

# 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

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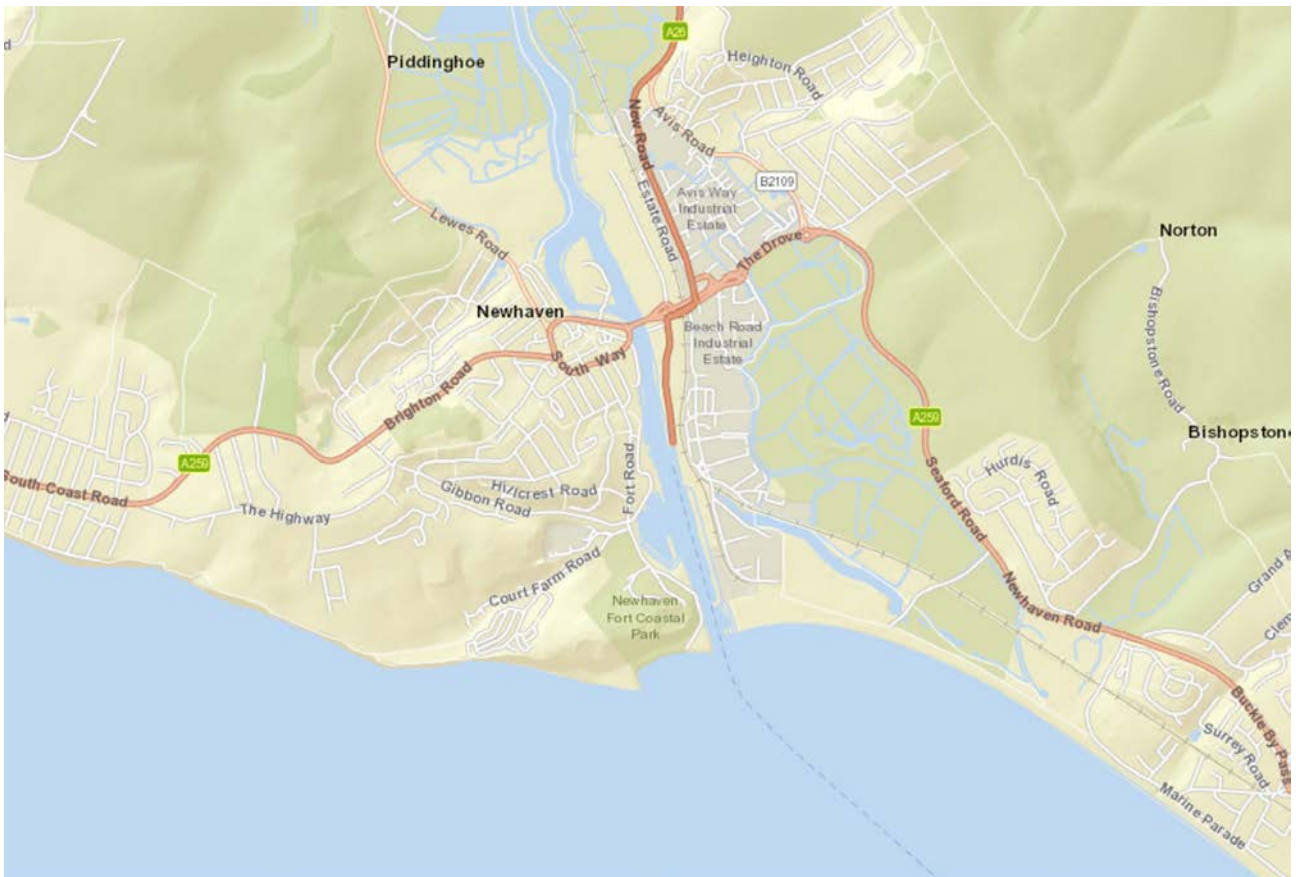
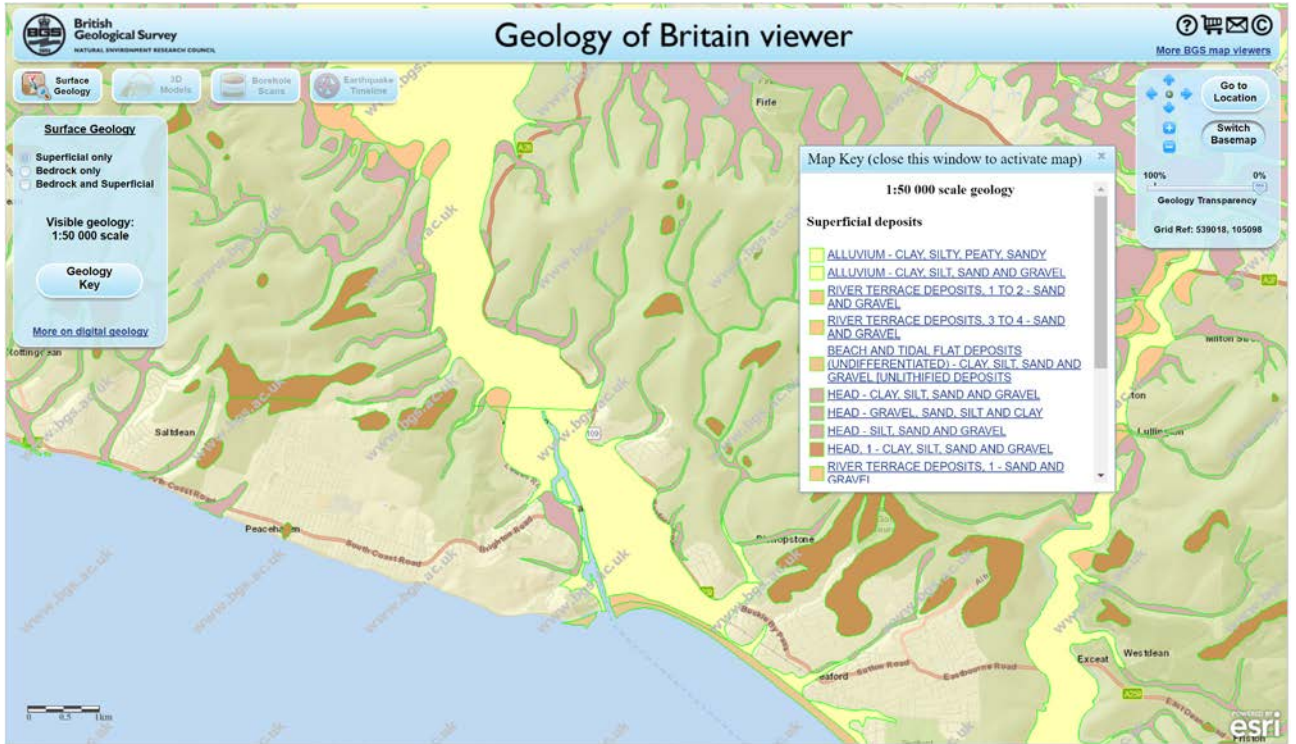
Links to OCR GCE Specification for Activity

<b>2. How are coastal landforms developed?</b>	
<b>Key Ideas</b>	<b>Content</b>
2.a. Coastal landforms develop due to a variety of interconnected climatic and geomorphic processes.	<ul style="list-style-type: none"> <li>• The influence of flows of energy and materials on geomorphic processes, including weathering, mass movement, wave, fluvial and aeolian erosion, transportation and deposition.</li> <li>• The formation of distinctive landforms, predominantly influenced by erosion, including bays, headlands, cliffs, shore platforms, geos, blow holes, caves, arches, stacks and stumps.</li> <li>• The formation of distinctive landforms, predominantly influenced by deposition, including beaches, spits, on-shore bars, tombolos and salt marshes.</li> </ul>

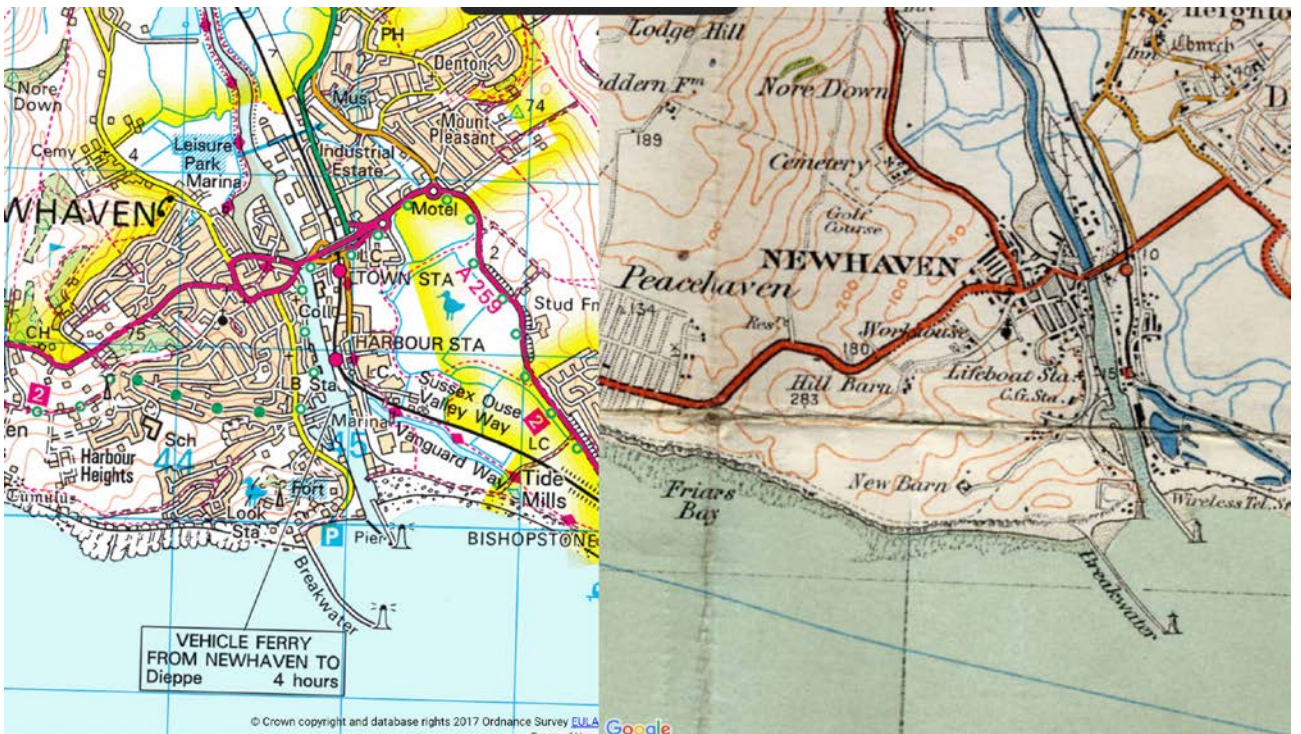
<b>3. How do coastal landforms evolve over time as climate changes?</b>	
<b>Key Ideas</b>	<b>Content</b>
3.a. Emergent coastal landscapes form as sea level falls.	<ul style="list-style-type: none"> <li>• How landforms in emergent landscapes are influenced by falling sea levels due to a cooling climate, including:               <ul style="list-style-type: none"> <li>○ climate changes that occurred during a previous time period and the resultant sea level fall</li> <li>○ the influence of sea level fall and geomorphic processes in shaping landforms, including raised beaches, marine terraces and abandoned cliffs</li> <li>○ the modification of these landforms by processes associated with present and future climate and sea level changes.</li> </ul> </li> </ul>
3.b. Submergent coastal landscapes form as sea level rises.	<ul style="list-style-type: none"> <li>• How landforms in submergent landscapes are influenced by rising sea level due to a warming climate, including:               <ul style="list-style-type: none"> <li>○ climate changes that occurred during a previous time period and the resultant sea level rise</li> <li>○ the influence of sea level rise and geomorphic processes in shaping landforms, including rias, fjords and shingle beaches</li> <li>○ the modification of these landforms by processes associated with present and future climate and sea level changes.</li> </ul> </li> </ul>

*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.*

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



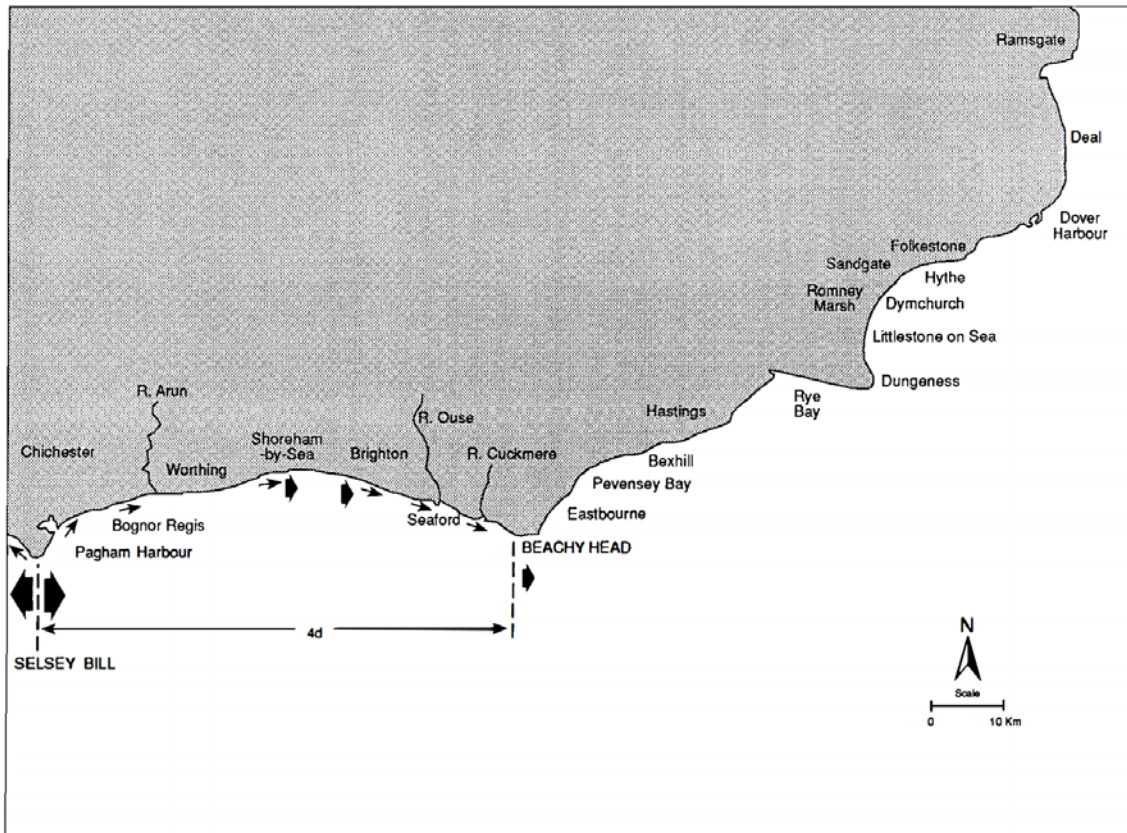
Source: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>



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



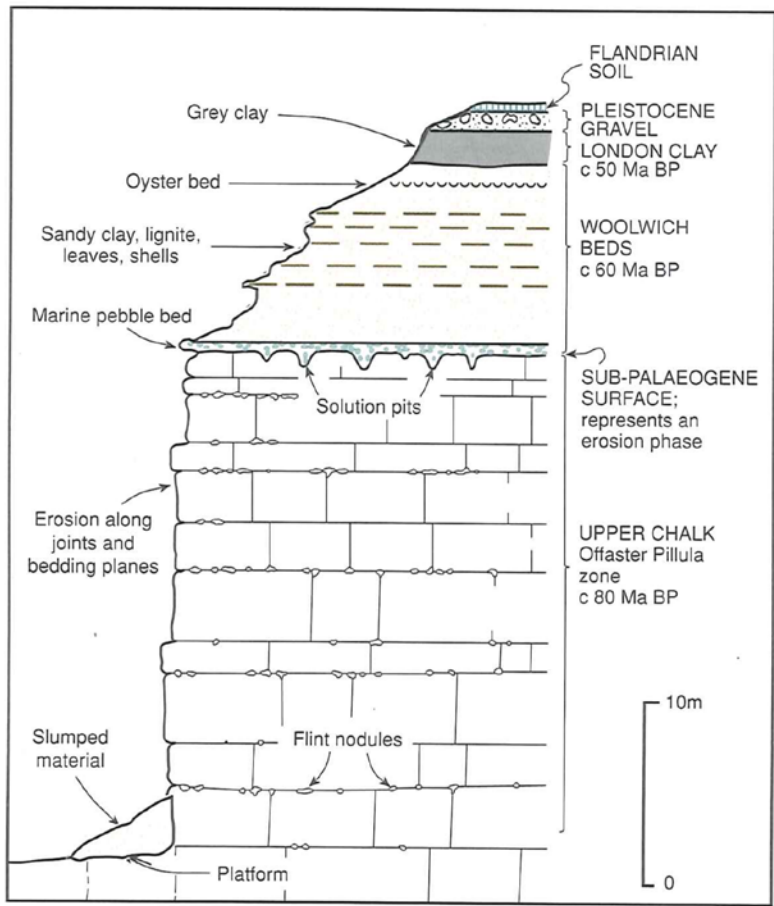
## 2 Sediment processes and littoral cells



Sub-cell 4d Beachy Head to Selsey Bill



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.

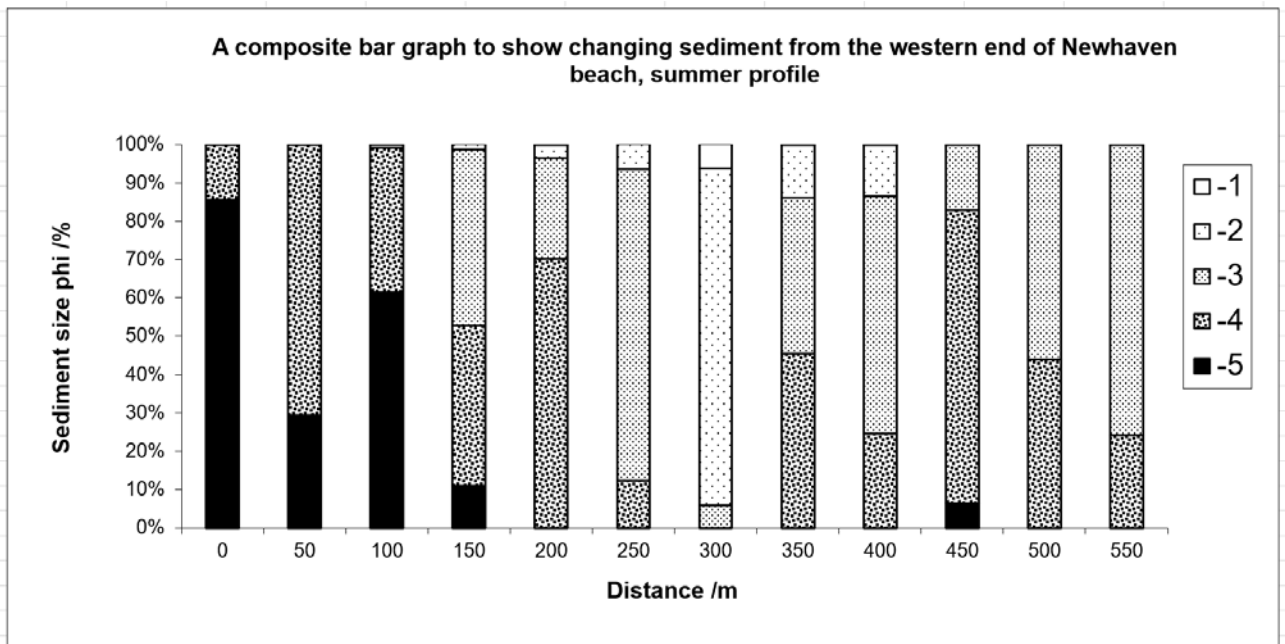
Source: Extract from local SMP

(3) Fieldwork data on sediment size

Φ	PHI - mm COVERSION Φ = log <sub>2</sub> (d in mm) 1 μm = 0.001mm		Fractional mm and Decimal inches	SIZE TERMS (after Wentworth, 1922)	SIEVE SIZES		Intermediate diameters of natural grains equivalent to sieve size	Number of grains per mg		Settling Velocity (Quartz, 20°C)		Threshold Velocity for traction cm/sec		
	mm				ASTM No. (U.S. Standard)	Tyler Mesh No.		Quartz spheres	Natural sand	Spheres (Gibbs, 1971) cm/sec	Crushed	(Nevin, 1946)	(modified from Hjulstrom, 1939)	
-8	256	10.1"		BOULDERS (> -8Φ)										
-7	128	5.04"			COBBLES									
-6	64.0	2.52"		PEBBLES	2 1/2"	2"						200	1 m above bottom	
-5	53.9	2.12"			very coarse	1 1/2"	1 1/4"						150	
-4	45.3	1.76"			coarse	1 1/4"	1.05"							
-3	33.1	1.26"			medium	3/4"	.742"							
-2	32.0	1.26"			fine	5/8"	.525"							
-1	26.9	1.06"			very fine	1/2"	.371"							
0	22.6	0.63"			Granules	3/8"	.265"							
1	17.0	0.32"			very coarse	5/16"	.265"							
2	16.0	0.32"			coarse	4	4	1.2	.72	.6	10	8	40	50
3	13.4	0.16"			medium	5	5	.86	2.0	1.5	8	7	30	40
4	11.3	0.16"		fine	6	6	.59	5.6	4.5	7	6	30	30	
5	10	0.08"		very fine	7	7	.42	15	13	6	5	30	30	
6	9.52	0.08"		very fine	8	8	.30	43	35	5	4	20	26	
7	8.00	0.08"		very fine	10	10	.215	120	91	4	3	20	26	
8	6.73	0.08"		very fine	12	12	.155	350	240	3	3	20	26	
9	5.66	0.08"		very fine	14	14	.115	1000	580	2	2	20	26	
10	4.76	0.08"		very fine	16	16	.080	2900	1700	1	1	20	26	
11	4.00	0.08"		very fine	18	18								
12	3.36	0.08"		very fine	20	20								
13	2.83	0.08"		very fine	25	24								
14	2.38	0.08"		very fine	30	28								
15	2.00	0.08"		very fine	35	32								
16	1.63	0.08"		very fine	40	35								
17	1.41	0.08"		very fine	45	42								
18	1.19	0.08"		very fine	50	48								
19	1.00	0.08"		very fine	60	60								
20	.840	0.08"		very fine	70	65								
21	.707	0.08"		very fine	80	80								
22	.545	0.08"		very fine	100	100								
23	.500	0.08"		very fine	120	115								
24	.420	0.08"		very fine	140	150								
25	.354	0.08"		very fine	170	170								
26	.297	0.08"		very fine	200	200								
27	.250	0.08"		very fine	230	250								
28	.210	0.08"		very fine	270	270								
29	.177	0.08"		very fine	325	325								
30	.149	0.08"		very fine	400	400								
31	.125	0.08"		very fine										
32	.105	0.08"		very fine										
33	.088	0.08"		very fine										
34	.074	0.08"		very fine										
35	.062	0.08"		very fine										
36	.053	0.08"		very fine										
37	.044	0.08"		very fine										
38	.037	0.08"		very fine										
39	.031	0.08"		very fine										
40	.025	0.08"		very fine										
41	.020	0.08"		very fine										
42	.016	0.08"		very fine										
43	.012	0.08"		very fine										
44	.009	0.08"		very fine										
45	.007	0.08"		very fine										
46	.005	0.08"		very fine										
47	.004	0.08"		very fine										
48	.003	0.08"		very fine										
49	.002	0.08"		very fine										
50	.001	0.08"		very fine										

Source: Wentworth Sediment Chart

Distance from the Western end of Newhaven beach /m	Phi size Metric Equivalent	Amount retained of each Phi size /g								Total /g
		-5	-4	-3	-2	-1	0	1	2	
		>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.