Rural Environment Physical Geography Study: Danby

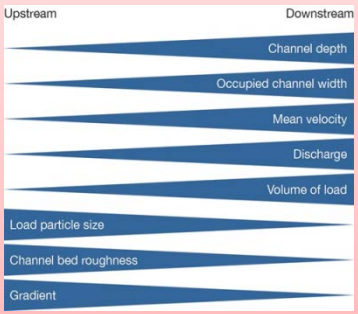
Key Question: What changes in bedload and cross profile can be found over distance along the River Esk?

Unit 3b CGP pages 113-114 Fieldwork

AQA

1. Theory/Concept Link to GCSE Geography

The fieldwork links to Bradshaw's Model. The **Bradshaw Model** is a geographical **model**, which describes how a river's characteristics vary between the upper course and lower course of a river.



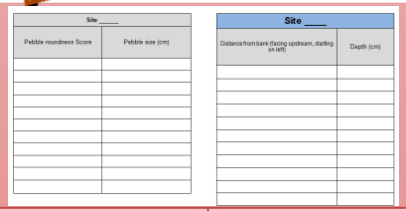
As the river flows from source to mouth:

1. The cross-section area gets wider
2. The river's velocity increases
3. **Stone (bedload) size decreases**
4. Discharge increases
5. Gradient decreases
6. Wetted perimeter increases
7. Turbulence decreases
8. **River's depth increases**
9. **Stone angularity decreases**
10. **Rivers width (cross profile) increases**

This is relevant to our studies because in Y10 we studied **River Landscapes** and we looked at how the **shape of river valleys change as rivers flow downstream**. We visited a section of the River Esk near to the village of Danby in North Yorkshire. Danby is **accessible** to our school, being about an hour's drive away. There is a study centre at Danby and measuring equipment and guidance was provided. The River Esk at Danby is in its upper course. This means the river is still relatively small and safe enough for us to enter to collect measurements. There are enough sites for us to measure several times to compare the changes as we walk downstream. Site 1 was the furthest upstream, site 3 was the furthest downstream.

2. Data Collection Methods

Systematic Sampling



We picked up a pebble from the river bed every 20cm across the river. We rated its roundness score on the **Power's Index** and measured its length in cm. Tests number 3 & 9 above.

We measured the width and depth of the river every 20cm across the river. Tests number 8 & 10 above. These methods were repeated at 3 sites, site 3 being the furthest downstream.

Sampling Methods

4 different ways to get 100 shoe sizes

Biased
Members of a 'population' or sets of data have unequal chances of being selected – some are more likely to be included than others, e.g. only interview 100 students in Y7.

Random
Members of a 'population' or sets of data have equal chances of being selected, e.g. interview 100 students from Year 7 to Year 11 in the school.

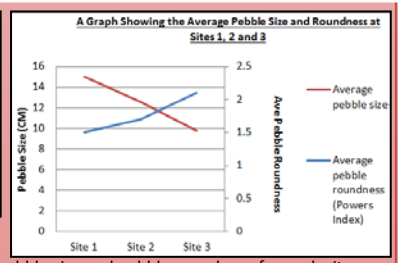
Systematic
Members of a 'population' or sets of data are selected in a systematic or regular way. They are evenly spaced or numbers, e.g. interview every 10th person on the school register.

Stratified
Members of a 'population' or sets of data are selected from smaller sub-groups, e.g. interview 10 girls in Year 7, 10 boys in Year 7, 10 girls in Year 8, 10 boys in Year 8 and so on.

Risks: Falling in river > follow staff's instructions, remain on river bank when not collecting data, use rope to hold on to, be aware of ground conditions and tread carefully!

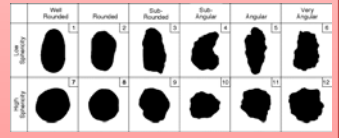
3. Data Presentation and Analysis

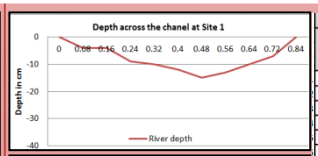
Sample number	Site 1 Pebble roundness Site 1	Site 1 Pebble size (cm) Site 1	Site 2 Pebble roundness Site 2	Site 2 Pebble size (cm) Site 2	Site 3 Pebble roundness Site 3	Site 3 Pebble size (cm) Site 3
1	1	23	2	17	4	9
2	2	17	3	16	1	11
3	1	20	1	11	2	9
4	2	19	2	17	2	11
5	1	14	1	11	4	18
6	2	12	1	19	2	11
7	1	15	2	11	3	16
8	1	17	3	12	2	8
9	2	16	1	15	2	9
10	1	23	2	17	4	12
	1.5	16	1.7	12.6	2.1	9.8

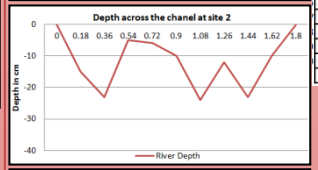


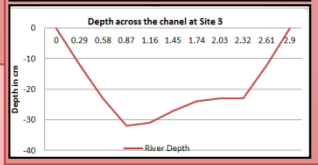
The **average score** for pebble size and pebble roundness for each site was **calculated** and plotted onto a line graph. A line graph was suitable for displaying this data as it **shows trends**. Another method would have been to plot as a scatter graph and draw the line of best fit. A scatter graph would also show any outliers.

The graph shows that as we move downstream from site 1 to site 3, the **average pebble size decreases** from 15cm to just under 10cm. Meanwhile, the **average pebble roundness increases** from just under 1.5 on the Powers Index to almost 2.25. See Powers Index, below.









Site 1		Site 2		Site 3	
Distance from bank (facing upstream)	Depth (cm)	Distance from bank (facing upstream)	Depth (cm)	Distance from bank (facing upstream)	Depth (cm)
0	0	0	0	0	0
0.08	-4	0.18	-15	0.29	-12
0.16	-4	0.36	-23	0.58	-23
0.24	-9	0.54	-5	0.87	-32
0.32	-10	0.72	-6	1.16	-31
0.4	-12	0.9	-10	1.45	-27
0.48	-15	1.08	-24	1.74	-24
0.56	-13	1.26	-12	2.03	-23
0.64	-10	1.44	-23	2.32	-23
0.72	-7	1.62	-10	2.61	-12
0.84	0	1.8	0	2.9	0

The river depth and width were plotted as a cross-section. By keeping the depth on the y axis constant, this enable us to see the profile of the 3 sites and compare them.

The cross section shows that the deepest part of the river at site 1 is 15cm, whereas at site 3 the river is more than 15cm deep for the majority of the cross-section, reaching more than 30cm deep at some points. The width of the river increases from 0.84m at site 1 to 2.9m at site 3.

4. Conclusion: How does the data support the Key Question?

The line graphs show that average pebble size decreased from site 1 to site 3, while pebble roundness increased. This supports point 3 of the Bradshaw Model, 'stone size decreases' and point 9 'stone angularity decreases'. The cross sections show that the River Esk got wider and deeper from site 1 to site 3. This supports point 8 'river depth increases' and point 10 'river width increases' of the Bradshaw Model. **In conclusion to the key question, the changes which can be seen in bedload and cross profile over distance along the River Esk is that bedload becomes smaller and more rounded, while the cross profile becomes wider and deeper.**

5. Evaluation

Problems of data collection methods

- River Conditions – previous weather conditions had seen a lot of rain. The river's discharge was much higher than normal, which made it difficult to complete the width and depth measurements.
- Powers Index – some stones were difficult to make a judgement on and score on the index

Limitations in the data

- Width & Depth measurements were not accurate
- The Powers Index results on angularity may not have been accurate.
- The cross section allows a comparison on depth, but the width changes on the x axis of all 3, so does not clearly show that the river gets wider.

What other data would be useful to have?

- More Sites – We only had data from 3 sites along the river. If we had visited more sites, for example 10, we would have increased our sample size, making it more reliable.

How reliable are the conclusions?

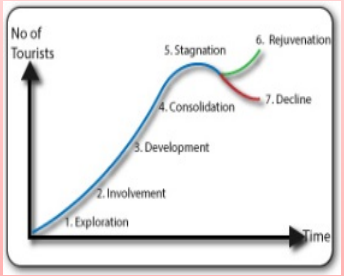
- Although some measurements may not have been accurate we still had a lot of data and the average scores we calculated from this would have been representative enough of the river to produce reliable results to analyse & draw conclusions from.

Urban Environment Physical & Human Geography Study: Whitby

Key Question: What are the physical and human attractions of the coastal landscape at Whitby?

1. Theory/Concept Link to GCSE Geography

The fieldwork links to the Butler Model. **Tourism** Life cycle **model**. **Butler** proposed that most **tourist** resorts go through a six stage **model** and he called this the **tourism** life cycle **model**. It states that most **tourist** resorts start on a very small scale and get bigger and bigger until stagnation occurs.

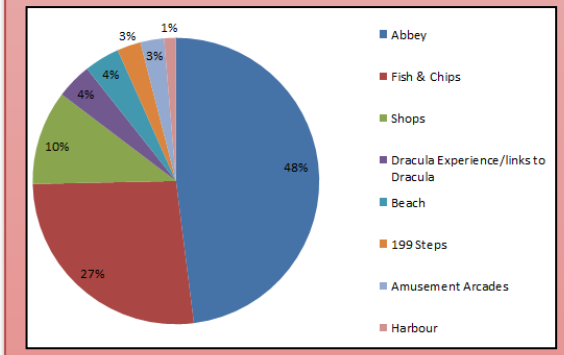


In **stages 1 & 2** tourism **is taking off** and **visitor numbers are low**. Tourism is welcomed as a **source of income. Stages 3 & 4** tourism becomes a **major part of the economy**, **large companies** move in and **jobs depend on tourism**. **Stage 5** sees a shift as visitor numbers, though still **high**, **level off**. After this, **investment** will either bring **improvements** to the area and a **continued growth**. Alternatively, **visitor numbers fall** and the **economy declines**. **Whitby is most likely in stage 4**.

This is relevant to our GCSE because in Y11 we studied **Changing Economic World**. We looked at how the **UK economy has shifted towards the tertiary sector**, of which tourism is part of. Tourist attractions can also be studied in Glacial Landscapes, although we have not covered this option in the Physical Landscapes of the UK section.

3. Data Presentation and Analysis

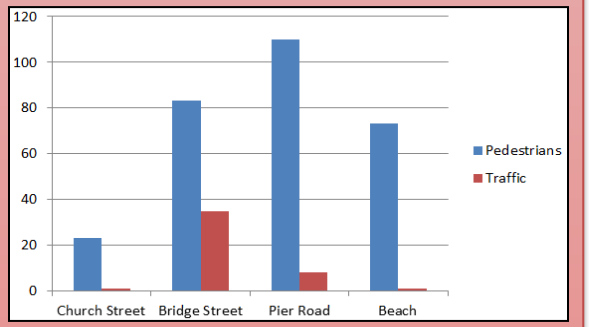
Pie Chart to show reasons for visit to Whitby (visitor survey)



This pie chart clearly **shows proportions** of popular visitor attractions. The data was typed into and Excel spreadsheet and the chart wizard created the pie chart. This data could have also been shown as a bar chart, histogram or pictogram.

The pie chart shows that the **most popular attraction in Whitby was the abbey** – with 48% of visitors giving this as one of their main reasons for visiting Whitby**. Fish & chips and the shops were the 2nd and 3rd most popular attractions**, with 27% and 10% respectively. This means that 85% of visitors went here. The **remaining 15% of attractions were split between the other 5 attractions**, with **the river and attractive coastline not scoring anything** on the survey.

Bar Chart to show pedestrian and traffic count for Whitby



This bar chart clearly **shows the volume** of pedestrians and traffic in Whitby. Both sets of data can be plotted in the same site on the x axis which **allows 2 pieces of data to be displayed**. The data was typed into and Excel spreadsheet and the chart wizard created the pie chart. This data could have also been shown as a pie chart to show proportions of traffic and pedestrians.

The site with the **most pedestrians** was **Pier Road**, with 110 pedestrians. The site with the **most traffic** was **Bridge Street**, with 35 vehicles counted. **Bridge Street and Pier Road scored a total of 118 pedestrians and vehicles combined each**. **Church Street** had the **lowest volume of pedestrians and vehicles**.

2. Data Collection Methods
Random Sampling

Study Sites: Church Street, Bridge Street, Pier Road & The Beach

Places such as Whitby are very popular with visitors. They attract such large numbers of visitors that they have become known as **honeypot sites**. This means Whitby will provide both **large numbers of tourists** and a **range of attractions** to allow us to investigate and answer our key question. For practical terms, Whitby is **accessible** to our school, being about an hour's drive away. The 4 study sites chosen are all within walking distance of each other and comprise both human and physical attractions.

Visitor Survey

We completed the questionnaire for 4 sites above using the table below to tally the results. We asked 5 visitors the reason for their visit – they could choose up to 3 attractions. Once we had 5 responses, we swapped results with 4 other people to get a total of 25 responses.

Area	Attraction	Number of people tally
1	Shops	
	199 Steps	
	Abbey	
2	River	
	Harbour	
3	Fish & Chips	
	Amusement Arcades	
	Dracula Experience/links to Dracula	
4	Beach	
	Attractive coastline	
	Other (make a note in space below)	

Pedestrian & Traffic Count

We completed a pedestrian count and a traffic count for 10 minutes. We used the timers on our phones and stood in one place. Working in pairs, one person counted pedestrians and the other person counted the vehicles. We used the tables below to record the results as a tally and then totalled up the score.

Pedestrian Count		Traffic Count	
Total		Total	

Risks: Road Traffic Accident> Remain on pavements. Check carefully before crossing roads. Be aware of traffic.

4. Conclusion: How does the data support the Key Question?

The pie chart showing data from the visitor survey shows that the abbey, fish & chip restaurants and shops were attracting the vast majority (85%) of visitors. These are human attractions. Only 4% of visitors went to Whitby for the beach and the river and attractive coastline didn't even score. This shows that human attractions are the main reason why people visit Whitby. The bar chart shows that Bridge Street and Pier Road have the highest volume of traffic – both people and vehicles. These 2 streets are dominated by shops and restaurants, which are human attractions. The beach does have a high number of pedestrians (73), so this is also a significant physical attraction. **In conclusion the human features of the abbey, shops and restaurants are the major attractions of tourism in Whitby. The beach is an important physical attraction. However, overall the human landscape is more significant and Whitby, therefore, is a human tourist environment.**

5. Evaluation

Problems of data collection methods

- Timing – site 1 data collected early morning before many visitors had arrived.
- Environment – Whitby is largely a human environment
- Weather – was poor

Limitations in the data

- Timing – site 1 data would have lower numbers
- Environment – More human attractions than physical
- Poor weather would have meant fewer visitors to Whitby on the day we were there.

What other data would be useful to have?

- Secondary data to show year round numbers to attractions to give an average rather than a snapshot of the day
- Survey of businesses to find out customer volumes

How reliable are the conclusions?

- Not reliable because numbers are only taken from one day snapshot and random sample
- Whitby is a human environment so the attractions were dominated by human features.