



Residential field studies for GCSE and A Level Geography and Geology in the UK, Andorra and Spain.

### VIRTUAL FIELDWORK ACTIVITY ONE

Studying attrition of limestone boulders on Swanage Beach.

**Location.** OS Grid reference SZ 032 799



Latitude	Longitude	Value
50.62111	-1.95450	Gabions
50.62117	-1.95433	Beach

Enter the above data into an excel spreadsheet and save as a CSV file. Open ARCGIS map viewer.

<https://www.arcgis.com/home/webmap/viewer.html?useExisting=1>

Drag and drop the CSV file onto the webpage with ARCGIS open and the two field data collection locations will be displayed.

### Background.

Swanage is a popular tourist resort on the south coast of England. The main attractions are the beautiful beach, crystal clear sea and coastal scenery. Tourism is a major part of the local economy and although like many UK seaside resorts, Swanage has suffered a decline in recent decades, it still maintains a vibrant and active summer holiday scene.

Many commercial properties are located on the cliff tops in the centre and northern section of the bay. This section of the coastline is susceptible to landslides thus threatening many of the cliff top properties, including the Grand and Pines Hotels.

The Pines Hotel was under considerable risk of damage by ongoing cliff instability and these links will give you more information.

<https://www.knightsbrown.co.uk/projects/pines-hotel-cliff-stabilisation/>

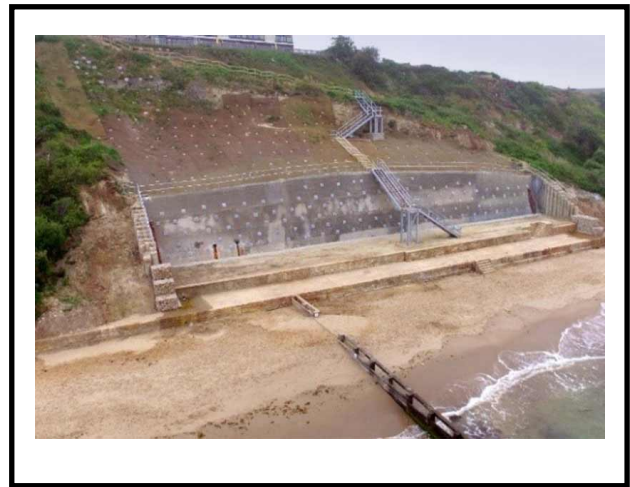
<https://slideplayer.com/slide/4428079/>

<https://www.dorsetecho.co.uk/news/15528520.project-to-stabilise-cliffs-at-swanage-and-save-the-pines-hotel-from-collapsing-been-recognised-with-national-award/>

<https://www.virtual-swanage.co.uk/things-to-do/education-resources/north-beach-cliff-stabilisation>



A



B

Large amounts of limestone boulders were used to construct a ramp that enabled the machinery to access the cliff - photo A.

Some of these boulders were used to fill the Gabions at the sides of the finished cliff stabilisation work but 99% of them were removed after the work was completed - photo B.

However some of the limestone boulders were left on the beach. These have been exposed to attrition by the sea and ***thus by comparing the roundness of the boulders on the beach, compared to those in the Gabions (protected from attrition by being above sea level), we can gauge how significant a process attrition is on Swanage Beach.***

### Task one

#### What would our hypothesis be for this comparative study?

#### Methodology

##### Boulders on the beach

A random sampling method using a 10m by 10m grid and randomly generated co-ordinates was used to select 20 limestone boulders on the beach. The Powers Index of Roundness was used to classify them into one of 6 categories.

##### Boulders in the Gabions

A random sampling method using the wire Gabion cages as a grid and randomly generated co-ordinates was used to select 20 limestone boulders in the Gabions. The Powers Index of Roundness was used to classify them into one of 6 categories.

#### Field data results

Number of sampled boulders in each powers index of roundness category

	Very angular	Angular	Sub-angular	Sub-rounded	Rounded	Very rounded
Gabions	2	5	6	4	3	0
Beach	0	2	6	7	4	1



---

## Data presentation and analysis

### Task two

Study the data closely.

Is there an obvious difference in the shape data?

Consider things like the modal class.

Use an appropriate method to present this data to allow a better visual analysis of the data.

What does this show?

### Task three

Research how to use a Chi-Squared Test for Association with this data and then have a go at doing the test.

(Check with the statistics sheet for this activity if you need help).

What does the result tell us about the data?

## Conclusion and evaluation

What have you learnt from this short piece of fieldwork?

Do you think it gives you a definitive picture of the way in which the process of attrition works on Swanage Beach?

What else have you learnt about Swanage from this activity?

What further fieldwork would you do to be able to draw a better conclusion?

Was our methodology good? What about our sample size? What could we learn if we had similar data collected a year ago?

## Further research

These links will give you more information and ideas about Swanage Bay and the processes on the cliffs and beach.

<https://www.scopac.org.uk/sts/dh-shp.html>

<https://www.twobays.net/SMP2%20Final/Main%20Report/Section%204%20-%204.5%20PDZ4.pdf>

<http://www.southampton.ac.uk/~imw/Swanage-Ballard.htm>