

© UKRIGS Education Project: Earth Science On-Site

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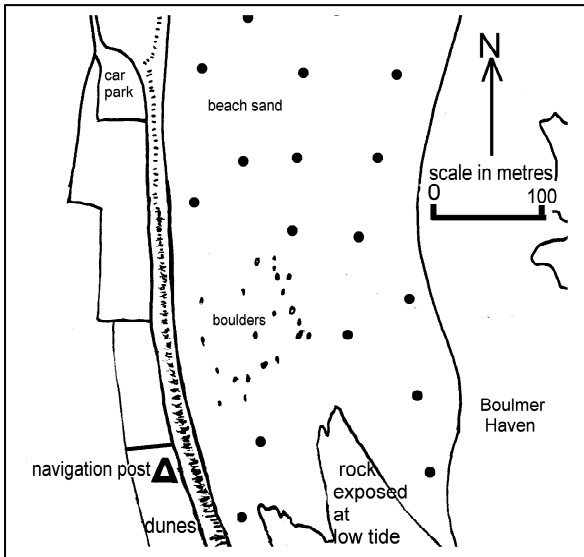
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PUPIL WORKSHEET 1

Pupil Name

Site 1: Investigating Boulmer Beach Sands.



1. On the map mark and label the first four sites you investigate as **a, b, c,** and **d.**

2. Circle the words below which best describe the boulders you see at **site "1a"**.

black, fine interlocking crystals, no joints, no fossils, no bedding.
Igneous.

grey, fine grained, with fossils
Sedimentary.

Metamorphic rock.

3. Summarise the evidence of the processes you have seen affecting the sediments, in the table below.

Chemical:
Biological:
Physical:

4. Describe in the table below the different beach sands you have seen.

Describe the sand on the lower part of the beach at Site "1b"	
Describe the sand in the beach channel of running water at Site "1c"	

PUPIL WORKSHEET 2

Pupil Name

Site 1d: Investigating The Dune Sands.

1. Describe the dune sand at **Site "1d"**.

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2. On the section across **site 1d** below label: **the beach sand; rock platform; colonisation of beach by salt-loving plants; main dune colonised by shrubs and grass.**



Site 2: The Rocks Of The Wave Cut Platform.

3. Draw a sketch of the near-horizontal wave cut platform and the dipping cross beds. **Then label the following features:**

- a. the wave-cut rock surface.
- b. the cross beds.
- c. Use a compass to measure the direction of dip of the cross bedding (that is the same as the direction of the current) and write it on your sketch.

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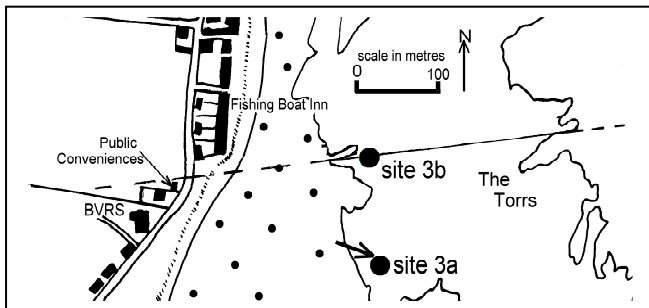
4. Number the following statements in the order that they describe what must have happened to these rocks. **The oldest statement is number 1.**

- Weathering of sandstone to form sand grains on the beach
- Uplift of the sandstone by plate tectonic forces
- Transport of the sand in a flowing current
- Deposition of the sandstone in large asymmetrical ripples by a fast current
- Weathering of an ancient rock to form sand grains

PUPIL WORKSHEET 3

Pupil Name

Site 3a: The Rocks on "The Torrs"



1. Circle the words below which best describe the rocks at **site 3a**.

- igneous; metamorphic;**
- sedimentary;**
- sandstone; horizontal;**
- dipping;**

2. Measure the direction and amount of dip of the rocks at **Site 3a**, and write it next to the dip arrow on the map.

Site 3b: The Grey Rocks on "The Torrs".

3. Circle the words which best describe the grey rocks:
coarse grained; medium grained; igneous; interlocking crystals;
metamorphic; sedimentary; cemented sand grains horizontal; dipping;

4. Measure the width of the grey rock (**Take Care!** The weed is slippery). _____

5. What name would you give the feature which the grey rock forms? _____

6. Explain your reasons for naming this feature _____

7. **On the map** draw in the northern edge of the grey rock parallel to the southern edge.

8. **On the section below** draw in the northern contact between the grey rock and the other rocks. (Hint: Use the scale and the southern contact to help you).

9. Extend the contacts upwards as dotted lines to show they are eroded away.

10. Then label

a) sedimentary rocks; b) dyke; baked contact; and c) eroded part of dyke.



PUPIL WORKSHEET 4

Pupil Name

Site 5 Boulmer Coastal Defences.

1. On the sketch below mark on and label the **concrete blocks** and last **high water mark**.
2. Also label any signs of **bedding planes**, and **slipping or slumping** you can see in the cliff.



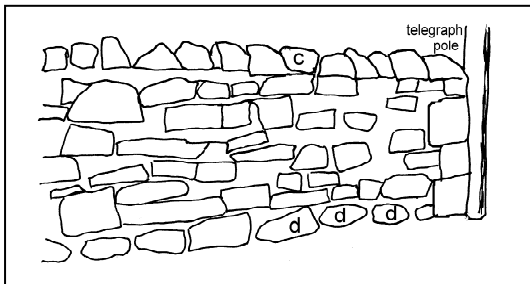
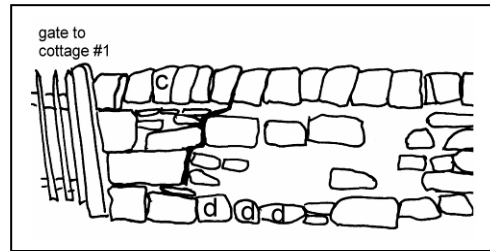
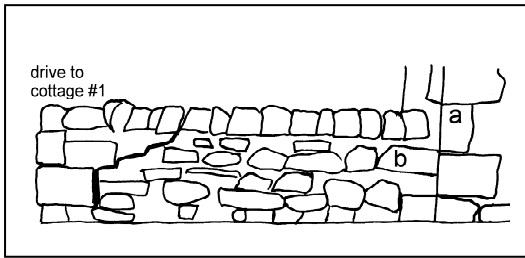
3. Describe the materials which make up the large blocks.	
4. Explain why these large blocks are here.	
5. Describe the rocks exposed in the bottom of the cliff. Draw them in on your sketch.	
6. Look along the base of the cliff to the right of the blocks. Can you find ripples on the bedding planes? What does this tell you?	
7. See how many of these extra features you can tick off. Find them either in the rocks, or pebbles from further up the beach.	<p>Burrows, tracks or trails; Cross bedding and direction of current; ripples; Shelly fossils like corals and crinoids; Limestone pebbles Fossil plant fragments;</p> <p>8. Use the evidence to complete the sentence below</p>
<p>These Carboniferous rocks were formed in a ___-___ area which was mostly silted up with _____ deposits (from the north) that eventually had plants growing on top, forming _____ in places.</p>	

PUPIL WORKSHEET 5

Pupil Name

Site 5: Boulmer Wall Stones.

- As you walk along the street by Boumer Hall find the 3 walls sketched below, and **without upsetting the people who live there**, look carefully at the stones that have been labelled a to d.



- Read the descriptions in the table below and write the correct letter against each description.

- Then write in the rock type in the right hand column.

WALL BLOCK	DESCRIPTION	ROCK TYPE Igneous, metamorphic or sedimentary
	Made of grains cemented together. Red in colour and with flat bedding planes	
	Coarse grains and angular pebbles cemented together. Grey in colour.	
	Made of grains cemented together. Has small cross beds above larger cross beds.	
	No joints or bedding planes. Made of medium sized interlocking crystals. Dark in colour.	

- Circle the part of the walls listed below which is LEAST resistant to weathering? (Circle your answer).

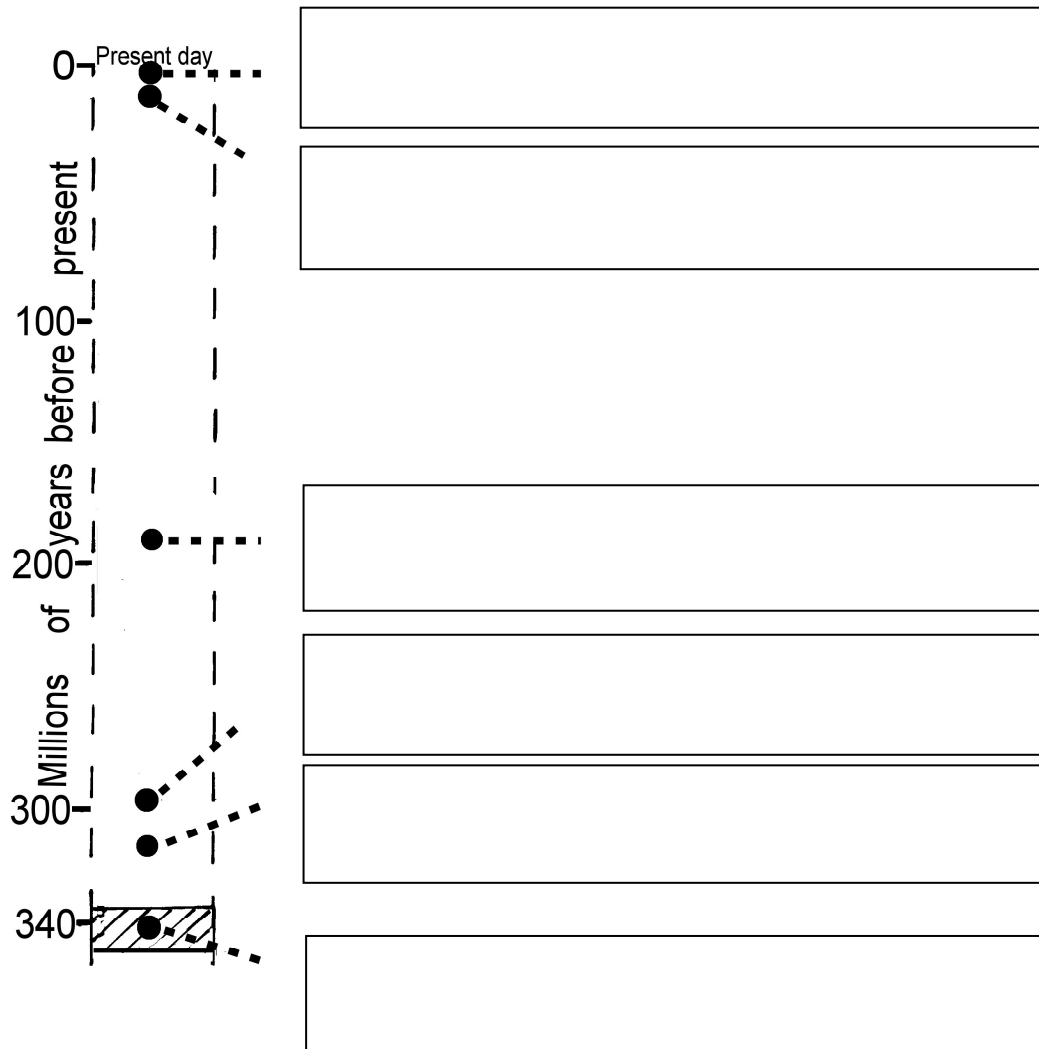
pale sandstone, the cement, or the dolerite.

- Explain **why** this part is the weakest. _____

PUPIL WORKSHEET 6

Pupil Name

Summary Of Events.



Summarise all of the geological events you have seen by writing 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 intrusion**
- C. Deposition of dune and beach sands begins**
- 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 animals**
- F. 340 million years of erosion leaving no rock evidence behind.**

PUPIL WORKSHEET 7

Pupil Name

1. SUMMARISING THE ROCK CYCLES:

PUPIL HOMEWORKSHEET: The Two Rock Cycles at **Boulmer**.

FIRST CYCLE: deposition. What can you say about the deposition of the older beds on the foreshore HINTS: Evidence for deposition; currents, fossils, grain size etc.

FIRST CYCLE: uplift and tilting. What can you say about the changes to the beds cause by plate tectonics? HINTS: tilting, faulting, intrusions etc.

SECOND CYCLE: weathering and erosion. What evidence of **present day** weathering and erosion have you seen on the foreshore?

SECOND CYCLE: sediment transport. How many different 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.