

How does deposited material vary along a stretch of beach?

Context	Deposited materials, such as beach sediment, seaweed and marine debris can vary along a stretch of beach in many ways. Different sized pieces will be deposited on different angles of slope. Troughs, swells and berms are likely to see differences in the size, shape and type of material and the surrounding positions of headlands, bays and natural breakwaters may also affect longshore drift and where materials will amass on a beach.		
Length of time	Half a day	Suitable locations	Beaches with variations in profile within a safe survey area
Equipment needed	Pebble boards; 30cm ruler; callipers; safety gloves; litter pickers; waste sacks		
Suggested delivery			Key Skills
<p>The type of beach students have access to will decide whether they are able to conduct a survey of litter that has been washed ashore by the waves (marine debris) or beach sediment (pebbles and shingle). In either case students can engage in a number of activities:</p> <p>Fieldsketch Students should walk the length of the beach included in the survey area first. Then, using a base map of the survey area, students can mark on features of the beach such as swells, berms, cusps, bars and rip channels as well the position of the storm beach and the high-water mark.</p> <p>Sediment roundness survey Sampling sediment from an equal number of sites in the foreshore and in the backshore, students should estimate and record the roundness of pebbles using the Powers scale. Ten pieces of sediment should be selected from each site and the sites themselves should cover the range of features identified in the initial fieldsketch. Students may be able to recognise a pattern of how rounded sediment is according to where it is found on the beach. This may be at a microscale level, with students recognising the impact of features such as a cusp on sediment roundness, or it could be more simply a comparison between sediment found in the foreshore and sediment found in the backshore.</p> <p>Material size survey In a similar manner, students can measure and record the size of beach material (sediment or marine debris) found in relation to different natural features of the beach. Students should measure the longest axis of the material using a ruler or set of callipers. As with sediment roundness, students may be able to recognise a pattern of sediment size and where it is found on the beach. It is likely that the waves will have created a degree of natural sorting on the beach, with the smallest material found in the foreshore and on slopes of the smallest gradient, and larger material found in the backshore and on steeper gradients.</p> <p>Beach material type survey Students can also record the type of material found in and around different features of the beach. Shingle may be identifiable from geological keys and marine debris can be identified by the main material it is made from (such as rubber, plastic, wood or metal). As with the size of the material, students are likely to see clusters of different types of material in different places on the beach. Low density beach sediment (such as chalk) or less dense marine litter (such as low grade plastic) is likely to be found in different places to higher density beach sediment (such as granite) or more dense marine litter (such as steel).</p> <p>If possible students should be encouraged to remove from the beach any marine debris they find using gloves and litter pickers. Great care (or complete avoidance) should be taken if sharp materials or those associated with bodily fluids are found.</p>			<ul style="list-style-type: none"> Students might like to develop a scoring system for beach materials based on how easily they might be moved by longshore drift. This would involve the type of material (and its density) and the size of the material. Using their original basemap, students can annotate the map with areas that feature sediment of different sizes. This could be presented as annotations, sited bar charts or choropleth shading across the map.
Potential risks to consider	<ul style="list-style-type: none"> The position of the tides at the time of the activity, how high they are and are likely to get and when the peak tide will be. Discarded items on the beach (or those brought onshore by the waves) may pose a health and safety risk. 		
Possible follow-up activities	<ul style="list-style-type: none"> Students can look up historical wind data for the site and find the prevailing wind direction for the site (and therefore the dominant angle of the waves as they break on the shore). They can use this to explain the impact any protectant landforms (such as headlands) might have on the impact of the waves on the beach and the movement of beach materials. 		
Useful links	Report into trends in UK beach litter Beach litter - Marine online assessment tool (cefas.co.uk) Historical weather data for the UK Met Office WOW - Home Page		