OCR / RGS-IBG DATA SKILLS IN GEOGRAPHY

Royal Geographical Society with IBG

Advancing geography and geographical learning

TOPIC 1: Coastal Landscapes

Investigating coastal landscape geography using a range of quantitative resources

Nuffield Foundation

This project was funded by the Nuffield Foundation, but the views expressed are those of the authors and not necessarily those of the Foundation.

OCR Oxford Cambridge and RSA

Links to OCR GCE Specification for Activity

2. How are coastal landforms developed?	
Key Ideas	**Content**
2.a. Coastal landforms develop due to a variety of interconnected climatic and geomorphic processes.	• The influence of flows of energy and materials on geomorphic processes, including weathering, mass movement, wave, fluvial and aeolian erosion, transportation and deposition. • The formation of distinctive landforms, predominantly influenced by erosion, including bays, headlands, cliffs, shore platforms, geos, blow holes, caves, arches, stacks and stumps. • The formation of distinctive landforms, predominantly influenced by deposition, including beaches, spits, on-shore bars, tombolos and salt marshes.

3. How do coastal landforms evolve over time as climate changes?	
Key Ideas	**Content**
3.a. Emergent coastal landscapes form as sea level falls.	• How landforms in emergent landscapes are influenced by falling sea levels due to a cooling climate, including: o climate changes that occurred during a previous time period and the resultant sea level fall o the influence of sea level fall and geomorphic processes in shaping landforms, including raised beaches, marine terraces and abandoned cliffs o the modification of these landforms by processes associated with present and future climate and sea level changes.
3.b. Submergent coastal landscapes form as sea level rises.	• How landforms in submergent landscapes are influenced by rising sea level due to a warming climate, including: o climate changes that occurred during a previous time period and the resultant sea level rise o the influence of sea level rise and geomorphic processes in shaping landforms, including rias, fjords and shingle beaches o the modification of these landforms by processes associated with present and future climate and sea level changes.

This is a coastal geographical mystery. Using a range of qualitative and quantitative evidence, delegates will need to piece together the landscape coastal processes that are operating in a this complex coastal environment.

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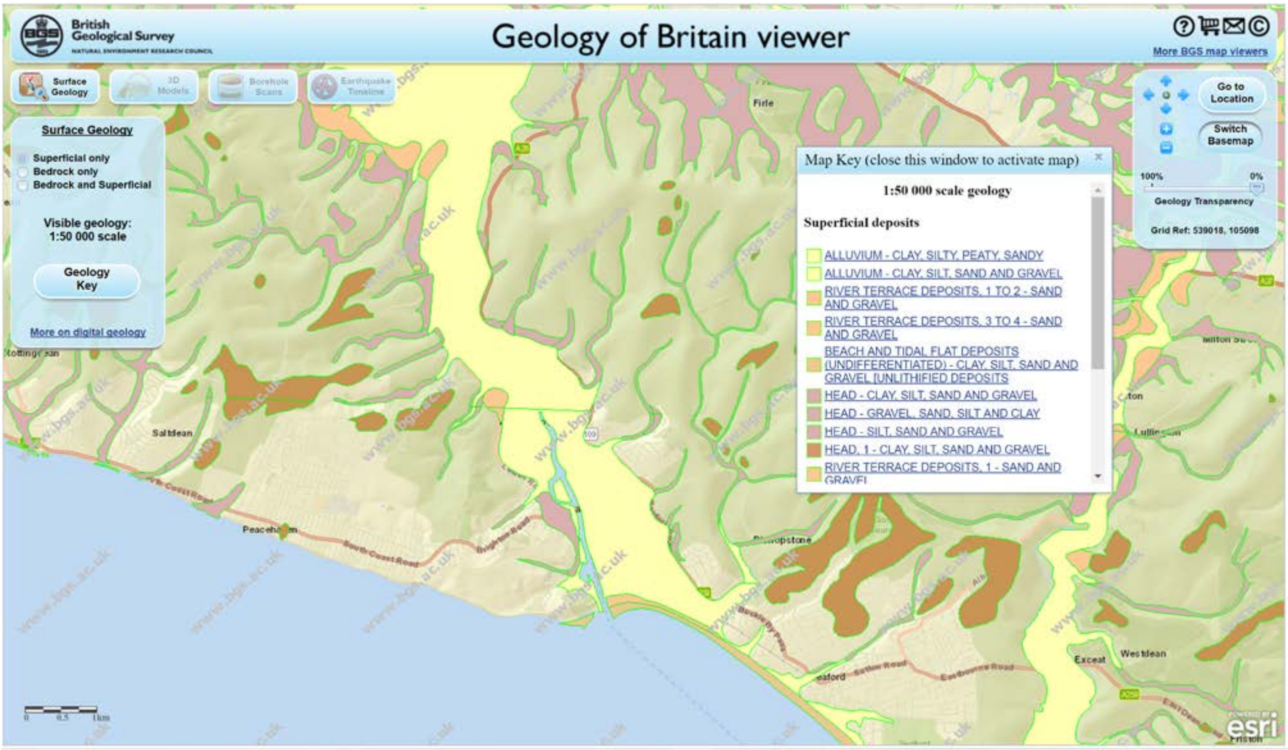
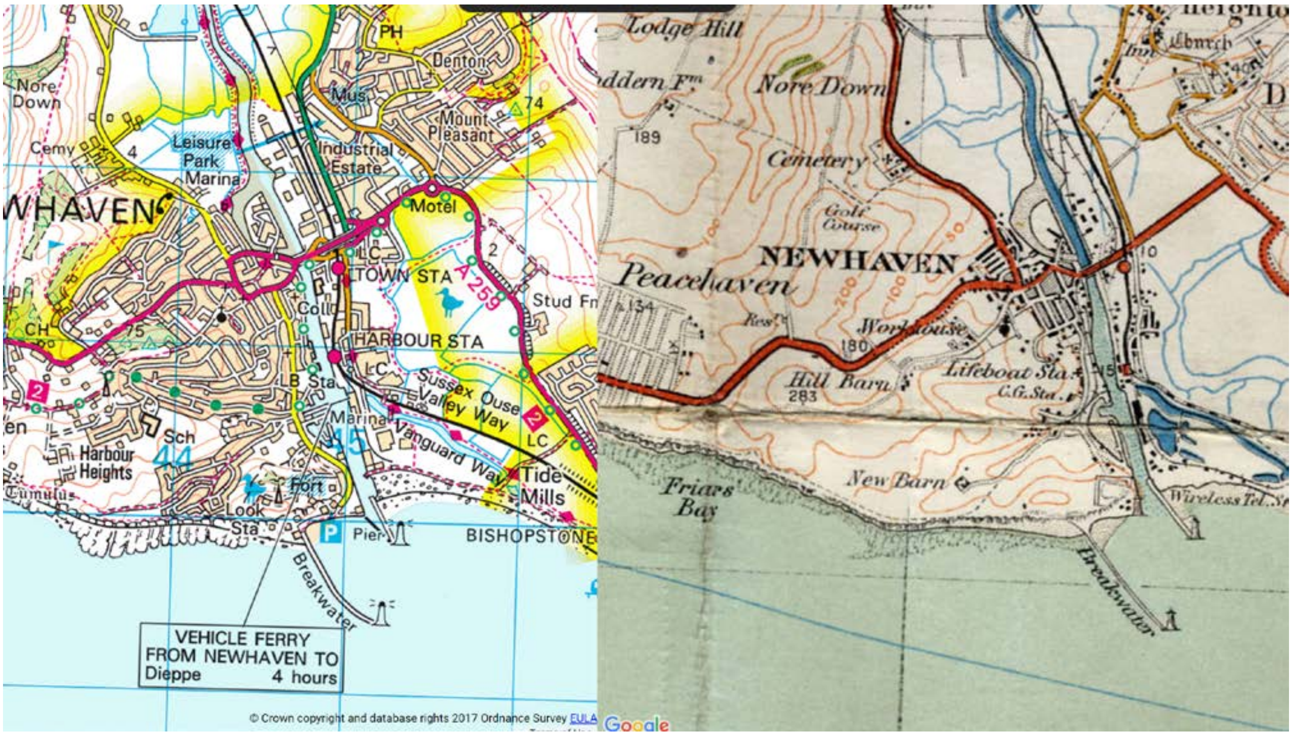
(1) Background (superficial) geology and landscape (topography)

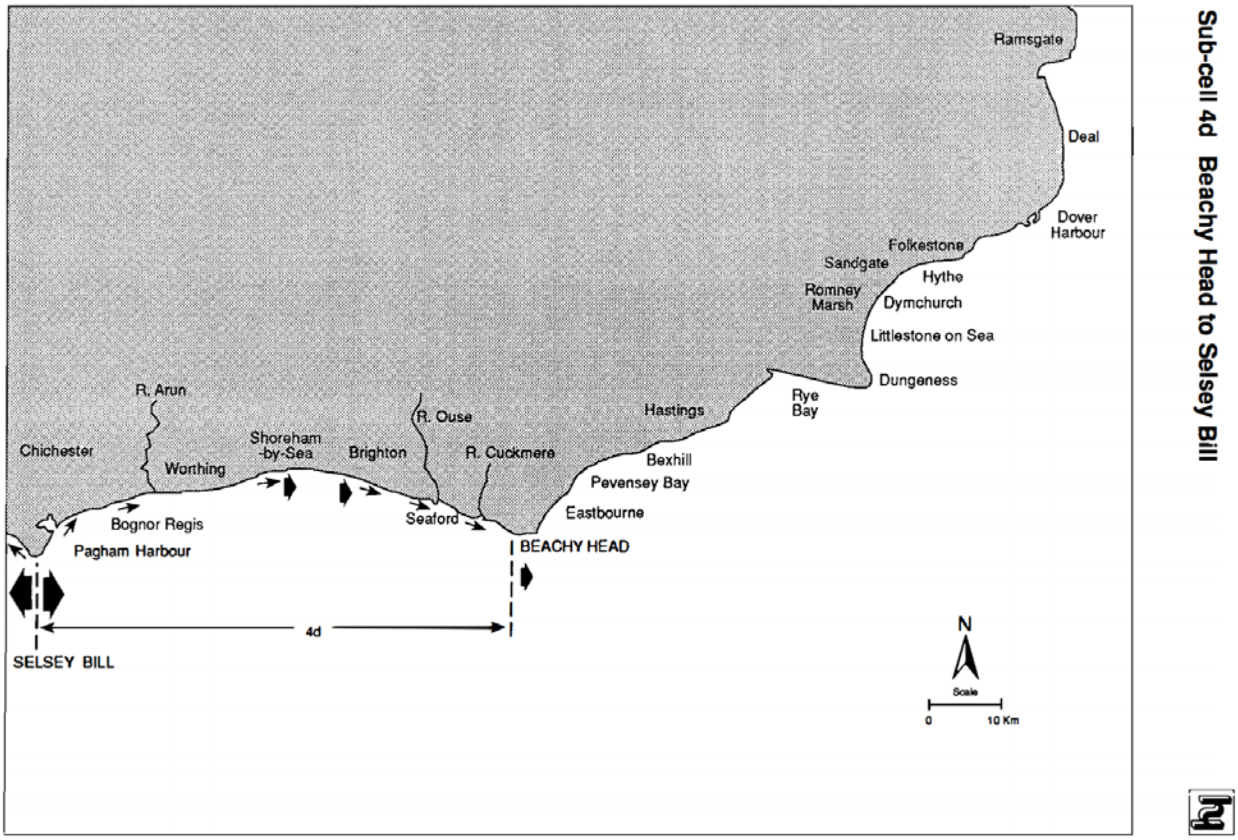


Source: http://mapapps.bgs.ac.uk/geologyofbritain/home.html



Source: https://wtp2.appspot.com/wheresthepath.htm

2 Sediment processes and littoral cells



The Newhaven Harbour in a storm.

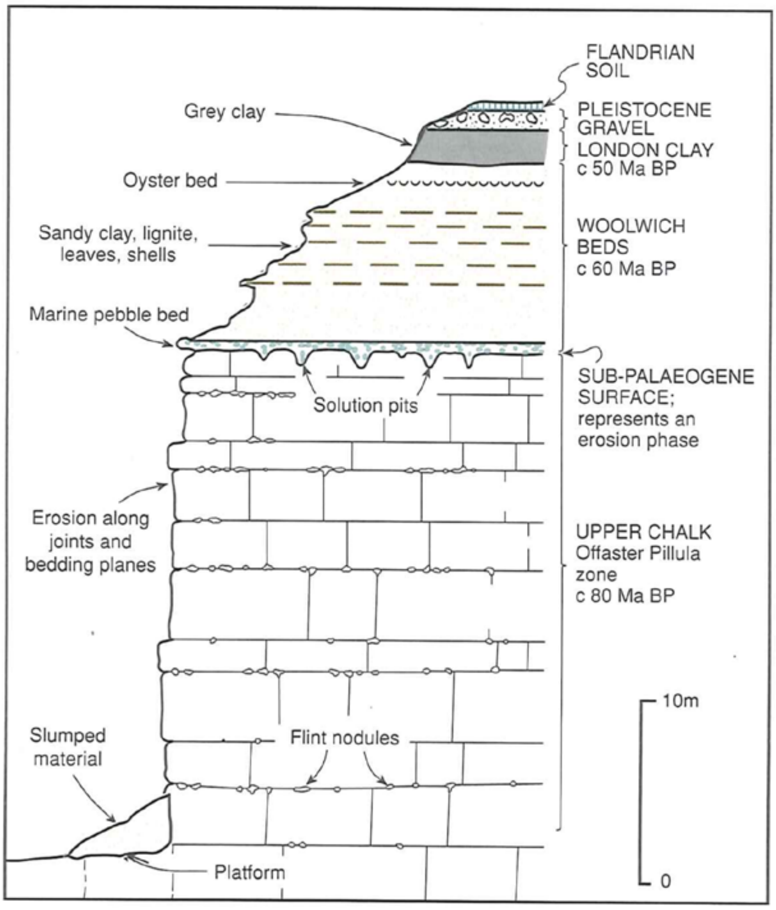


Figure 6: Profile of cliff at Castle Hill, Newhaven

The shape of the cliff is closely related to its geology. This is the only natural exposure of the basal bed of the Sussex Palaeogene, the 'Reading Bottom Bed', made of cemented green-coated flint pebbles. The solution pits in the Chalk were made by acidified groundwater passing through the overlying Woolwich Beds

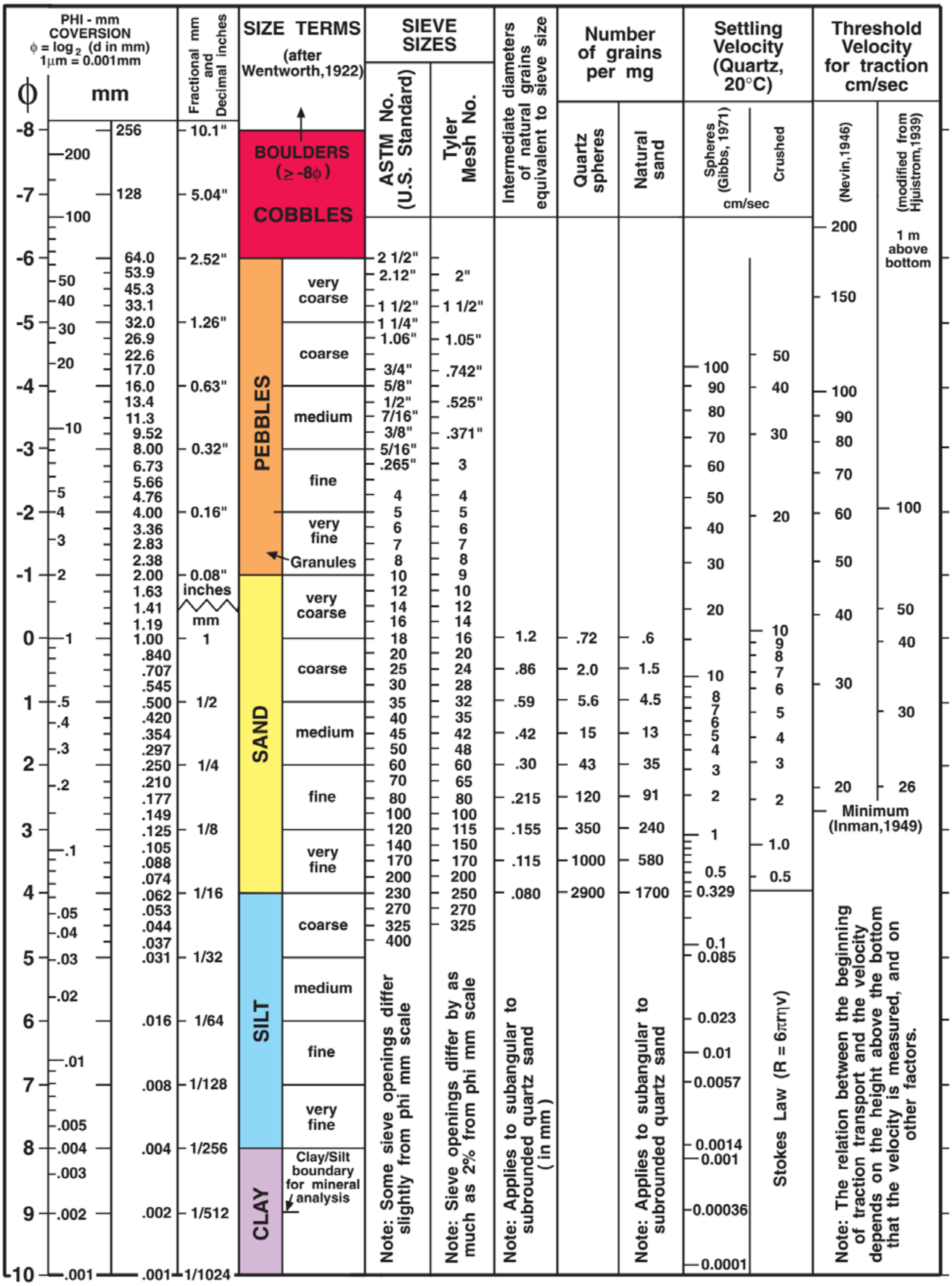
Source: Classic Landforms

6 Newhaven Harbour and Ouse Valley

This major harbour development, with a wide trained channel and prominent breakwater is heavily urbanised with a large number of residential and commercial properties and infrastructure existing within the flood area. The long term policy for this unit is to ***Hold the Line*** in order to protect and sustain these existing assets.

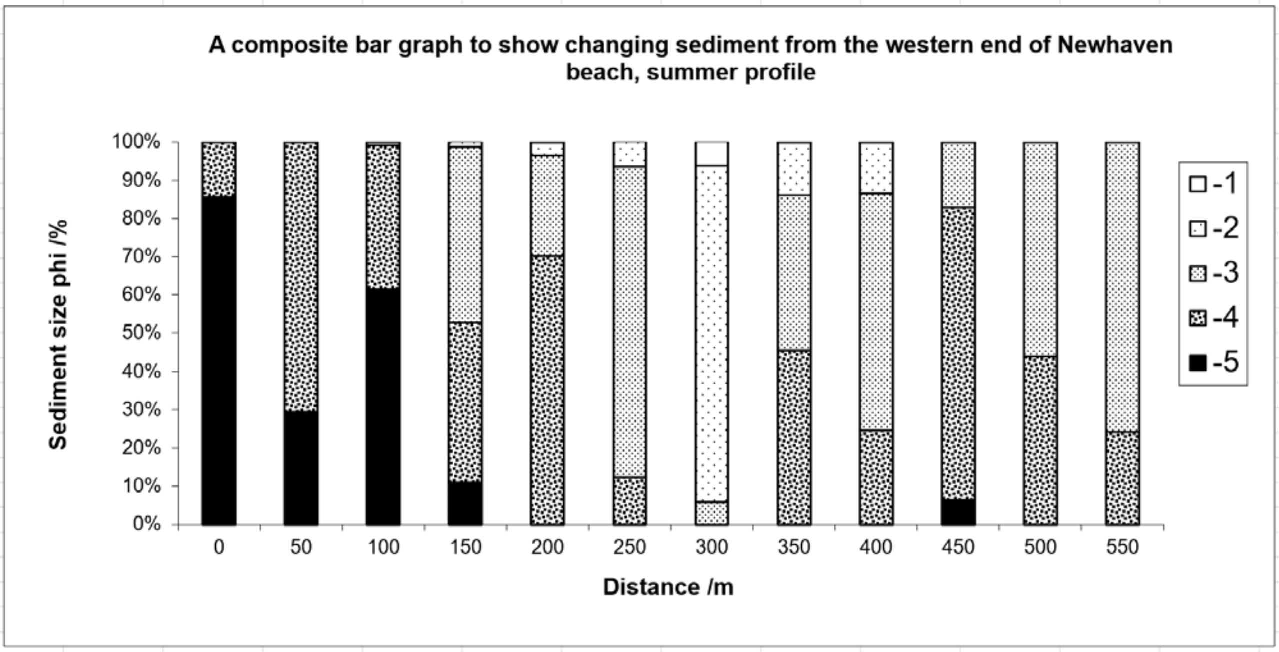
Source: Extract from local SMP

(3) Fieldwork data on sediment size



Source: Wentworth Sediment Chart

Distance from the Western end of Newhaven beach /m	Phi size	Amount retained of each Phi size /g -5	-4	-3	-2	-1	0	1	2	Total /g
	Metric Equivalent	>32mm	16-31mm	8-15mm	4-7mm	2-3mm	1-1.9mm	0.5-0.9mm	0.25-0.49mm	
0	Weight /g	1316.0	221.0	0.0	0.0	0.0	0.0	0.0	0.0	1537.0
	%	85.6	14.4	0.0	0.0	0.0	0.0	0.0	0.0	
50	Weight /g	402.0	968.0	0.0	0.0	0.0	0.0	0.0	0.0	1370.0
	%	29.3	70.7	0.0	0.0	0.0	0.0	0.0	0.0	
100	Weight /g	926.0	571.0	12.0	0.0	0.0	0.0	0.0	0.0	1509.0
	%	61.4	37.8	0.8	0.0	0.0	0.0	0.0	0.0	
150	Weight /g	153.0	580.0	639.0	18.0	0.0	0.0	0.0	0.0	1390.0
	%	11.0	41.7	46.0	1.3	0.0	0.0	0.0	0.0	
200	Weight /g	0.0	854.0	319.0	41.0	1.0	0.0	0.0	0.0	1215.0
	%	0.0	70.3	26.3	3.4	0.1	0.0	0.0	0.0	
250	Weight /g	0.0	162.0	1072.0	85.0	0.0	0.0	0.0	0.0	1319.0
	%	0.0	12.3	81.3	6.4	0.0	0.0	0.0	0.0	
300	Weight /g	0.0	0.0	52.0	783.0	56.0	0.0	0.0	0.0	891.0
	%	0.0	0.0	5.8	87.9	6.3	0.0	0.0	0.0	
350	Weight /g	0.0	861.0	768.0	262.0	1.0	0.0	0.0	0.0	1892.0
	%	0.0	45.5	40.6	13.8	0.1	0.0	0.0	0.0	
400	Weight /g	0.0	378.0	947.0	206.0	1.0	0.0	0.0	0.0	1532.0
	%	0.0	24.7	61.8	13.4	0.1	0.0	0.0	0.0	
450	Weight /g	94.0	1107.0	249.0	0.0	0.0	0.0	0.0	0.0	1450.0
	%	6.5	76.3	17.2	0.0	0.0	0.0	0.0	0.0	
500	Weight /g	0.0	562.0	713.0	1.0	0.0	0.0	0.0	0.0	1276.0
	%	0.0	44.0	55.9	0.1	0.0	0.0	0.0	0.0	
550	Weight /g	0.0	301.0	941.0	1.0	0.0	0.0	0.0	0.0	1243.0
	%	0.0	24.2	75.7	0.1	0.0	0.0	0.0	0.0	



Source FSC – Juniper Hall.

Comment on the reliability and accuracy of the data.

(4) Synthesis and analysis of data and research information

Focus themes. Take 2 of these, and build and evidenced-based answer.

1. The sources of the material forming the beach west of Newhaven Harbour
2. The cause and extent of the distinct gradation in the size of clasts
3. The role of longshore sediment transport
4. The role of extreme events in the formation and present-day development of the pebble-beach feature
5. Relic vs active nature of deposits
6. Prevailing wind vs dominant wind

Below: space for your synthesis discussions.