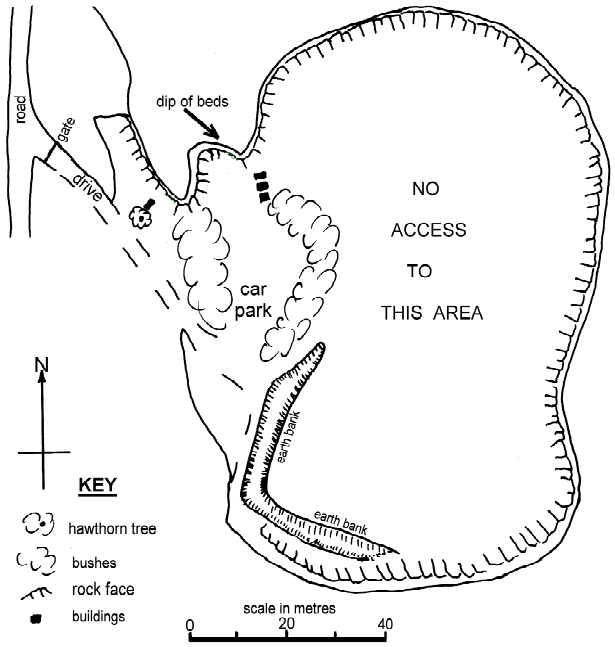
Funded by Defra's Aggregates Levy Sustainability Fund, administered by English Nature.

Contact: info@ukrigs.org.uk

PUPIL WORKSHEET 1 Pupil Name……

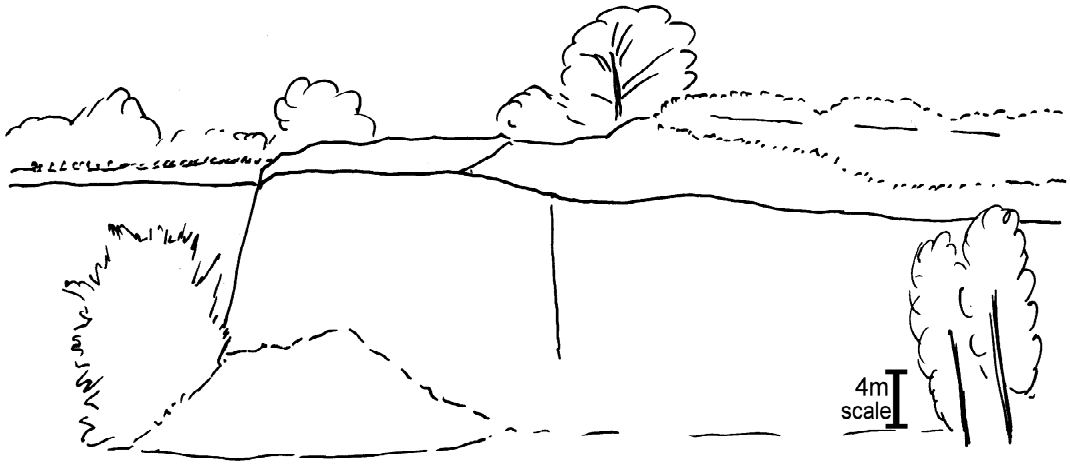
Site 1 Snableazes Quarry.



1) Mark on your position as site "**a**" on the map to the left.

2) As you come to sites **"b" and "c",** mark those on the map as well.

Site 1a: Snableazes Quarry, East Face.



3. Draw in the **bedding** and **joints** on the sketch above.

4. Mark and label the following features on the sketch of the quarry above:

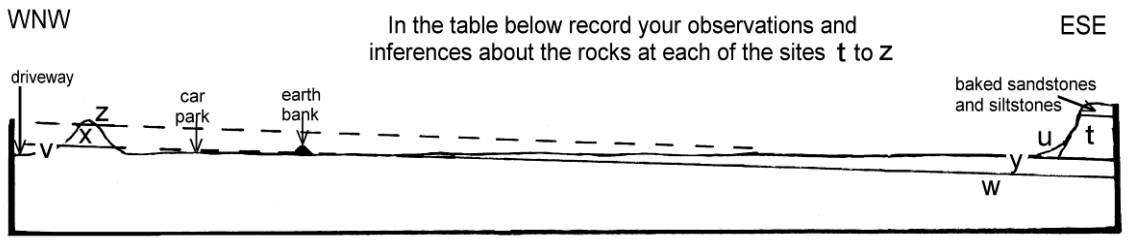
a) North & South;
b) Dolerite sill;
c) Top contact of sill;
d) Baked sedimentary rocks;
e) Scree slope.

PUPIL WORKSHEET 2 Pupil Name.....

Snableazes Quarry In Section.

1. At Site 1b measure the dip of the beds.
The dip of the limestone is _____ towards _____.

2. Use the sketch section below to help you investigate the rocks at sites **(t)** to **(z)** as you move through the quarry. On the sketch section below draw in where you think the top of the sill might have been before it was quarried away.



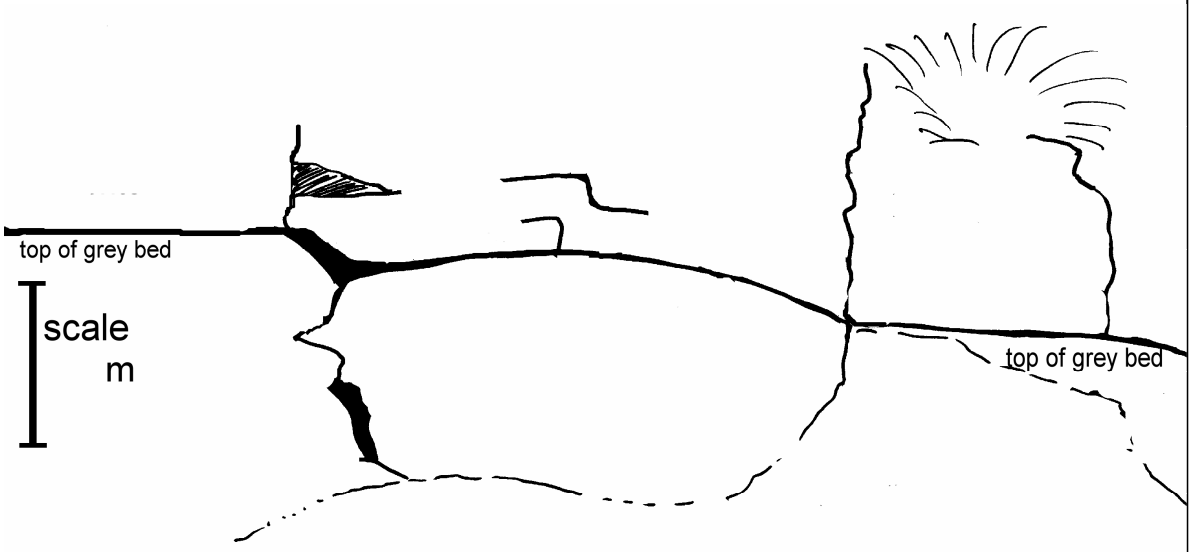
Location	Description of rock	Type of Rock (I, M or S).
t		
u		
v & w		
x & y		
z		

3. The quarry was used by tarmac for road-stone till 1987. Which of the rocks in this quarry would have been useful as road-stone and why?

4. What geological reason might have caused quarrying to stop at this site?

PUPIL WORKSHEET 3 Pupil Name.....

Site 1c: Snableazes Quarry, West Crag.



1. The top of the limestone and part of the sill have been drawn on the sketch. Draw in the dolerite from left to right of the exposure and label where it "steps down". Mark on the height of the scale bar on the left.

2. On the field sketch of the crag above draw and label the following features:

a. limestone; **b. baked shales and fine sandstones;**
c. a joint plane; **d. one or more bedding planes ;**
e. oldest bed; **f. youngest bed;**
g. scree slope; **h. dolerite sill.**

3. What feature of the small sill is evidence that it must have been a liquid when it was formed?

_____

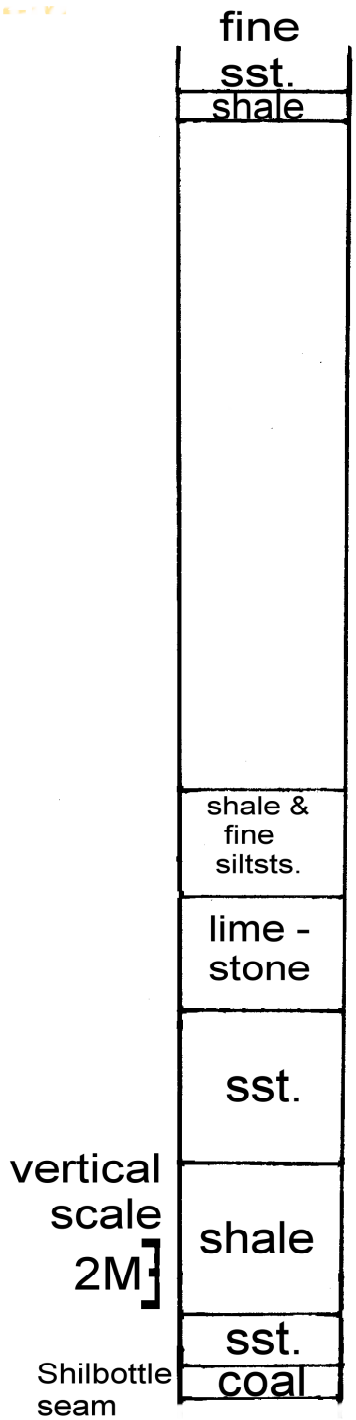
_____

4. Number the following statements in the order in which they happened. Number the oldest event as 1 and youngest as 5.).

. deposition of shales & fine sandstones in delta conditions
. uplift weathering and erosion
. deposition of limestone in marine conditions
. intrusion of dolerite sill, baking the rocks top and bottom
. quarrying for roadstone

PUPIL WORKSHEET 4 Pupil Name.....

Site 1: The rock succession at Snableazes Quarry.



The column to the left shows the rocks in the area with the oldest at the bottom (think of it as a sketch of a borehole down through the rocks).

2. Shade in the thickness of the column which is the large sill you have seen, and then label it.

3. Label the **baked rocks at the top of the sill.**

4. Label the **baked rocks at the base of the sill**.

5. Draw a horizontal line across the column to mark the **lowest** (oldest) **bed you have seen** in the quarry.

6. Mark on and label the **small sill** you have just seen.

7. Why can't you see the Shilbottle coal seam?

_____

8. Use the scale to estimate how far from the coal seam you are standing.

_____

The changing rock types tell us that the environment of deposition was changing from swampy land area, to delta to marine deposits.

9. Write 3 labels on the lower part of the column **below the sill** to mark where rocks show:

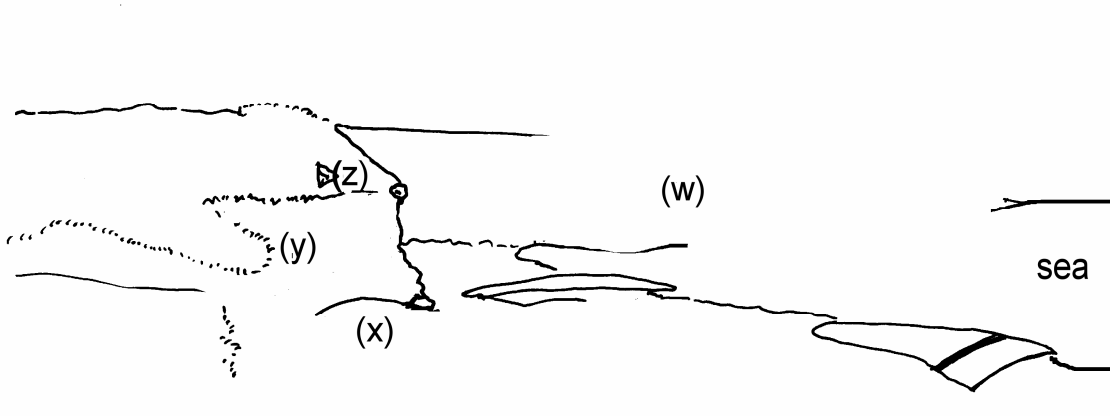
marine conditions;
delta conditions; and
swampy land conditions.

1. What must have happened to sea level during this time of deposition?

_____

PUPIL WORKSHEET 5 Pupil Name.....

Site 2a: View of Cullernose Point.



Complete the sketch by drawing in the eastern skyline and water line.	
Sketch in the joints in the igneous rock around point (w) on the sketch. Is this likely to be a dyke or a sill?	
Describe the material on the beach near point (x) and explain how it got there.	
Draw in the bedding planes around point **(y)**. What kind of folds are these?	
What kind of stresses caused these folds?	
What do we call this kind of deformation ?	
Describe the sediment around point **(z)** which covers the area inland. Is it older or younger than the rocks below? How do you know?	
How do you think this un-sorted and much younger deposit, was formed?	

PUPIL WORKSHEET 6 Pupil Name……

Site 2b: Cullernose Point. Dolerite & Columnar Joints.

Sketch the features of a broken piece of dolerite. Label the following: **medium grained crystals, black colour, interlocking texture, joint faces.**

Cullernose Point: vesicles.
Vesicles are small holes in the sill which can be filled with minerals. Find and sketch one.

Sketch of vesicles.

Explain how the vesicle was formed?

Regular cooling of a magma can produce evenly spaced and hexagonal. Investigate if this has happened at Cullernose Point or not.

Choose the top of a column and leave a pen on it to mark it. This is column "A".
Sketch column "A" and the columns next to it in the box to the right.

Count the number of edges for each column, and measure the distance from the **centre** of column "A" to the **centre** of each of the surrounding ones. Record your measurements in the table.
Summarise your results in the following sentence.

Most of the columns are _____ in

shape. The closest spacing is ____cm

and the largest spacing is _____ cm.

I think the cooling of this magma was **regular** / **irregular** (circle your answer).

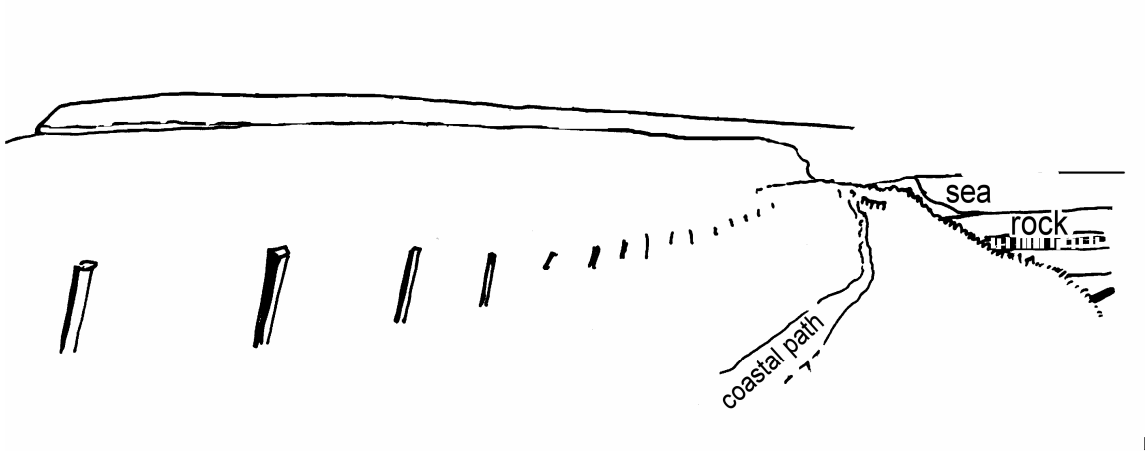
Sketch of joint blocks.

Block	Number of edges	Cm from centre of "A"
A		--
B		
C		
D		
E		
F		
G		
H		
I		

PUPIL WORKSHEET 7 Pupil Name.....

Site 2c: View Of Long Heugh Crag.

On the way back to the road, stop at **site 2c** and look back at the skyline to the north.



1. Complete the skyline and waterline of the sketch at the eastern end.

2. Draw in a dotted line above the skyline to indicate the eroded top of the sill, and label it.

3. Label the following features:

a) Cullernose Point;
b) sedimentary rocks;
c) dyke on foreshore (if visible above waves)
d) sill with vertical jointing;
e) rounded boulders on storm beach;
f) cliff of sedimentary rocks;
g) Long Heugh Crag;
h) screes of angular boulders;

4. Shade in the area of the sketch underlain by the sill and label it "dolerite sill".

5. Number these events in the order they occurred here, **numbering the oldest as 1.**

Deposition of sedimentary rocks

Deposition of boulders on the beach;

Glacial erosion and deposition;

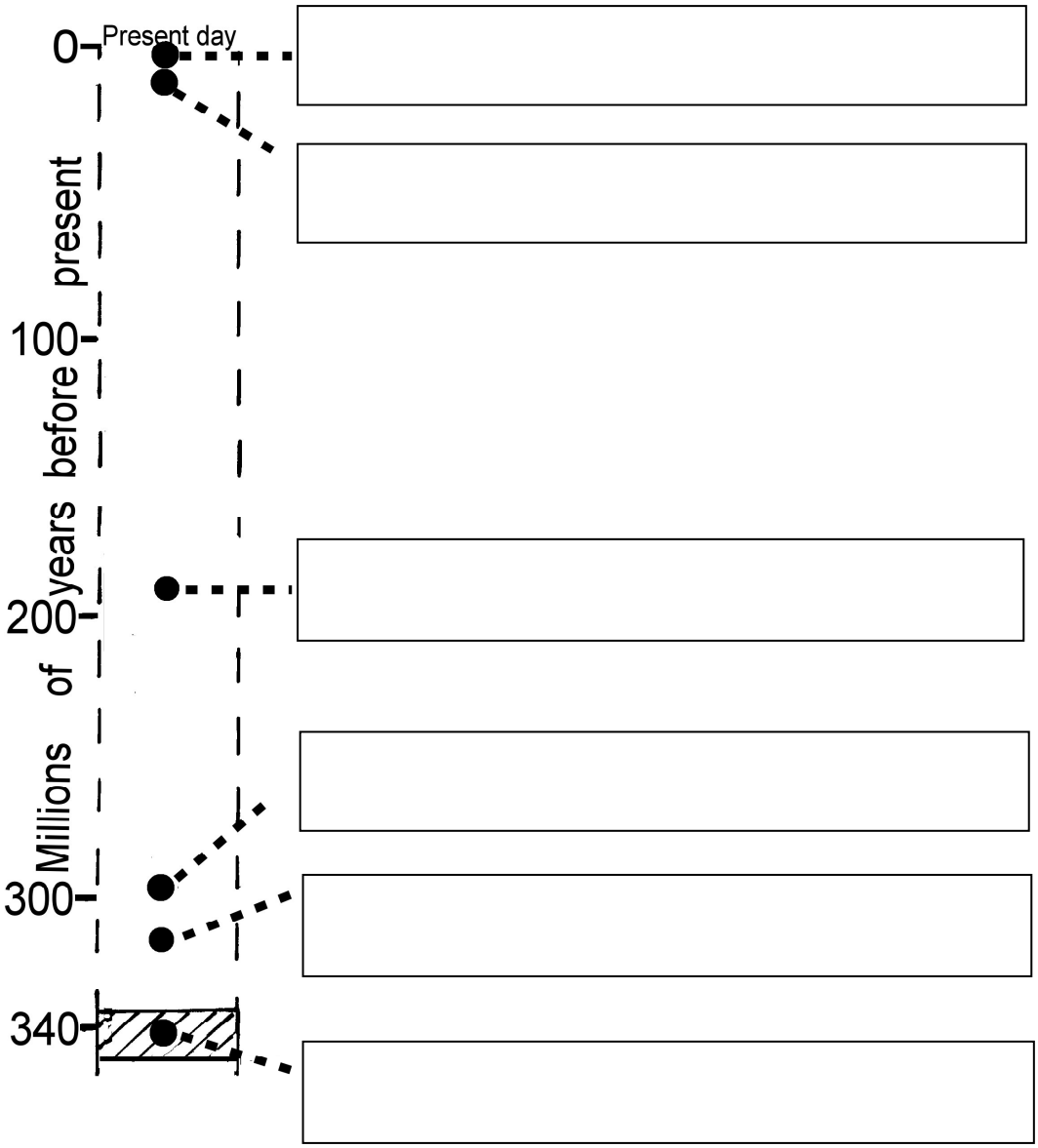
Intrusion of dolerite sill;

Uplift by Plate Tectonic forces;

Present day weathering & erosion

PUPIL WORKSHEET 8 Pupil Name.....

Summary Of Events.



Write each of the following statements (or its letter) in the correct box on the geological event column above.

A. Period of faulting
B. Period of dolerite dyke and sill intrusion
C. Deposition of beach sands and boulders.
D. End of glaciation and beginning of weathering and marine erosion continuing to present day.
E. Deposition of delta deposits with plant growth and burrowing marine animals.
F. 340 million years of erosion leaving no rock evidence behind.

PUPIL WORKSHEET 9 Pupil Name.....

SUMMARISING THE ROCK CYCLES:
PUPIL HOMEWORKSHEET: The Two Rock Cycles at **Snableazes / Cullernose.**

FIRST CYCLE: deposition. What can you say about the deposition of the sedimentary beds in the quarry? HINTS: fossils, limestone, shales, oldest / youngest etc.
FIRST CYCLE: uplift and tilting. What can you say about the changes to the beds cause by plate tectonics? HINTS: tilting, intrusions, metamorphism etc.
SECOND CYCLE: weathering and erosion. What evidence of **present day** weathering and erosion have you seen on the foreshore at Cullernose Point?
SECOND CYCLE: sediment transport. In what ways have you seen sediments being transported on the foreshore?
SECOND CYCLE: deposition. What kinds of **modern deposits** have you seen and what rock types might they form in future? HINT: Don't forget plant and animal evidence – and which parts might survive as fossils.