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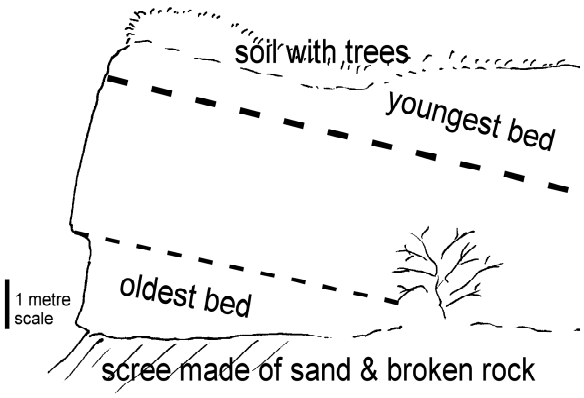
Site 1: The Fenced Cliff



Match this diagram with what you can see in the cliff face.
One rock layer or bed has been sketched in for you. Try to sketch in another one you can see.

Mark on this diagram:
1. The oldest bed
2. The youngest bed
3. Soil with trees
4. Scree made of sand and broken rock.

Use your diagram to answer these questions:

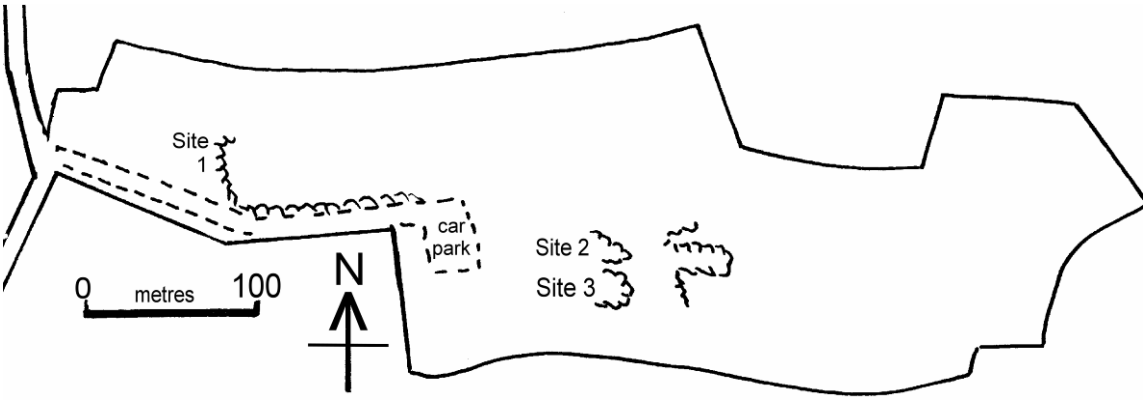
1. In which direction do the beds of rock slope down towards [dip]?

They slope in a ___SOUTHERLY_____direction.

2. Use the scale bar to find the height of the quarry face to the nearest metre

The quarry face is ____5_____ metres high.

On your map, below, make sure you have marked the North point. Use a compass to check.



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Site 2: Sloping beds

Task 1: Describing the rocks.

TASK	WRITE YOUR ANSWERS HERE
Write down why the rocks are layered. [You might have done an experiment in school with water and sediments like sand and mud]	Sand and mud was washed about in the sea and settled out in the water.
How many different types of rock can you see?	Two.
Write down the way these rocks look different from each other.	One is hard and stands out. One is soft and easily worn away.
What name is given to this group of rocks?	Sedimentary.

Task 2: A close look at Ragstone.

[The hard layers [beds] are called "ragstone" and were quarried for use in buildings and for making roads. Take a closer look at a loose piece lying around.]

TASK	WRITE YOUR ANSWERS HERE
Write down what happens to the ragstone when you rub it with your fingers?	A few sand grains may rub off, but the rock is quite hard.
Write down the name of the hard glassy mineral you can see in the rock with a magnifier	Quartz.
Describe any other minerals you can see.	Dark green is glauconite, which weathers to rusty brown.
Circle the words which best describe the shape of the grains.	Mostly in between.
Use the 1mm grid to measure the size of the grains and circle the answer.	Mostly about 1mm, a few over 1mm.
Look at the creamy material sticking the grains together. If it is tested with a drop of dilute acid what happens?	It fizzes.
This is calcite mud, which sticks all the grains. Write down the name we give to a rock containing so much calcite?	Limestone [sandy limestone].
You might be able to find fossil shells of sea creatures. What does this tell us about where these rocks were formed?	In the sea.

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3. Now look closely at the softer, sandy beds. These are called "hassock"

TASK	WRITE YOUR ANSWERS HERE
What happens when you rub hassock with your fingers?	Sand grains rub off easily.
Look at the sand grains with a magnifier. You should be able to see the grains made of a hard glassy mineral. What is it called?	Quartz.
There is also a very fine smooth material, grey-brown in colour, which helps to stick the grains together. What is it called?	Clay.
Describe any other minerals you can see.	Dark green is glauconite, which weathers to rusty brown.
Circle the words which best describe the shape of the grains.	Mostly in between.
Use the 1mm grid to measure the size of the grains and circle the answer.	Mostly about 1mm, a few over 1mm.
If this rock is tested with a drop of dilute acid what happens?	Some layers fizz, some do not.
The sand grains are stuck together mostly by clay mud. What do we call a rock containing mostly sand?	Sandstone [limey sandstone].
You might be able to find fossil shells of sea creatures. What does this tell us about where these rocks were formed?	In the sea.

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4. We have found out that these rocks formed under the sea. The fossils found here tell us that this was about 115 million years ago, early in the Cretaceous Period. The rocks are now above sea level, are tilted, folded and broken by cracks called joints.

TASK	WRITE YOUR ANSWERS HERE
How do you think all this happened?	Earth movements over millions of years uplifted, tilted [site 2] and folded [site 3] the rocks.
Write down the direction in which the rocks here are tilted [dip]. [Use a compass to find out.]	Tilted [dip] down to the North [site 2] North & South - part of a downfold [site 3].
Look back to Site 1 and write down the direction in which the beds were sloping there? Is it the same or different from here?	Tilted[dip] down to the South It is different here.

5. Look at the top of the quarry. You may notice that the beds of rock have been worn away over all those years, long before the quarrying took place.

TASK	WRITE YOUR ANSWERS HERE
What do we call the sandy/clayey material lying on top of the rocks? Your teacher may collect a sample for testing back in school.	Soil.
As well as sand and clay, what is it made of?	Lumps of limestone, plant roots, decaying plant materials, minibeasts etc.
Describe where the tree roots are growing	Down the cracks [joints] and along the bedding layers.
Try to identify some plants growing in the new soil on the scree slopes.	Grass, plus others – identification depends on season! Moss & lichen in dark, damper areas.
Even on the hard surface of the limestone you should find places where tiny plants are growing. Try to describe and identify any you see.	Green mosses & green/black lichen.
What clues have you found to show that two animals live in the soil in this area?	Mole hills. Rabbit burrows and droppings.

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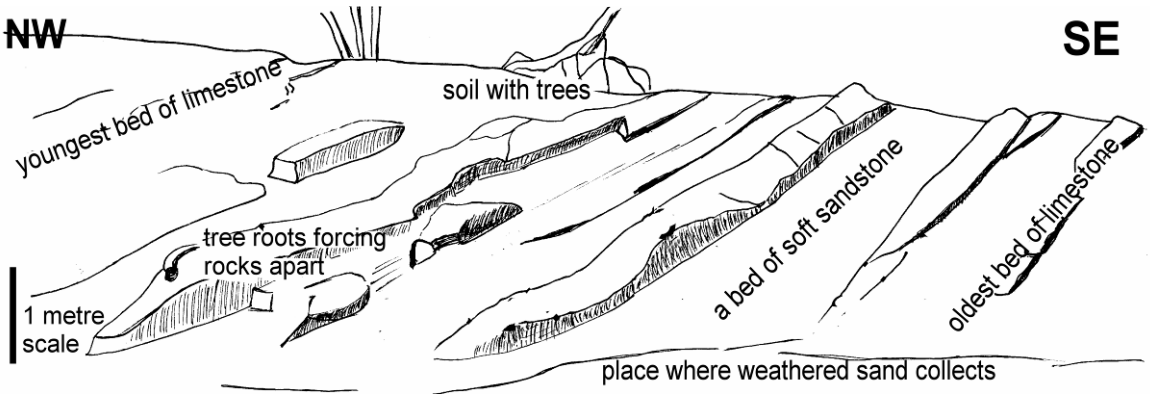
6. You might have wondered why this area is called Dryhill. Perhaps it is something to do with being without water! Test the limestone and sandstone with a water dropper. If water soaks in, the rock is porous. If it doesn't soak in, it is <u>not porous</u>.

TASK	WRITE YOUR ANSWERS HERE
Test the limestone (ragstone) with a water dropper. What happens to the water? Is this rock porous?	The water stays on the surface. It is not porous.
Test the sandstone (hassock) with a water dropper. What happens to the water? Is this rock porous?	Water sinks in. It is porous.
There don't seem to be many streams or ponds in the area. Where do you think the water goes to when it rains?	Water soaks into the ground, into the sandstones underground.
What do we call the place where water comes out of the ground naturally?	A spring.

7. We have already mentioned that the limestone [ragstone] was quarried for use as a building stone and as an aggregate for making roads.

TASK	WRITE YOUR ANSWERS HERE
What is it about the limestone that makes it so useful for buildings and roads?	It is hard – the hardest rock in the area.
What else might the limestone be used for?	Lime on fields.
What might the sandstone be used for?	Mortar etc.

Site 2: Sketch of the site



After you have completed the activity sheets 2, 3, 4, and 5 you should be able to match this diagram with what you can see in the old quarry face. Several beds have been sketched in for you.

Task: Mark on the sketch above:

1. Oldest bed of limestone
2. Youngest bed of limestone
3. A bed of soft sandstone
4. Soil with trees
5. Tree roots forcing the rocks apart
6. Place where weathered sand collects.

Use your diagram to answer:
8. In which direction do the beds of rock slope down towards [dip]?

The beds slope in a _____NORTHERLY_____direction.

9. Use the scale bar to find the height of the quarry face to the nearest metre.

The height of the quarry face is ___2 (or 3)_____ metres.
(depending on exactly where it is measured)

Site 3: Folded rocks. Something interesting has happened to the layering in the beds of rock. At site 1 the layering sloped [dipped] to the south. At site 2 it sloped [dipped] to the north.

TASK	WRITE YOUR ANSWERS HERE
In which direction does the layering slope [dip] in this quarry?	Both south and north!!!
What do we call beds which dip in different directions like this?	Downfold or syncline.
Try to explain what happened.	Earth movements over millions of years uplifted, and folded the rocks.

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Site 2. SLOPING BEDS SUMMARY. (This can be used as an alternative to worksheets 2-5.)

On our visit to Dryhill we have found out a lot about the rocks beneath our feet.

1. Are the rocks jumbled up or layered?

They are _____LAYERED_____.

2. How many different types of rock have you found?

We have found _____2_____ types of rock.

3. The soft rock made mostly of sand grains is called a _____SAND_stone.

4. The hard rock is made of some sand grains but is mostly made of calcite mud which cements it all together.

It is a _____LIME stone

5. You might have found shells of ancient sea creatures. What are ancient remains of animals and plants called?

They are called _____FOSSILS_____.

6. Were these rocks formed on land, or in the sea? (Your first 6 answers will help you to decide)

They were formed _____IN THE SEA_____.

7. Sand and mud are types of sediment. What is the name given to the large group of rocks, including sandstones, mudstones and limestones?

They are called _____SEDIMENTARY____ rocks.

8. What has happened to the rocks after they were formed on the sea bed about 140 million years ago?

They have been ____ TILTED/FOLDED BY GREAT EARTH MOVEMENTS AND ERODED/WORN AWAY ____.

9. The limestone has been quarried in the area for hundreds of years. What are the two main uses made of it?

It has been used for _BUILDING STONE and __AGGREGATE OR ROADSTONE.