MEASURING LONGSHORE DRIFT

1. Working in a small group, plan a study that could be carried out on a shingle beach to show:

i - Whether the flint pebbles are moving along the beach;
ii - If they are, in which direction they are moving;
iii - And what is the likely cause of the movement.

EQUIPMENT AVAILABLE

- 25 flint pebbles, collected from the beach, and which have been painted in bright durable paint, and numbered
- 25 artificial pebbles ('tracers'), also numbered, made of hardened resin with a metallic copper core, as used in the BAR research project
- A 50 m long tape measure ('surveyors' tape')
- A shorter tape, to measure offsets
- 2 poles, each 1 m long
- A compass
- A ball of string
- A metal detector
- A small flag or streamer to detect wind direction
- Floats such as corks, dog biscuits or hollow rubber balls
- Anything else that might be useful?

METHODS AND RESULTS

a) Suggest suitable weather and tide levels for the study to be carried out.
Divide into sections **(i)**, **(ii)** and **(iii)**, as above.

b) Use diagrams to explain your methods, and possible results. Would you expect the resin pebbles to yield more useful results than the painted flint pebbles?

ANALYSIS AND CONCLUSION

c) Explain how your results might reflect the current wind and wave conditions.

A synthetic tracer pebble, as used in the BAR experiments. Notice copper core inside pebble.

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2. AN ACTUAL STUDY

35 flint pebbles were collected from Seaford Beach, painted bright green, numbered and weighed. At low tide on an August afternoon a transect line was measured out in the vicinity of the Martello Tower, running up the beach from near the low water mark. The pebbles were left in piles at regularly spaced intervals along the transect, where they could be picked up by the waves during the overnight high tide. There was a breeze from the south-west during the night, which created gentle (50 cm high) waves. The next morning at low tide the beach was searched for the pebbles. Fifteen were found; the distances they moved along the beach from their original locations on the transect is shown in the table:

	Weight of pebble (in grams)	Start distance up the transect line towards high water in metres.	Movement along the beach, eastward (positive values) or westward (negative values) in metres.	Movement up (negative values) or down the beach (positive values) in metres.
1	157	0	3.3	-0.9
2	126	0	11.1	1.6
3	225	0	4.1	-3.1
4	465	5	21.6	18.7
5	228	5	26.1	16.8
6	409	10	30.7	-4.3
7	153	15	12.4	5.1
8	427	15	0.6	-2.6
9	385	20	3.9	-1.4
10	265	20	7.3	3.0
11	84	20	3.8	10.1
12	123	20	13.4	-5.7
13	506	25	-0.2	-3.1
14	213	25	0.5	-1.1
15	68	25	0.7	-2.5

On a separate sheet of paper, answer the following:

a) What was the average distance travelled along the beach?

b) Was it in the usual direction of longshore drift (eastwards) or was it westwards?

c) What was the average distance travelled up or down the beach?

d) Do the data suggest that waves were constructive or destructive?

e) Is there any evidence of a relationship between the weights of the pebbles and the distances they travelled? (Hint: drawing a graph might be helpful.) Would you expect to find a relationship?

f) If there are around 700 high tides in a year and the movement on this one tide was typical, how far might the average pebble move in a year?

g) Comment on the weaknesses of the study.