River rother

Environment, Water

We are visiting four different locations, on the 18th September 2009, along The River Rother. It is hoped that these locations will demonstrate the three main courses of a river; Upper Course, Middle Course and Lower course.

The four locations that we will be visiting and carrying out our tests are:

1. Marley Lane, for the upper course (the source)

2. Sedlescombe, for the middle course

3. Bodiam, for the lower middle course

4. Rye Harbour, for the lower course (mouth)

The purpose of the study is to find out if our hypothesis proven correct or not, 'The River Rother includes all the physical features and land use of a typical river.'

Collecting data from each of the location hopefully will prove our hypothesis correct.

The information that we need to collect from the three locations are; the width, depth and speed. To obtain these results we will be using a meter ruler, tape measure, clinometer and a dog biscuit. For some of the results that we are unable to get we will use a secondary source and we will compare our results to the results from text the books. The four locations that have been chosen are ideal for our study because they are close to the school, they show all the three stages of the rivers course and we are able to visit all the locations and get out tests done in one day.

The River Rother, is 35 miles long, is a river flowing through the South East of England and runs though East Sussex and Kent. Its source is near Rotherfield which is in East Sussex, and its mouth is Rye Harbor, which is part of the English Channel.

METHODOLOGY

Width

At a narrow point of the rivers course (Battle and Sedlescombe), we will use a meter ruler to measure the distance from one bank to other. At mid point (Bodiam), we will use a tape measurer crossing via a bridge. At the lower course (Rye), we will either estimate or use a secondary source. The hypothesis we expect to be proven correct that the width does get bigger as you carry on down the rivers course.

Depth

At Battle and Sedlescombe we will measure the river's depth 5cm interval to find out the shape of the river channel. At Bodiam there is a bridge and at every meter we will measure the depth using a tape measure with a weight at the end to hold it down. At Rye we will use a secondary source because the river there is much to deep for us to measure. The hypothesis we expect to be proven correct that the depth does getting deeper as you carry on down the rivers course.

Speed of River

The method for collecting the speed of the river will be the same at all for locations. We will measure ten meter along the side of the river, drop a dog biscuit in at zero on the stopwatch, and time it to see how long it takes to get to the end of the ten meters. The hypothesis we expect to be proven correct that the speed does increase as you carry on down the rivers course.

Photographs

We will be taking photos as we walk round to show the type of land use that is there and the landscape to see if it is the same as a typical landscape. The landscape showed to be the same as a typical rivers landscape. The hypothesis we expect to be proven correct.

Field Sketches

We will be noting down features/land uses of the land as we walk around so we can later on make a Field Sketch, really get an idea of the land use in the area, and see if it is like a typical river lay out. The hypothesis we expect to be proven correct; the landscape forms a more U shape as you carry on down the rivers course.

Observations

As we are walking round, we will be noting down the land uses.

Valley/Slope Profile

In pairs, we will measure the valley sides and floor at the river and will measure the distance it is between each other gradient of slope and

measure the angle using a Clinometer. In pairs we will stand at the top of the valley sides. The first person will pace out until the slope changes angle, we will note this and the person at the top of the slope will note down the reading of the angle change with the Clinometer. The second person will meet the first person and the will repeat this, until the other side of the valley. The hypothesis we expect to be proven correct that the valley does make a 'V' shape and closer you get to the mouth the 'V' shape turns into a 'U' shape.

River Profile

We will take the width measurement and depth measurement and create a cross section of the river for each location.

Land Use Survey

We will have an OS map of each location and use the keys to note down the land use. We will colour in the the land uses in different colour and after wards use a Ten by Ten grid (squared) and count up the number of square for each one and calculate the percentage out of a hundred for each one. We will then out this into a pie chart to show the percentages. The hypothesis we expect to be proven wrong for the land use to be the same as a typical river's land use.

WHAT I EXPECT TO FIND

Upper Course (Battle, Marley Lane)

At this stage of the river it should be every slow and narrow and shallow. There should be many obstructions in the way of the river. It is because of all these obstructions that the river is flowing slowly. There will be steep valley sides a, 'V', shaped valley and several waterfalls. There should be interlocking spurs. The land use should be over run by Pastoral Farmland and Woodland, Settlement. The volume should be small due to the large amount of obstructions and the shape of the valley which is due to the Interlocking Spurs (hard rock).

Middle Course (Sedlescombe)

The river should be wider than the upper course. The valley flor should be wider, faster flowing water and the volume should increase due to the change in the channel's shape. The valley shape should start to change more like a 'U' shape. Pastoral Farmland and Woodland will dominate the land use.

Lower Middle Course (Bodiam)

The river has already started to widen so at this stage it is becoming even wider and the valley into a more pronounced 'U' shape.

From this the river is much large and deeper and volume is larger. The river should now be flowing much faster because there are very little obstructions in the way. Pastoral and Arable Farmland should dominate the land use.

Lower Course (Rye)

This stage should have the largest depth of the whole river because it is a deep 'U' shape and the width is very wide. The speed as increased to its top

speed because there is no obstructions in the way now and if there is every few. The main feature that should be found here is the mouth of the river that leads out to the Ocean. The flood plain is very large and the land use is all mainly Slat Marsh Land and Mud Flats so it unused and there is Industry.

DATA ANALYSIS / INTERPRETATION

Width

The data that is being shown is the width of Battle, Sedlescombe, Bodiam and Rye. Rye had the largest width in between each bank leaving Battle the smallest.

Ryes width was 2500cm; Bodiam had 1240cm, Sedlescombe 134cm and Battle 50cm.

Rye has the largest width between each bank, this is because Rye is the lower course of the river and has no obstructions in the rivers path so it is the fastest flowing and erodes the banks faster. It is also the location where the mouth of the river, where it enters the sea. However, we did have to get this from a secondary source.

Battle has the smallest width; this is because it is located in the upper course and the speed of the river here is at its slowest and is unable to erode the banks as freely as the lower course.

The erosion found in the upper course is Vertical Erosion this is why in the upper course the river is shaped as a 'V'.

The most common type of erosion found in the middle course of the river is Lateral Erosion, which is why the river gets wider as you carry on further on down the river.

The textbook theory from the textbook that the river gets bigger, in lateral erosion and vertical erosion, as you get near to the mouth of the river.

Our hypothesis is proven correct for the width does act like a typical river.

DATA ANALYSIS/INTERPRETATION

Depth

The data that shows the depth of Battle, Sedlescombe, Bodiam and Rye. From the upper course to the mouth the rivers depth got larger. Starting with Battle, which had the smallest depth of, only had 37cm, Sedlescombe with 50cm, Bodiam 97cm and Rye with the largest out of them with 400cm.

The data for Battle may have been altered due to the heavy rain on the day, which may have caused erosion. However, previously very dry weather had led to low volume of water.

The depth at Rye we have had to get from a secondary source due to the difficult fact that we are unable to measure.

From the data, it shows very clearly that the rivers depth does increase as it goes along. This is due to the transportation of more water and material, which erodes vertically, this, is the act of it eroding downwards and laterally, which of it eroding across.

The theory from the textbook agrees with our hypothesis and what we have found, the river does get bigger in lateral erosion and vertical erosion, as you draw nearer to the month of the river.

DATA ANALYSIS/INTERPRETATION

Speed

The data shows that the River Rother picks up speed from Battle (Source) to Rye (Mouth).

The speed of Battle was the slowest with 0. 03m/ps, Sedlescombe 0. 52m/ps, Bodiam 0. 98m/ps and Rye with the fastest 1. 72m/ps.

The change in the speed is very noticeable when the river gets to Bodiam (lower middle course) the speed increases by 1. 69m/ps. This is because this is the point of confluence (were two rivers meet). Battle and Sedlescombe are the tributary river from the River Brede, when a tributary river meet the speed and volume of the river increases. Because the volume increases that means there is more water in the river and from that there less obstructions in the way, so the river speed goes much faster.

The theory from the textbook agrees with our hypothesis and what we have found, the river does get fast as you draw nearer to the mouth of the river.

DATA ANALYSIS/INTERPRETATION

Valley Profiles

The valley at Battle is quite deep at the sides and not very deep in the middle. The shape is shaped like a 'U' but this maybe be because of the bridge that goes over the top of the river. Battle has a small valley that had been enlarged by the bridge. Therefore, this affected our results slightly but the valley was meant to be 'V' shaped.

Sedlescombe is a lot flatter than Battle and it is wider. But we where only able to measure one side of the valley, so our interpretation is an estimate due to privet land but it still has the typical shape of a 'U' which is what we expected to find.

Bodiam has a very wide valley floor and the valley slopes where at an angle making a rough 'U' shape like a typical river at this stage.

Rye, we where unable to measure because the valley floor was too large. However, this is what we expected to find because it is the last stage of the river, the mouth.

The theory from the textbooks is that the valley goes from a 'V' shape valley to a 'U' shape valley. This is due to hard rock being in the upper course of the river and because the high lands are mainly rock it is harder for the river to erode the away at the banks so it's a narrow shape forming a 'V' shape but the river winds around the hard rock a pattern like a snake.

As you carry on down the river the hard rock starts to get erode so what is left are interlocking spurs, these also erode over time crating a wider valley floor crating a 'U'shape. The hypothesis is proven correct for the Valley Profile.

How do I add the figures?

DATA ANALYSIS/INTERPRETATION

River Profiles

The width for the three locations is as followed from smallest to the largest; Battle 55cm, Sedlescombe 130cm and Bodiam with 1200cm. Bodiam had the largest depth also with 150cm. This was we expected to find because it is in the middle lower course But this is possible to wrong because in the river were we measured there are pillars to hold the bridge up. So while measuring we may have measured off one of those by accident.

In Sedlescombe the deepest point was 53cm which isn't very deep but this is also expected because it is the upper lower course. The depth is possible to change here too though but only due to lateral erosion.

In Battle we expected a shallow depth and we got a shallow depth with 5. 5cm.

When we took measurements of the river at the different points we put this information into a graph, the graph showed us the shape of the river at each location; Bodiam had long steep vertical banks and the river bed was flat with a few bumps and then back up forming an almost 'U' shape.

Sedlescombe was more of a 'V' shape, the banks both went down at different angles to each other and the river bed had a lot more bumps. The two banks are at different angles this would be due to Lateral Erosion (which is erosion

at outside of the bend) which is common in the middle course to form such features like Ox Bow Lakes.

Battle was very shallow and lots of bumps along the bed and is hard to tell if it looked like a V shape.

After comparing our graphs to a typical river to see if our hypothesis proven correct or not, 'The River Rother includes all the physical features and land use of a typical river.' It is proven that it does act like a typical river when it is compared.

Evaluation - Conclusion

From all our data that we have collected proves our hypothesis, 'The River Rother includes all the physical features and land use of a typical river.' Our hypothesis has got most typical physical features and land use of a normal typical river.

For example;

Width, the width of the river proved our hypothesis correct that the river does get bigger, in lateral erosion as you get near to the mouth of the river.

Depth, the depth of the river proved our hypothesis correct that the river does get bigger, though vertical erosion, as you get near to the mouth of the river.

Speed, the speed of the river proved our hypothesis correct that the river does get faster as you get nearer the mouth of the river.

River Profile, the river profile went clearly from a V shape to a U as you carried on down the river nearer to the mouth.

Vertical Erosion and Lateral Erosion cause this.

Valley Profile, the valley profile also went clearly from a V shape to a U shape as you got nearer to the mouth of the river.

So from our data our hypothesis is proven correct. However they are some parts of our data that does not agree with the typical river physical features.

Like for example;

Land Use, the land use around the four locations was proven to be wrong because at each location the land use was predicted different to what we found to really be their.

Land Use, In Battle it was predicted we would find Hill Sheep Farming due to the steep land and large areas. But we found was Arable Farming mainly and lots of Settlement.

Sedlescombe it was predicted we would find Arable Farming and Settlement. What we found was correct for this location.

Bodiam was predicted that we would find it dominated by Arable Farming which is correct.

Rye was expected us to find mainly Marsh Land and some Industry. What we found was mainly Marsh Land but also a lot of Industry and Lines ofCommunication.

With that being the only thing that proves our hypothesis wrong against the several other facts that proves our hypothesis correct, The River Rother does includes all the physical features and land use of a typical river.

Photoand Filed sketches

Evaluation - Limitation

After getting all of my results I am happy with what I ended up with because a large amount of the data agrees with our hypothesis, 'The River Rother includes all the physical features and land use of a typical river.'

The land use is the only thing that went against our hypothesis but two of the locations were a tributary from the River Rother.

And because Rye is such a large river we are unable to carry out our tests on it because we don't have the resources so we have to get all the results from a secondary source, which could be either out of date or a bad estimate.

All the data we collected could be improved for example;

The measuring of the speed, instead of using a Dog Biscuit and counting till it got to a certain spot. We could have used a Flow Meter. We were only able to do the Dog biscuit test once because we only had one Dog Biscuit for each location and it kept getting caught on debris in the river; sticks, rocks, trees and other debris. In Sedlescombe there were too many trees to get an accurate result the dog biscuit kept getting caught so we had to use several leafs to get our results. If we had a Flow Meter the test would have been much easier to carry out and a lot more reliable.

Measuring the depth in all three locations can change and be inaccurate, due to the amount of water volume at the time of the measurement. And for the fourth locations, Rye, we had to use a secondary source which could be wrong and out of date. Bodiam we could only measure one side, the other is an estimate so that can be wrong affect the results of the data. Also the pillars in the river that hold up the bridge, it is possible that we could have been measuring off one of those for our depth.

Sedlescombe's results were as good as we could get them. There was no interference other than the rocks in the water but they are natural so it's possible. In Battle it was very easy to measure because at Battle the river was very shallow. So if there was any interference we could just easily move it out the way. The way that we could have improved measuring the depth would be getting a boat and sailing to the middle of the river and dropping a weight with a tap measure and making sure we don't get any pillars.

Finding the width of the river valley could all be wrong because in Rye we had to use a secondary source, in Bodiam we were only able to measure one side of the river valley due to what looked like privet land and us having to estimate what the other side, and finally Battle and Sedlescombe are both a tributary from the River Brede, so this could be a problem to our results because were meant to be collecting results from the River Rother and not the River Brede. The way we can improve all of this is by having different up to date sources and up to date equipment and measure more than once and take an average.

For Sedlescombe how we measured the width was measuring across the bridge rather than measuring the river its self which means the bridge was probably wider than the river so this is a problem that can affect our results. The way we could have done this better is by getting two people down on either side of the river and measuring the length with a tape measure as close as we can. Battle is small enough to easily enough to have trustworthy measurements.

The Valley Profile could have been improved a lot more by actually counting and measuring out our own individual steps instead of making all our steps the same with the same distance between each one. These problems could have easily been solved with a Meter Counter, counting our distance and adding up the distance we travelled accurately and correctly. And once we are back in the class room working out our meters into our own steps. This would have improved our data.

Measuring the shape of the land with the clinometers wasn't perfect because not everyone was the same high as their partner so the accuracy was off at that point as well as the clinometers steaming up from the temperature made it hard to read the angles.

The day that we went to the four different locations to do our test to get our results wasn't the best of days. The weeks before where hot and sunny causing evaporation, less water. Then the day and night before our trip it rained causing erosion and prevented us from doing most of the tests we needed to do correctly. It wasn't a good temperature either causing the clinometers to steam up and unable to read the angles accurately enough for

a good result. The rain also ruined my own paper with my results on it making me have to get other results that could be wrong. And people rushing the test because it would start to rain again made it possible that we skipped something important and get the wrong results.

Our hypothesis, 'The River Rother includes all the physical features and land use of a typical river.' can be inaccurate because it isn't being very clear to what kind of river it wants us to test for, 'a typical river' is there such thing? All rivers are going to be different whether its due to what part of a country they are in or the size of the river or even how much rain the river gets. But I think the main problem that makes our hypothesis inaccurate is not noting what country this typical river is from. A river in Africa is going to be different to a river in England because of the amount of rain fall, less rain less water in the river to clear the obstructions causing the river to have a smaller volume and slower speed.

The land use would be completely different too; most of Africa is a LEDC (Less Economically Developed Country) so there wouldn't be a large amount of Settlement and Industry around the mouth of the river. The weather conditions affect the comparisons too, for example; if there is a heat wave the river will lose a lot of water causing speed to slow and volume to drop, depth and width would change too.

In England we usually expect rain so the rivers volume, speed, depth and width would all increase.

The hypothesis should change to a more clearer, 'The River Rother includes all the physical features and land use of a typical river in England'. Or something similar that is more targeted on a specific river.