# IGCSE & IB DP Geography Rivers Investigation – Methodology

| Occupied Channel Width (metres) |
|---|
| Using a tape measure, hold one end at the point where the water meets the bank on the right side of the channel. Ensure the tape is not twisted pull the tape measure across the river and measure to the point where the water meets the bank directly opposite. **Only measure the width of the body of the where the water is.** See below.<br><br>**Why measure it?**<br><br>**Measuring the width of the river channel enables you to calculate the cross-sectional area. Also, according to the Bradshaw Model, channel width increases downstream.** |


| Bankfull Channel Width (metres) |
|---|
| Using a tape measure, hold one end at the point where the bank starts on the right side of the channel. Ensure the tape is not twisted pull the tape measure across the river and measure to the point of the bank directly opposite. **Measure the whole width of the river channel, even if it is not completely filled with water.** See below. |

| Wetted Perimeter (metres) |
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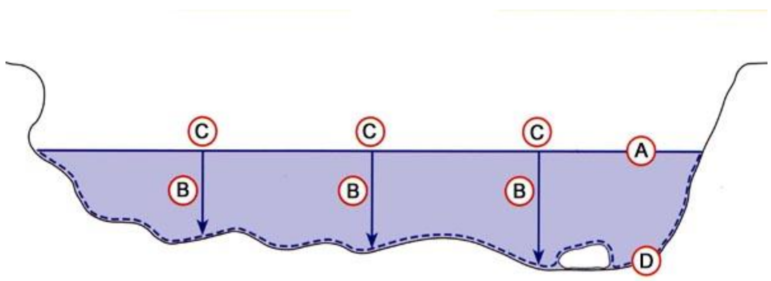
| What is the wetted perimeter? The wetted perimeter is the entire length of the bed and riverbank (sides) in contact with water.<br><br>Use the chain, lay it from the starting point on the right bank of the occupied channel width, and along the bed until it reaches the point where the water ends on the left bank. Mark the link with your finger and then pull the chain out and measure the total length against the tape measure. Note: The wetted perimeter should be a greater length than the occupied channel width. If it isn't, there's a problem!<br><br>**Why measure it?**<br><br>**According to the Bradshaw Model, the wetted perimeter of a river should increase along its course.** |




| River Depth (metres) |
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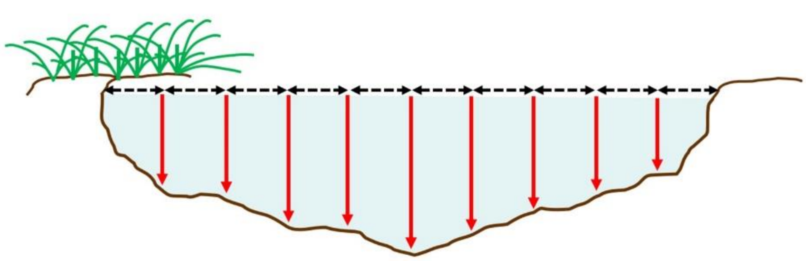
| **What is river depth?**<br><br>River depth is how deep a river is. Depth changes across a river channel due to material on the river bed. Rivers can be deeper on the outside of a bend than on the inside of a bend.<br><br>**How do you measure it?**<br><br>Divide the total occupied channel width by 10. e.g. a 4.5-metre channel would have 10 x intervals of 45 cms. Start at the 0cm point and use the plastic meter ruler to measure the depth **in metres**. If it's 25cm deep, you need to shout out 0.25 metres to your recorder. The ruler should be the right way up and the bottom of it should be touching the riverbed. Measure this depth at each of the 10 intervals across the river.<br><br>**Why measure it?**<br><br>**To calculate the cross-sectional area you will need to know the mean depth. According to the Bradshaw Model depth increases from the source to the mouth of a river.** |



## Bedload Size (CM but need to transfer to metres once back in the classroom).

The aim of this is to measure the size and shape of a sample of stones from each site visited in the river.

How do you measure it?

At each site along the river move across the river and select 10 different stones found on the river bed on the same 10 point interval as the depth method above.

You should use a random method of collection – put the metre ruler into the water and pick up whatever stone it is touching. Use the callipers to measure the long axes of each stone (the longest two points on the stone) – this should be recorded in cm but we must transform this into metres once back in the classroom. ****Make sure the calipers are set to cm and not inches****

**Why measure it?**

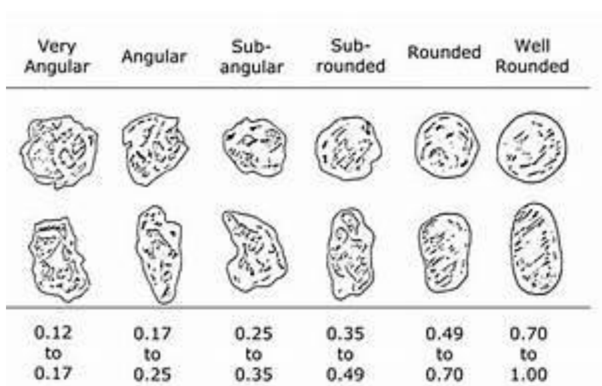
**Load particle size decreases along the long profile of a river.**

## Bedload Shape

Do this at the same time as the test above. For each pebble that you pick up, compare its shape to the sphericity index sheet. Once you have decided on the category, decide on a score within the parameters of that category.

**Why measure it?**

**Bedload becomes less angular along the course of a river.**



| Velocity |
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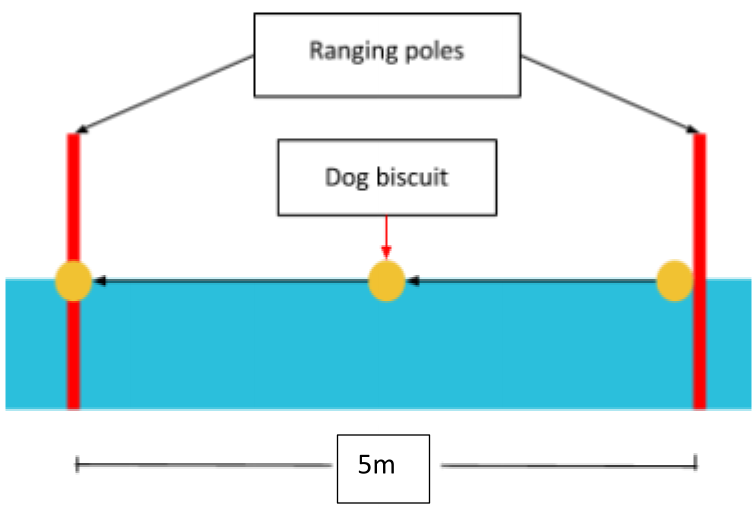
| What is the velocity of a river?<br><br>The velocity of a river is the speed the water flows. The velocity will change along the course of a river.<br><br>How do you measure it?<br><br>You will take measurements in the field using a dog biscuit, stopwatch and tape measure. Once you have recorded the appropriate data you can use the formula below to calculate the velocity.<br><br>**Velocity = Distance / Time**<br><br>To gather your data you need to measure a distance of 5 metres downstream. One person with a ranging pole should stand at the top and another person with a ranging pole should stand at the 5m mark. Place your float in the water upstream at 0m. Record the time it takes for the float to travel 5m. Repeat this three times and calculate the mean. Next, use the above formula to calculate the velocity.<br><br>**Why measure it?**<br><br>**According to the Bradshaw Model velocity increases from source to mouth.** |



| Gradient of River - Degrees |
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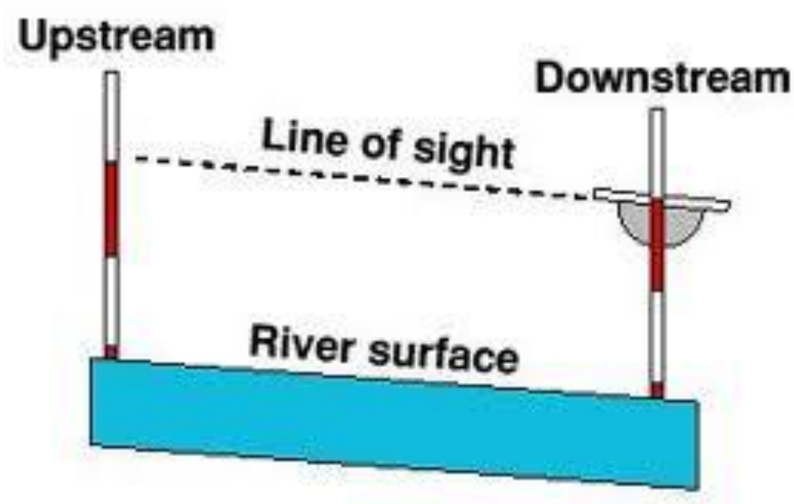
| Using the same two positions as the velocity measurements above. Use the clinometer to work out the gradient of the river channel. Make sure you are stood in a central area of the channel and the person measuring should be facing downstream.<br><br>**Why measure it?**<br><br>**According to the Bradshaw Model gradient decreases from the source to the mouth.** |




| Calculations for back in class – River Discharge |
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| What is the discharge of a river?<br><br>The discharge of a river is the volume of water flowing through a river channel. It is usually measured in cubic metres per second.<br><br>How do you measure it?<br><br>It is not possible to measure river discharge directly in the field. Instead, you need to take measurements that allow you to calculate discharge.<br><br>Discharge(m3/s) = Cross sectional area(m2) × Velocity (m/s)<br>Cross sectional area (m2) = Width(m) × Mean depth(m)<br><br>In order to calculate Discharge we must measure Width, Depth and Velocity.<br><br>**Why measure it?**<br><br>**According to the Bradshaw model as you move downstream river discharge should increase. This is because tributaries will feed the river leading to an increase in discharge.** |

## Bradshaw Model – Rivers