Analysing and explaining fieldwork data

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Key Questions
How will I analyse the fieldwork data using maths and statistics?
What evidence can I use to explain the data?
What conclusions can be made from the data?

Documents
PowerPoint Slides: Lesson 4 starter
Handout 4.1 Writing analysis and conclusions
Handout 4.2. Coastal data analysis
Handout 4.3 River Wyre data analysis
Handout 4.4 River data 2 analysis
Handout 4.5 Rural settlements data analysis
Handout 4.6 Ambleside honeypot data analysis
Coastal data
Rivers data
Rural settlements data
Ambleside honeypot data

Starter
Image of 3 graphs: pie chart, scatter graph and flow lines.
Starter questions: How can the data be analysed?
What ways can you describe the data?
Students to consider the data analysis, describing and explaining patterns using mathematical and statistical analysis.
Summarise how to describe data as evidence.
What are the key points to include?
Why is data important in reaching conclusions?

Starter can refer to data collected by students and/or data presented on example graphics.

Main
Analysis and conclusions.

Own data:
Students use their data and presentation techniques (from lesson 3) and Handout sheet 4.1 to write specific questions and answers about their fieldwork results.
The handout includes generic questions. Opportunities for differentiated activities allow some pupils to be given specific questions to guide them, whilst others can use the handout to write their own questions.

Unfamiliar data**:**
Data for coasts, rivers, rural settlements and a honeypot site is provided. Both raw data as an Excel spread sheet and handouts with instructions and questions for each set of data.
Instructions for the maths and statistical analysis of data are not provided in the lesson but can be found in relevant texts, and instructions on the links provided.
Links to data analysis:
Link to Edexcel Geography Fieldwork Guide

Link to Edexcel Maths for Geographers
Link to FSC GCSE planning guide

Plenary
Peer evaluation of analysis and conclusions.
Students to highlight correct use of data, description, and explanation and conclusions.
Reference is made to the enquiry process (lesson 1)
Examples are shared within the whole class to provide exemplar analysis and conclusions.

Thanks to schools in Lancashire and FSC Blencathra for providing fieldwork data examples.

How can the data be analysed?

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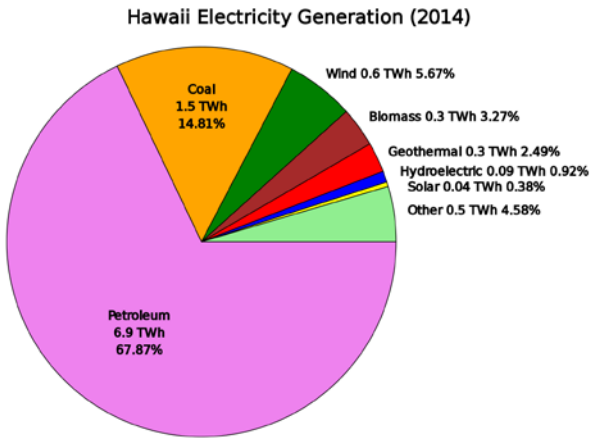

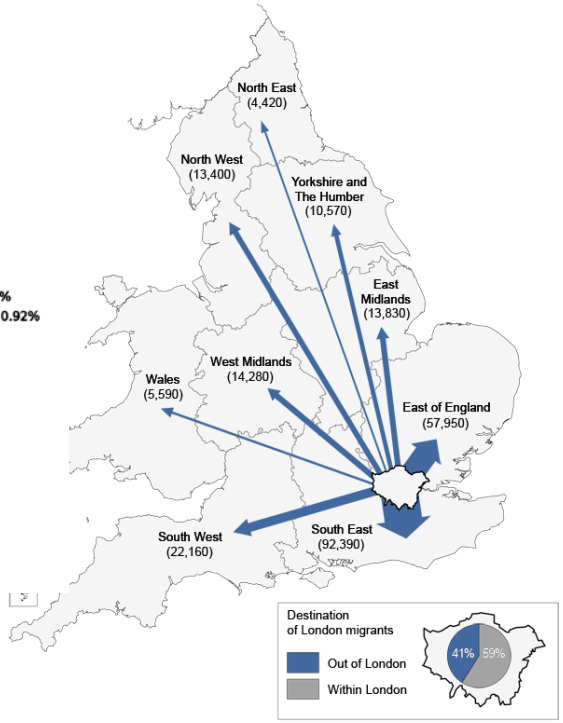

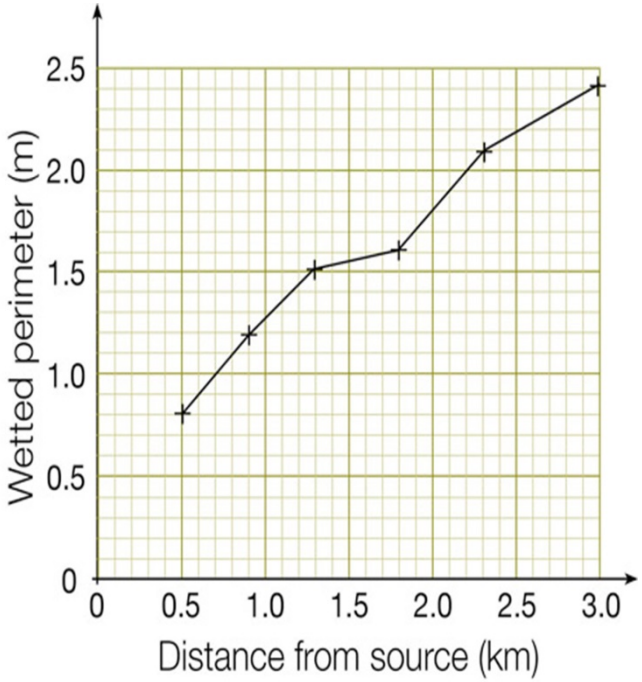

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How do we describe the data?

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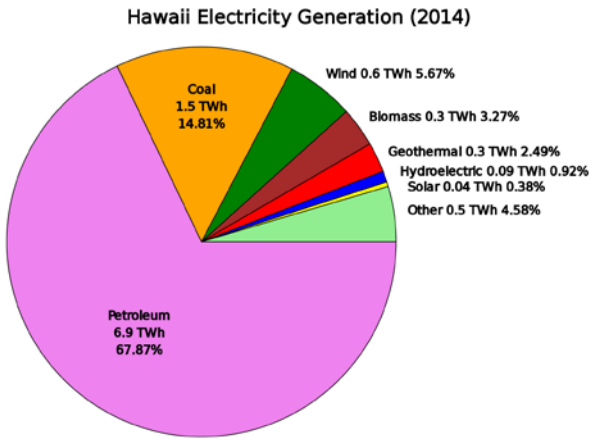

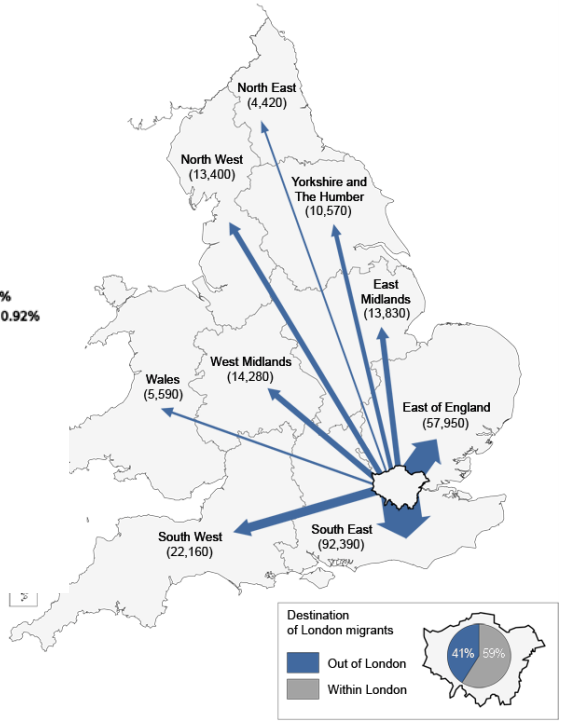

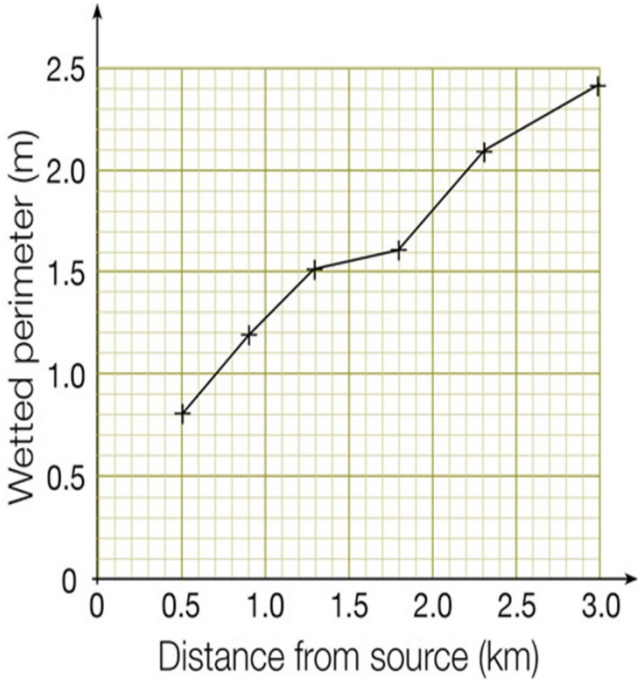

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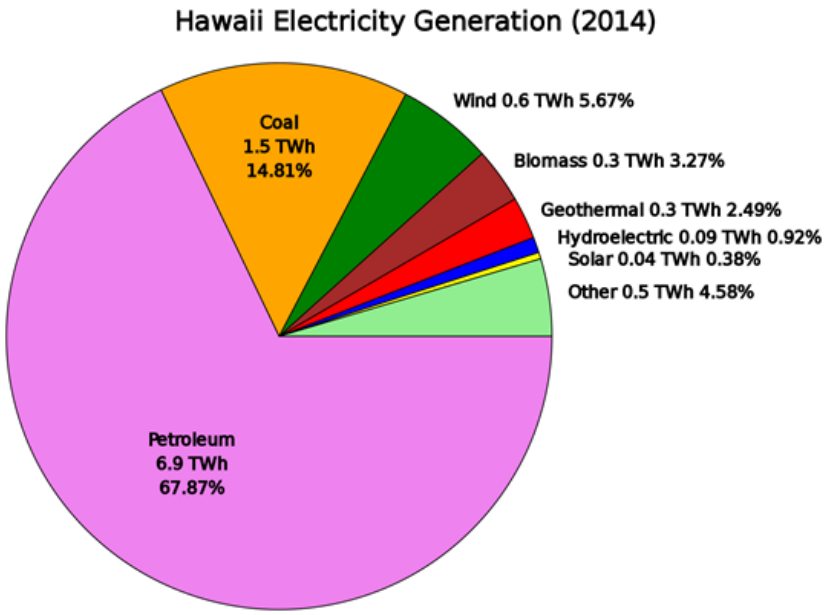

- Percentage
- Fraction
- Ratio
- Maximum & minimum

How do we describe the data?

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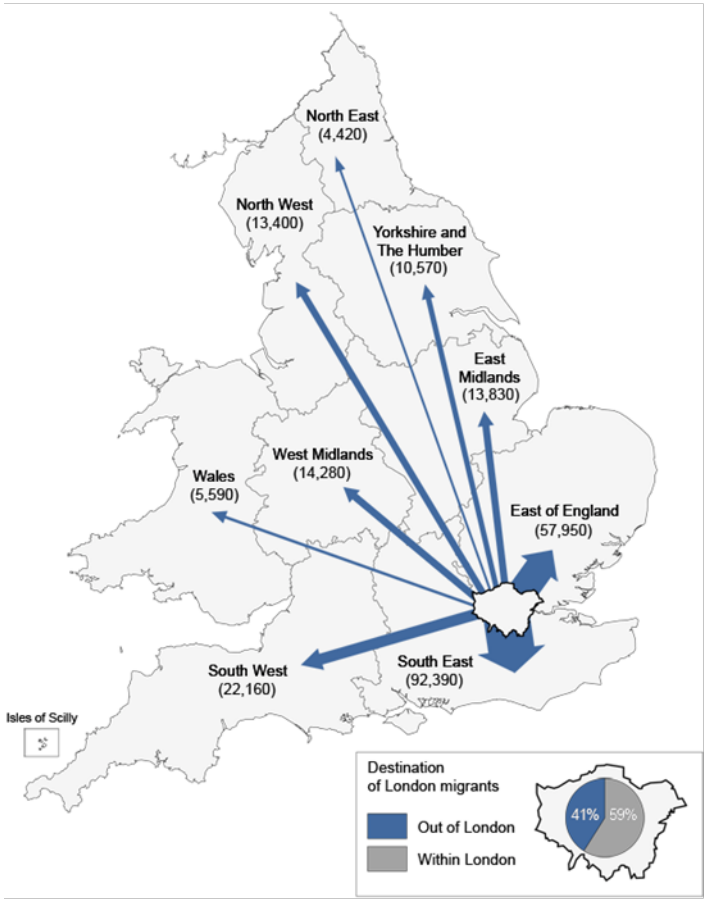
Destination of London migrants



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- Percentage
- Fraction
- Ratio
- Maximum & minimum
- Destination regions
- Distance
- Flows/movement

How do we describe the data?

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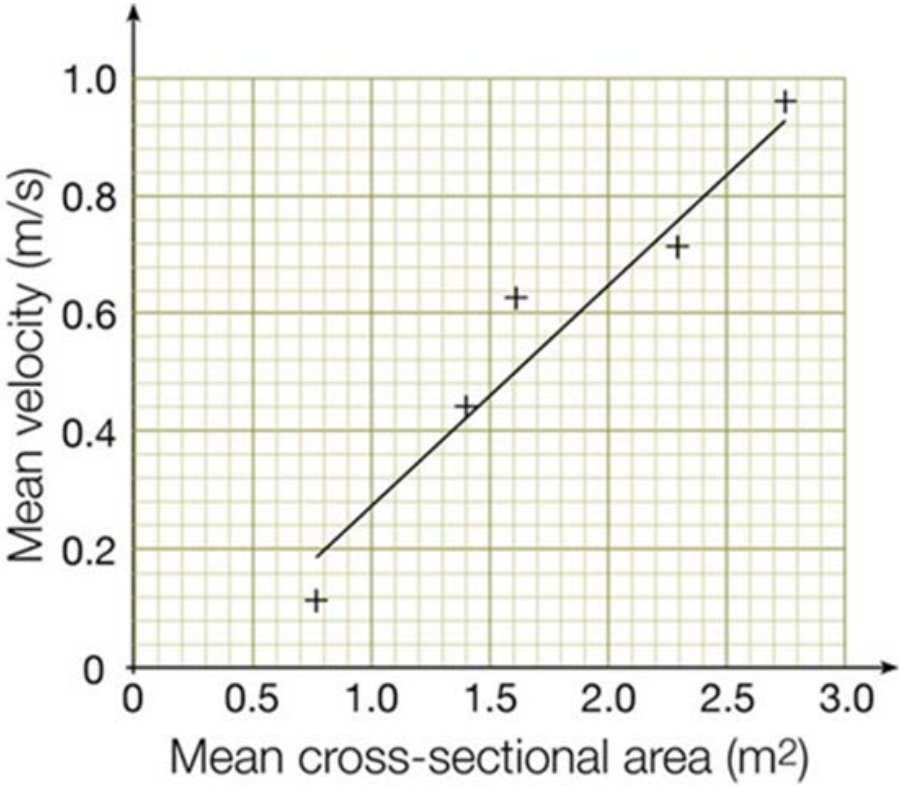

- Increase/decrease
- Maximum/minimum
- Change/trend
- Relationship/correlation
- Best fit line
- Positive/negative/ no correlation
- Strong/weak correlation
- Anomalous result

Summary

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- Summarise how to describe data as evidence.
- What are the key points to include?
- Why is data important in reaching conclusions?

Handout 4.1 – Writing an analysis and conclusions

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General questions describing the results	Your specific question	Answer
Describe the pattern shown on the graph/map/table/results.		
Pick out any changes over distance or location (spacial changes)		
Use the data as evidence: calculate the mean median or mode to describe the distribution of the data.		
Use maximum and minimum data to describe the range of data.		
Describe the scale and direction of flows		
Using statistical tests describe the relationship between sets of data. Is the correlation positive or negative?		
Are there any anomalies in the data?		
General questions explaining the results	**Your specific question**	**Answer**
What reasons can you give to explain the results?		
How do the results fit in with your enquiry question?		
How do the data sets link together?		

Can you use one set of data to explain another?		
Can you explain why there are anomalies?		
General questions reaching a conclusion	**Your specific question**	**Answer**
Can you prove or disprove your hypothesis?		
Describe any statistical evidence for your conclusions.		
How do your results fit in with other case studies or theories?		
What conclusion can you reach about your Enquiry questions?		

Handout 4.2 – Coastal data analysis

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GCSE students collected on a stretch of coastline to investigate changes in the beach profile and the effects of longshore drift on sediment size.

Site 1. Before Groyne		Site 2 After Groyne	
Distance across beach (m)	Gradient °	Distance across beach (m)	Gradient °
3.6	5	2.8	16
7.2	5	5.6	21
10.8	25	8.4	25
14.4	20	11.2	11
18	25	14	10
21.6	5	16.8	14
25.2	5	19.6	22
28.8	10	22.4	12
32.4	7	25.2	12
36	1	28	15

Longshore Drift along Grune Point.												
Average sediment size (mm) along 12 sites.												
Site along spit	1	2	3	4	5	6	7	8	9	10	11	12
	63	82	42	39	14	0	42	18	75	76	47	28
	50	84	47	60	49	31	33	37	22	64	47	21
	38	55	59	98	46	22	33	36	25	72	39	18
	43	30	79	71	46	12	26	43	20	62	27	0
	54	40	125	78	74	40	67	90	26	49	35	
		54	64	54			0	78	44	34	25	
		47	49						29		15	
		16	74								39	
		10	43								32	
			59									
			80									
			87									
			89									
			19									

Coastal data analysis:

1. Produce your own graphs of the data.
2. Describe the pattern shown for each set of data. Use maximum, minimum and mean values.
3. Compare the beach profiles before and after the groyne.
4. How can you explain the pattern shown by each set of data?
5. Are there any anomalies in the data?
6. How do the data sets link with one another?
7. Overall what conclusions can you reach about the effect of groynes on the beach profiles and longshore drift on sediment size?
8. What other data would they need to collect to reach more valid conclusions?

Handout 4.3 – River Wyre data analysis

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GCSE students collected data on the River Wyre to investigate changes in the river downstream.

Site	Distance from source (km)	Average width (m)	Average depth (m)	Cross Sectional Area	Wetted perimeter (m)	Average bedload length (cm)	Mode bedload shape (Power's Index)	Average velocity (m/s)
1	0	0.18	0.045	0.225	3	12.59	SR	0.06
2	0.03	0.16	0.053	0.213	1.65	10.57	SR	0.07
3	0.05	0.2	0.095	0.295	2.45	10.37	SR	0.02
4	0.57	0.2	0.118	0.318	2.4	10.5	SA	0.03
5	0.59	0.145	0.168	0.313	1.53	30.5	SR	0.02
6	0.61	0.16	0.141	0.301	1.7	8.1	SR	0.02
7	0.95	0.57	0.063	0.633	6.3	14.9	R	0.15
8	0.98	0.152	0.083	0.235	1.8	15.5	SA	0.13
9	1.02	0.425	0.06	0.485	4.4	9.3	SA	0.01
10	1.56	0.5	0.109	0.609	5.2	6.5	SA	0.44

River Wyre data analysis:

Use the data to draw 2 scatter graphs.

1. Plot distance from source against one other variable e.g. Average depth
2. Plot two variables e.g. Cross Sectional Area and Average velocity
3. Draw a best fit line.
4. For each scatter graph describe your results by answering these questions:
   Is there a positive correlation, negative correlation, or no correlation? If there is a correlation; how strong is it?
5. Are there any anomalies?
6. How do the data sets link together? E.g. Cross sectional Area and velocity

7. Can you use one set of data to explain another?
8. What reasons can you give to explain the results?
9. Why might there be anomalies in the data set?
10. What conclusions could the students reach about the changes along the stretch of river?
11. What other data would they need to collect to reach more valid conclusions?

Handout 4.4 – River data analysis

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GCSE students collected data on a river to investigate changes in the river downstream.

Site	Average width (m)	Average depth (m)	Cross Sectional Area (m)	Wetted perimeter (m)	Average velocity (m/s)	Average Roundness (Powers scale)	Average A axis (cm)	Average B axis (cm)	Average C axis (cm)
1	0.13	0.038	0.168	1.5	0.16	2	19.3	13.4	9.9
2	0.156	0.055	0.211	1.9	0.17	2.3	15.4	8.5	5.8
3	0.12	0.036	0.156	1.3	0.14	2.1	10.8	8.6	3.5
4	0.265	0.106	0.371	2.9	0.21	3.9	10.5	8.6	3.2
5	0.235	0.0982	0.3332	2.6	0.18	3.73	9.8	6.8	3
6	0.271	0.156	0.427	3.3	0.23	4.36	9.4	6.3	2.7
7	0.32	0.135	0.455	3.5	0.2	4.27	11.9	8.5	4.7
8	0.34	0.168	0.508	3.75	0.21	4.45	8.2	4.9	2.5
9	0.39	0.247	0.637	4.3	0.32	4.91	8.1	4.8	2.6
10	0.375	0.165	0.54	3.9	0.24	4.55	8.8	5	2.7

River data analysis:

Use the data to draw 2 scatter graphs.

1. Plot site number against one other variable (e.g. wetted perimeter)
2. Plot two variables e.g. Cross Sectional Area and average velocity
3. Draw a best fit line.
4. For each scatter graph describe your results by answering these questions:

Is there a positive correlation, negative correlation, or no correlation? If there is a correlation; how strong is it?

5. Are there any anomalies?
6. How do the data sets link together? E.g. Cross sectional Area and velocity
7. Can you use one set of data to explain another?
8. What reasons can you give to explain the results?
9. Why might there be anomalies in the data set?
10. What conclusions could the students reach about the changes along the stretch of river?
11. What other data would they need to collect to reach more valid conclusions?

Handout 4.5 – Rural settlements data analysis

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GCSE students investigating the quality of life in rural settlements. They visited 3 settlements in Cumbria and collected data on the services available and the environmental quality in each settlement.

	Settlement		
Service categories	**Mungrisedale**	**Threlkeld**	**Grasmere**
Accommodation	0	6	20
Retail	0	2	46
Professional & Commercial	0	0	15
Recreation & Leisure	2	6	32
Public Services	5	10	20
Transport	1	3	5
Total	**8**	**27**	**138**
Environmental Quality	**Mungrisedale**	**Threlkeld**	**Grasmere**
Paving and Roads	2	3	5
Street furniture	1	1	4
Wirescape	3	3	4
Landscape and Vegetation	5	2	4
Air pollution	5	4	3
Nuisance	4	5	3
Parking	2	3	4
Traffic safety	2	4	3
Vandalism	5	5	3
Litter	5	2	3
Total score	**34**	**32**	**36**

Rural settlements analysis:

1. Produce your own graphs of the data.
2. Describe the pattern shown for each set of data. Use maximum, minimum and mean values.
3. Compare the settlements using the data.
4. Explain the similarities and differences between the data.
5. Are there any anomalies in the data?
6. How do the data sets link with one another?
7. Overall what conclusions can you reach the quality of life in rural Cumbria?
8. What other data would they need to collect to reach more valid conclusions?

Handout 4.6 – Ambleside honeypot data analysis

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Ambleside Environmental Quality Survey, Pedestrian and Traffic Counts

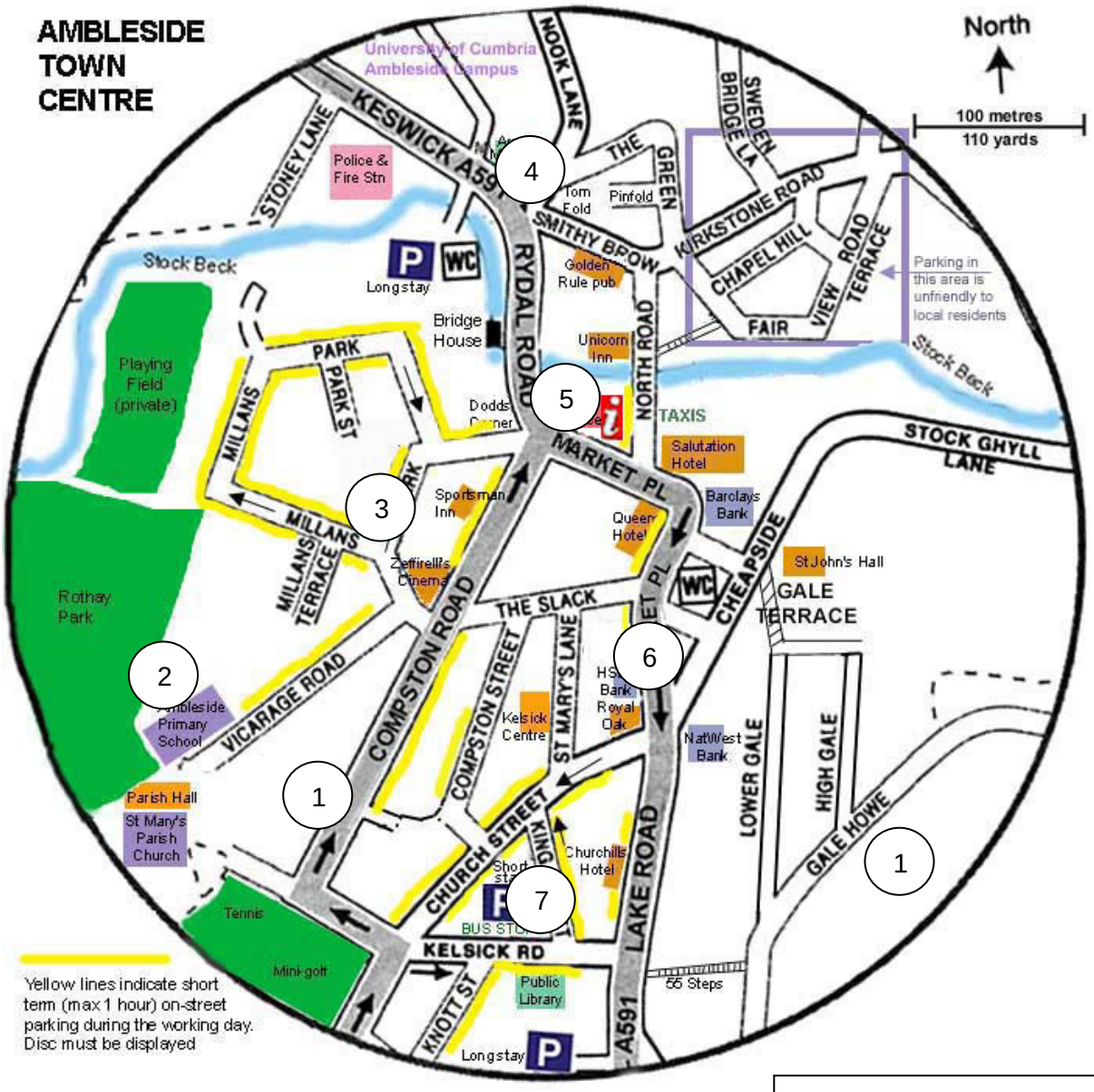
GCSE students visited Ambleside in the Lake District National Park in June to investigate a tourist honeypot.
Their study question was: What are the impacts of tourism on Ambleside.
As part of their fieldwork they collected data on Environmental quality, pedestrian and traffic counts at 7 sites within the village. The locations of the 7 sites are shown on the map.

Ambleside Environmental Quality Survey							
	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7
Environmental Quality							
Traffic Noise	-2	3	-2	-2	0	0	-3
Litter	2	2	1	2	2	1	3
Building attractiveness	3	1	3	3	3	3	3
Maintenance	2	2	2	2	2	3	3
Graffiti	3	3	3	3	3	3	3
Chewing gum	0	1	-2	0	1	-1	0
Noise from pedestrians	1	3	1	2	2	0	2
Scale: negative -3 to positive +3							

Ambleside pedestrian and traffic counts		
	Pedestrian count	Traffic count
Site		
1	42	62
2	10	1
3	52	56
4	29	85
5	53	66
6	80	57
7	45	49

Ambleside data analysis:

1. Produce your own graphs of the data. These could be located on the map.
2. Describe the pattern shown for each set of data. Use maximum, minimum and mean values.
3. How can you explain the pattern shown by each set of data?
4. How do the data sets link with one another?
5. Overall what conclusions can you reach about pedestrian, traffic, and Environmental Quality in Ambleside.



Key

1 **Station Number**