

AN INVESTIGATION INTO A NATURAL MEANDER

Natural Meander Site

Task 1: Channel Profile investigation

Aims:

- To investigate the channel profile of the natural meander

Hypothesis:

- The outside of the bend will have a greater water depth than the inside of the bend.

Equipment:

- Two Ranging Poles
- Tape Measure

Method:

1. Measure the width of the river channel from where the water touches the bank at both sides. The width usually varies between 2.6 – 6.6 metres.
2. Divide this width by 4 or 5 to give equal intervals to measure the depth of the water. Record the intervals on your table distance from the river bank.
3. At each interval use a meter rule to measure the depth of the river.

Results:

River Width _____metres

Distance from bank	Nearside 0m	1 st Interval __m	2 nd Interval __m	3 rd Interval __m	4 th Interval __m	Far side ____m
Water depth	0mm					0mm

Possible limitations with this method: _____

Task 2: Sediment and bed load investigation

Aims













- To compare sediment changes across the width of the river meander
- To compare the sediment load in a natural meander to the load in a straightened section of the river

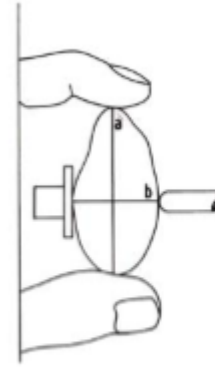
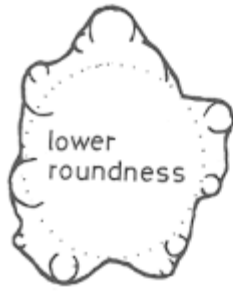
Equipment

- Ruler or callipers
- Roundness or angularity charts/indexes
- Record sheet

Methodology

1. Measure the width of the channel and divide into 3 equal sections.
2. At each section across the channel, reach down with your index finger extended and select the first pebble it touches. This method is to ensure an unbiased sample.
3. Measure the length of the longest axis on this pebble and record on the table
4. Analyse your findings using the roundness index below
5. Repeat this process, 5 times per location, ensuring that the distance from the bank is recorded

Roundness classes	Very Angular	Angular	Sub-angular	Sub-rounded	Rounded	Well Rounded
High Sphericity						
Low Sphericity						



Results: What part of the river channel is being sampled?

Inside / outside meander / middle of channel

	Size: Length	Very Angular	Angular	Sub Angular	Sub rounded	Rounded	Well rounded
1							
2							
3							
4							
5							

Results: What part of the river channel is being sampled?

Inside / outside meander / middle of channel

	Size: Length	Very Angular	Angular	Sub Angular	Sub rounded	Rounded	Well rounded
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Inside / outside meander / middle of channel

	Size: Length	Very Angular	Angular	Sub Angular	Sub rounded	Rounded	Well rounded
1							
2							
3							
4							
5							

Possible limitations with this method: _____

Task 3: River velocity investigation

Aims:

- To compare the velocity (speed) of a river at the outside and inside bend of a meander
- To investigate how the human management of rivers can affect velocity

Hypothesis:

- River velocity will vary across the channel

Equipment:

- Ranging poles
- Floating object e.g. an orange
- Tape measure
- Stop watch

Method:

1. Two students should hold ranging poles 3m apart with a tape measure between them close to the far side of the bank.
2. Gently place a satsuma into the water at 0 m and time how long it takes for satsuma to travel from one ranging pole to the other, record the results on your table.
3. Repeat the measurement 2 more times
4. Repeat step 2 and 3 in the middle of the river and close to the right bank of the river.

Results:

Time in seconds to travel set distance of 3 metres	Inside bend	Middle	Outside bend
1 st repeat			
2 nd repeat			
3 rd repeat			
Average			

Possible limitations with this method: _____

Task 4: Annotate a photograph to show the features of the natural meander section of the river.



Add the following annotations to a suitable place on your photograph

- Faster river velocity
- Slow river velocity
- Outside bend of the river
- Inside bend of the river
- Area of deposition
- Erosion of the river bank by the river
- Natural vegetation growing, good for wildlife
- Add any labels you think may be appropriate

Task 5: Environmental Perception Survey:

- Use this activity to compare your own impressions of the two sections of the river you are visiting.
- Give your own personal score for different aspects - there's no right or wrong answer.
- For each pair of opposite words/phrases, tick the box with the score (1 - 5) which you feel is most appropriate. For example, if there were lots of items of rubbish, you might tick box 2; old mattresses or shopping trolleys, tick 1.
- Remember different types of wildlife e.g. birds, fish like different river conditions. A river that has faster and slower water and vegetation growing will be best for wildlife.

Location: Natural Meander

	1	2	3	4	5	
River here doesn't look natural						River here is natural looking
Unattractive						Attractive
Lots of litter						No litter
Noisy						Quiet
Area feels unfriendly						Area feels friendly
Not good for plants						Good for plants
Not good for wildlife						Good for wildlife
The river here has been greatly changed by people						The river has not been changed by people.

Straightened Site

Task 1: Channel Profile investigation

Aims:

- To investigate the channel profile of the artificially straightened river

Hypothesis:

- The channel profile will not vary significantly across the river width

Equipment:

- Two Ranging Poles
- Tape Measure

Method:

1. Measure the width of the river channel from where the water touches the bank at both sides. The width usually varies between 2.6 – 6.6 metres.
2. Divide this width by 4 or 5 to give equal intervals to measure the depth of the water. Record the intervals on your table distance from the river bank
3. At each interval use a meter rule to measure the depth of the river.

Results:

River Width _____ metres

Distance from bank	Nearside 0m	1 st Interval 1m	2 nd Interval 2m	3 rd Interval 3m	4 th Interval 4m	Far side 5m
Water depth	0mm					0mm

Possible limitations with this method: _____

Task 2: Sediment and bed load investigation

Aims













- To compare sediment changes across the width of the straightened section
- To compare the sediment load in a natural meander to the load in a straightened section of the river

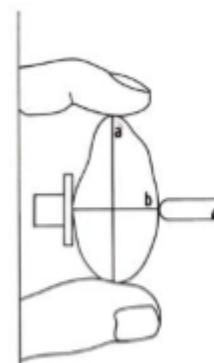
Equipment

- Ruler or callipers
- Roundness or angularity charts/indexes
- Record sheet

Methodology

1. Measure the width of the channel and divide into 3 equal sections.
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Results: What part of the river channel is being sampled?

Inside / outside meander / middle of channel

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Possible limitations with this method: _____

Task 3: River velocity investigation

Aims:

- To compare the velocity (speed) of a river at the outside and inside bend of a meander
- To investigate how the human management of rivers can affect velocity

Hypothesis:

- River velocity will vary across the channel

Equipment:

- Ranging poles
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Method:

5. Two students should hold ranging poles 3m apart with a tape measure between them close to the far side of the bank.
6. Gently place a satsuma into the water at 0 m and time how long it takes for satsuma to travel from one ranging pole to the other, record the results on your table.
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Results:

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Not good for plants						Good for plants
Not good for wildlife						Good for wildlife
The river here has been greatly changed by people						The river has not been changed by people.

Site Comparison

Task 1: Channel Profile investigation

Aims:

- To compare the channel profiles of the natural meander and straightened river

Method:

1. Revisit your results tables for the previous two 'Task 1' channel profile investigations. Use this information to plot a graph in the area below.

