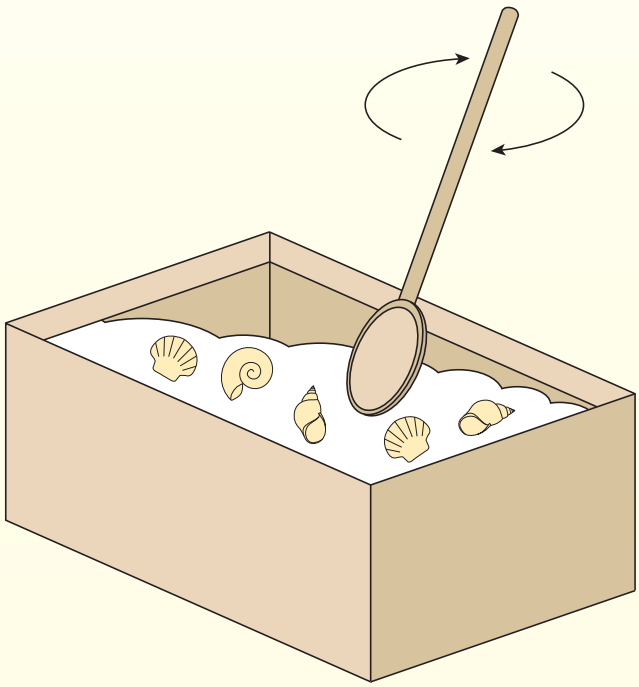
LIMESTONE

1) Make fake shelly limestone!

Limestone often contains fossils as it is formed in warm seas where the hard parts of marine animals are buried in the sediment when they die. If you split open shelly limestone you can sometimes find beautifully preserved seashells. See if you can make some convincing fake shelly limestone to fool your friends!

You will need:

Seahells
Plaster of Paris
Old show box or Plastic container
Plasticene
Mallet or hammer
Chisel
Cold black coffee or yellow food colouring (optional)



Instructions:

a) From your collection of seashells break some up into smaller pieces.

b) Make a rough 'rock-shaped' mould with the plasticene.

c) In the plastic container mix the plaster of Paris with water according to the instructions on the packet. Stir in your seashells. If you want to make a more sandy coloured limestone mix the plaster of Paris with cold black coffee or yellow food colouring instead of just water. You can also add some sand to make it feel gritty.

d) Pour the mixture into the plasticene mould., or use an old shoe box lined with plastic.

e Let your plaster harden overnight. Ask an expert to identify your rock! Will you manage to fool them?

f) With care you can now use your mallet and chisel to discover the fossils in your rock.

2. The Frosterley Marble

The Frosterley Marble you saw at the Durham Dales Centre and Harehope Quarry is a limestone that is rich in fossilised corals. Use the internet to find out how Frosterley Marble has been used in buildings, especially in Durham Cathedral.





Stanhope, Weardale, County Durham

Follow-up Activity 2 - Pupil Resource Sheet 5

LANDSCAPE IMPACT ASSESSMENT

Use your Landscape Impact Assessment results to calculate the overall 'attractiveness' score for each of the sites that you completed a Landscape Impact Assessment for. Use the Landscape Impact Assessment summary tables below to complete your calculations.

1. Landscape Impact Assessment summary – View of the working area of Broadwood Quarry.

Scale values	Value (v)	Weighing factor	Score
Unemotional / Emotional		8 - v	
Ugly / Beautiful		5 x v	
Obvious / Mysterious		3 x v	
Harmony / Discord		5 x (8 - v)	
Cold / Warm		4 x v	
Soft / Hard		3 x (8 - v)	
Frustrating / Satisfying		5 x v	
Private / Public		2 x (8 - v)	
Dislike / Like		5 x v	
Unstimulating / Stimulating		3 x v	
Full / Empty		8 - v	
Pleasant / Unpleasant		5 x (8 - v)	
Disruptive / Peaceful		4 x v	
Disordered / Ordered		3 x v	
		Total score	
		Total score divided by 3.43	

• Use your values to calculate the overall score using the weighting factor. For example, in row 1, subtract the value from 8; in row 2, multiply by 5.

• View results are obtained by adding together the scores. Te total score can range from 49 - least attractive, to a maximum of 343 – most attractive. The total score is then divided by 3.43 to give a value between 0 and 100. The closer the score is to 100 the more attractive the view.

Repeat this process for the other views that you carried a Landscape Impact Assessment on so that you can compare the relative attractiveness of the views.

2. Landscape Impact Assessment summary – View of Weardale to the South-east

Scale values	Value (v)	Weighing factor	Score
Unemotional / Emotional		8 - v	
Ugly / Beautiful		5 x v	
Obvious / Mysterious		3 x v	
Harmony / Discord		5 x (8 - v)	
Cold / Warm		4 x v	
Soft / Hard		3 x (8 - v)	
Frustrating / Satisfying		5 x v	
Private / Public		2 x (8 - v)	
Dislike / Like		5 x v	
Unstimulating / Stimulating		3 x v	
Full / Empty		8 - v	
Pleasant / Unpleasant		5 x (8 - v)	
Disruptive / Peaceful		4 x v	
Disordered / Ordered		3 x v	
		Total score	
		Total score divided by 3.43	

3. Landscape Impact Assessment summary – View of Harehope Quarry, a reclaimed quarry

Scale values	Value (v)	Weighing factor	Score
Unemotional / Emotional		8 - v	
Ugly / Beautiful		5 x v	
Obvious / Mysterious		3 x v	
Harmony / Discord		5 x (8 - v)	
Cold / Warm		4 x v	
Soft / Hard		3 x (8 - v)	
Frustrating / Satisfying		5 x v	
Private / Public		2 x (8 - v)	
Dislike / Like		5 x v	
Unstimulating / Stimulating		3 x v	
Full / Empty		8 - v	
Pleasant / Unpleasant		5 x (8 - v)	
Disruptive / Peaceful		4 x v	
Disordered / Ordered		3 x v	
		Total score	
		Total score divided by 3.43	

Which views had the hightest scores and which views had the lowest scores? Has quarrying had an impact on the landscape? Write your answers below:

Stanhope, North Pennines

Follow-up Activity 3 - Pupil Information Sheet 4

HOW WOULD YOU RECLAIM HAREHOPE QUARRY?

To reclaim a quarry means to improve the quarry once quarrying has stopped and make it useful again. The Harehope Quarry Project has reclaimed Harehope Quarry. The quarry is now used by visiting school groups and for community events, it is a nature reserve for wildlife and for people and it also produces food from its smallholding and fish farm.

Having visited Harehope Quarry you may have lots of other ideas about how you would like to see the quarry reclaimed. The map of Harehope Quarry shows some of the important features.

Task

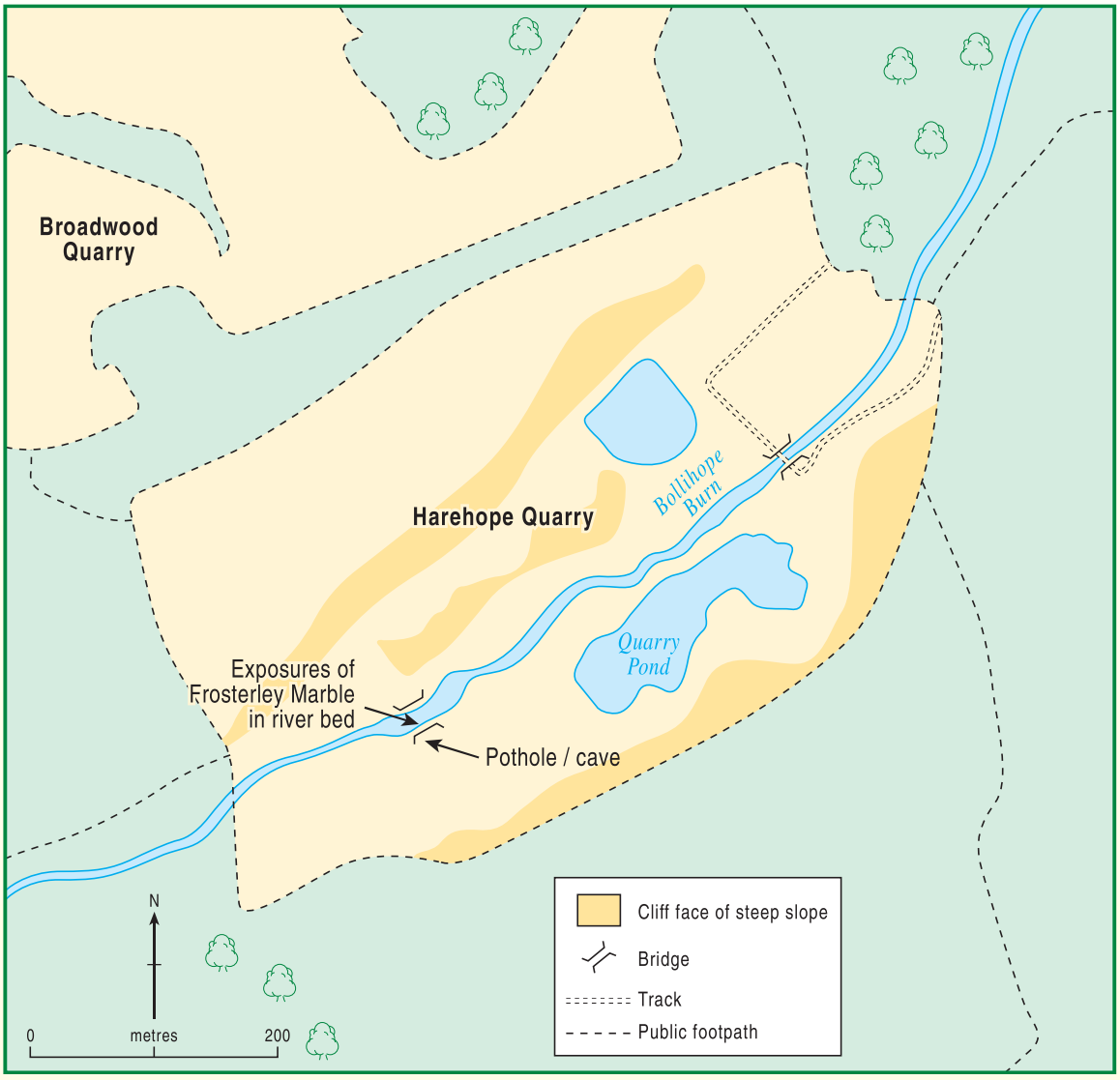
1) A good quarry reclamation project will do the following things:
   - Make the landscape more attractive and improve the area for wildlife and enjoying geology
   - Provide people with something to do in the countryside and
   - Make some money so that the site can be maintained in the future

In groups of 3-4 discuss what sort of things could be done for each of the bullet points above. List your suggestions under the headings landscape and wildlife, people and money. Be prepared to feed back your suggestions in a class discussion.

2) In your groups discuss what you would like to see at Harehope Quarry. Make a list of your suggestions. Do the suggestions cover all of the points above?

3) On the map plan where you will put the things you have suggested. When you are happy your ideas will work, draw them on the plan. Produce a key for the map.

4) Present your ideas to the class.



Map of Harehope Quarry

Stanhope, Weardale, County Durham

Follow-up Activity 4 - Pupil Information Sheet 6

PLANS TO EXTEND QUARRYING!

There are plans to extend the quarry at Broadwood so that the land between Broadwood Quarry and Harehope Quarry will be also be quarried for limestone.

As a class discuss what the advantages and disadvantages of extending the quarry would be. List the class suggestions. Overall do the advantages outweigh the disadvantages.

In pairs or small groups encourage the pupils to make a decision for or against an extension to the quarry. What do they feel having visited the area? Do the results of their Landscape Impact Assessments have an influence on what they think? Does that fact that quarries can be reclaimed later influence their decision?

Having come to a decision, in their groups write a letter of support or opposition to the quarry extension as if they are writing to the local planning authority.