

River Study

Links to Syllabus

- Core Unit 3
 - Skills
 - Geographical Investigation
- Core Unit 2
 - 1.5 Fluvial processes
 - 1.6 Fluvial adjustment

Skills

- Mapping
- Photographs
- Sketching
- Statistical analysis
- Data collection
- Report planning
- Analysis of results
- Evaluation

Aims

- River Valley
 - to identify river features
 - to construct a cross profile of the valley
- River Channel
 - to calculate the discharge
 - to determine the efficiency of the channel
 - to see whether the channel is meandering
- River Load
 - to determine the average grain size of the bedload
 - to determine the roundness of the bedload grains

Possible Hypotheses to Test

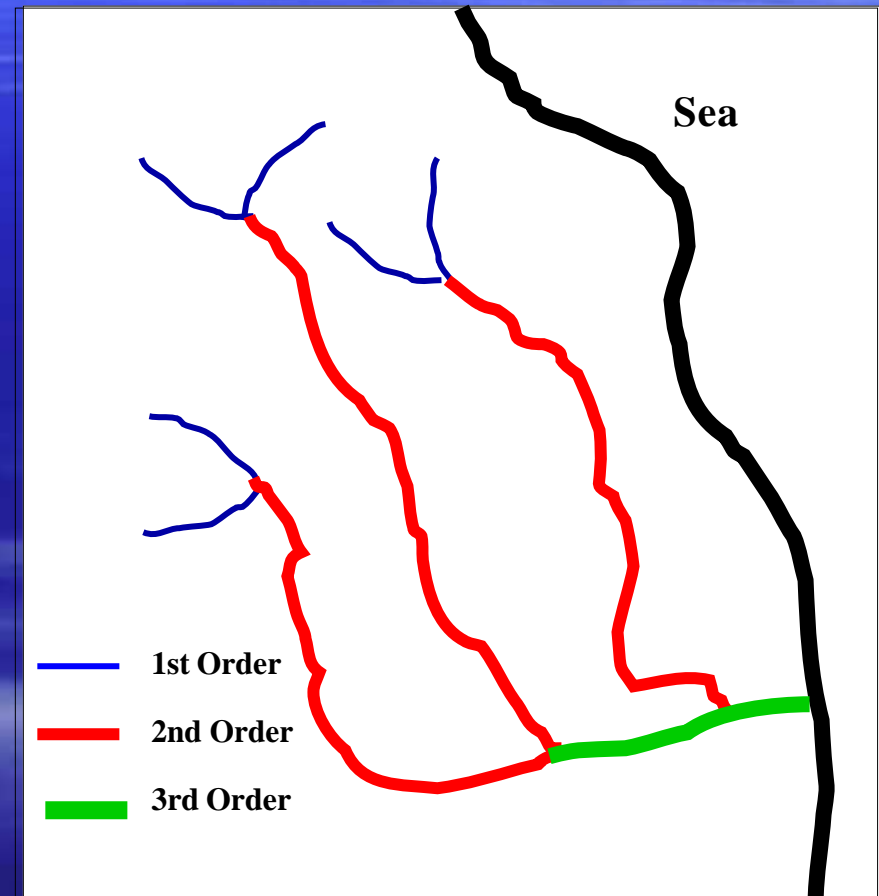
- River Valley
 - river valleys change along their courses
 - features of river erosion occur in upland areas only
- River Channel
 - river channels become more efficient downstream
 - discharge varies with stream order
 - meandering increases downstream
- River Load
 - river bedload grains become smaller and more rounded downstream

Planning

- Choosing a suitable location
 - accessible from school
 - access approved if on private land
 - safety
 - for comparative studies order the stream network

Ordering a River Network

- Trace out river network from an OS map
- Order the streams as follows:
 - 1st order streams have no tributaries
 - Two 1st order streams joining up make a 2nd order stream
 - Two 2nd order streams joining up form a third order stream and so on



Collection Methods

- Field sketching/photography
- Do a slope transect to be able to draw a cross-profile of the valley
- Measure width, depth and speed to determine discharge
- Measure the wetted perimeter to calculate the efficiency of the channel
- Measure the straight and curved distances to determine if the river is meandering

Collection Methods

- Randomly select grains from the river bed using a pebbleometer
- Measure the axes of the grains using a pebbleometer

Equipment Needed

- Viewfinder
- A measuring tape
- Metre sticks
- Ranging poles
- Clinometer - Abney Level - Pantometer
- Quadrat
- Pebbleometer
- Surveyor's chain

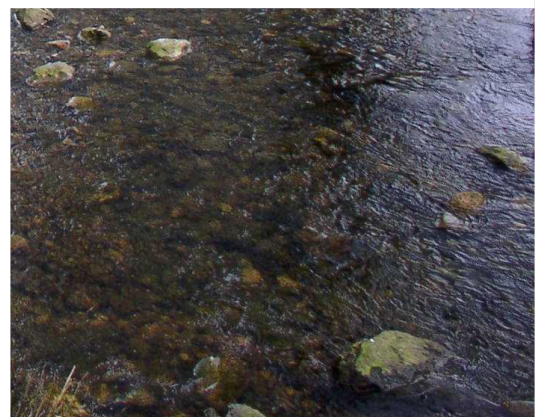
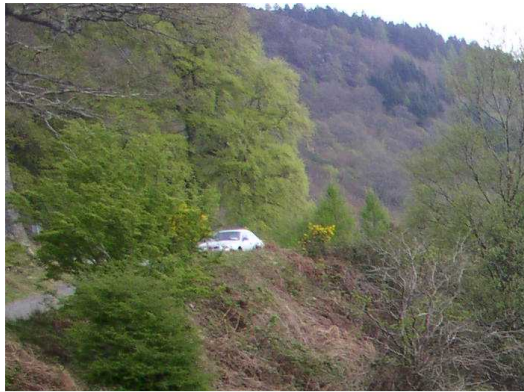
Fieldsketching

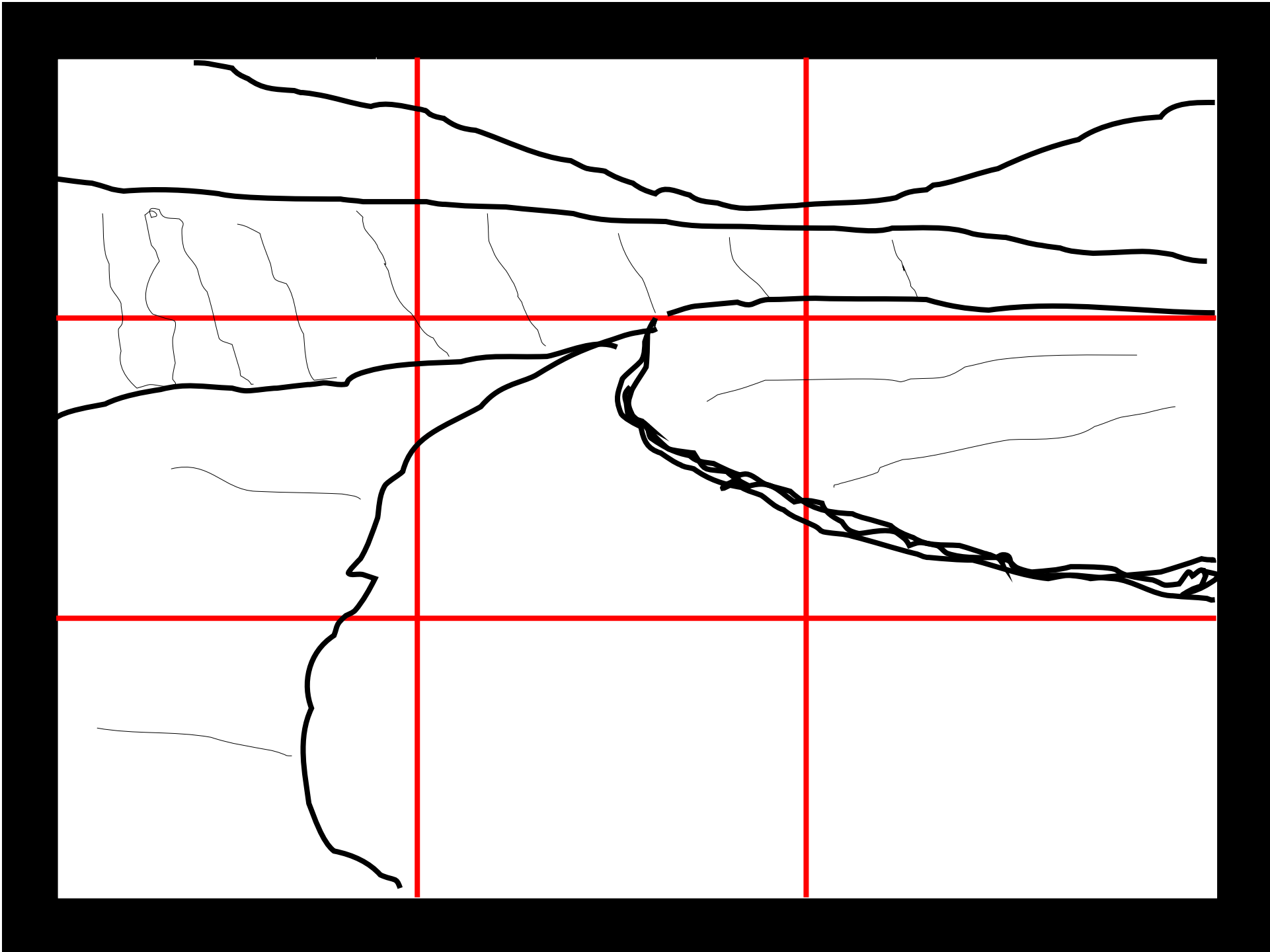
- Select a position which gives a good view of the study site
- Observe the site carefully
- Identify river features
- Use a viewfinder to help draw a field sketch
- Annotate the sketch

Fieldsketching







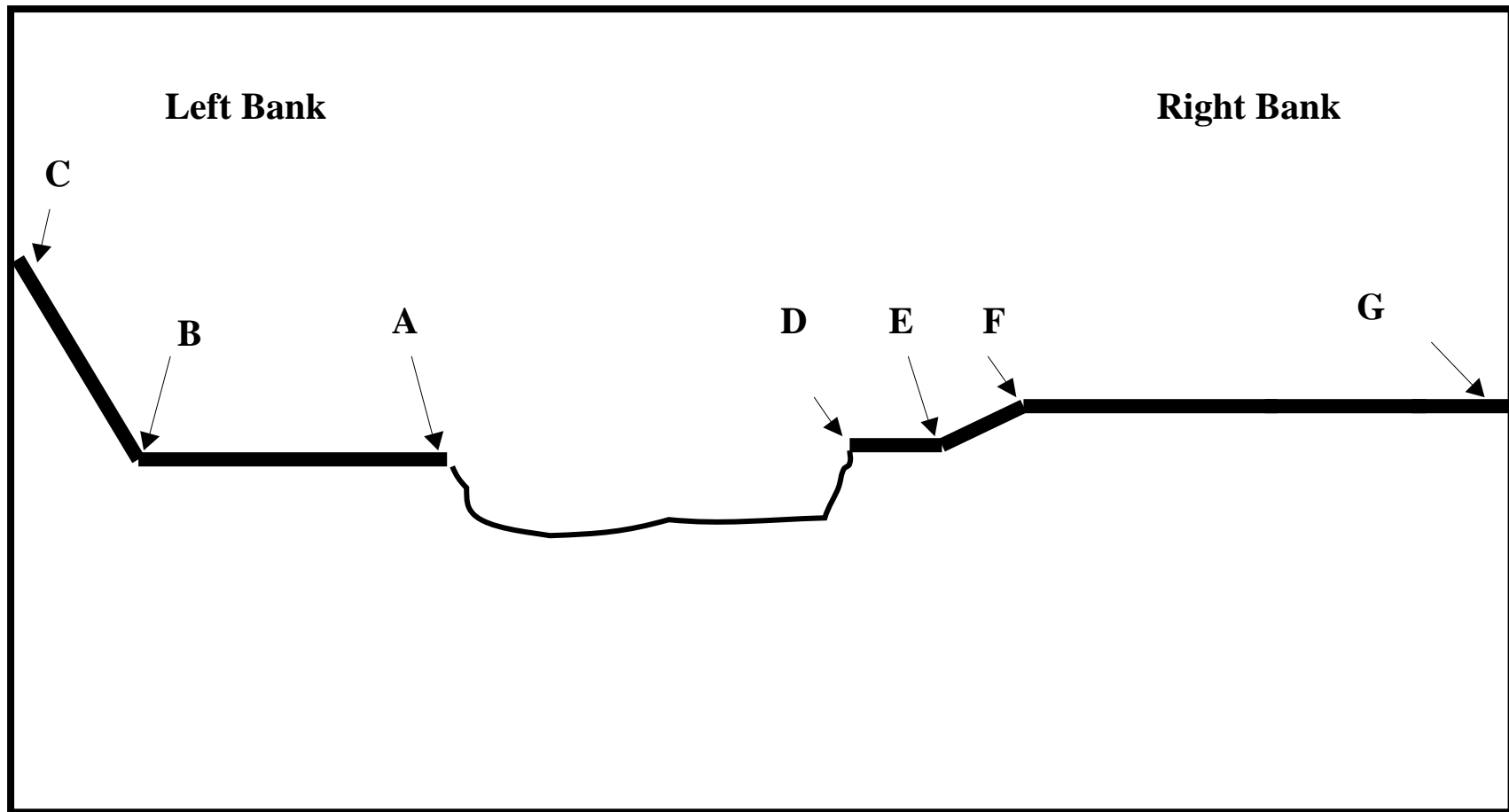


Valley Transect

- Observe the valley carefully
- Identify the break of slope points
- Mark the breaks of slope with students of equal height or ranging poles
- Draw a sketch of the slope sections
- Measure the angle of slope and the length of each of the sections of slope
- Record these on your record sheet

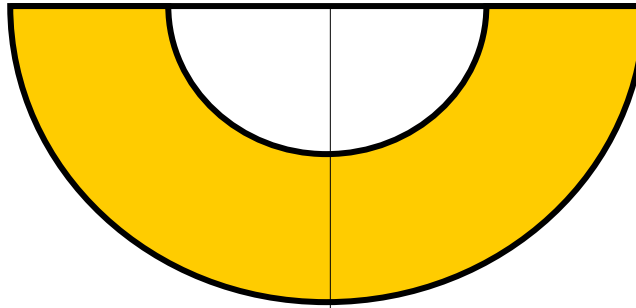


Sketch of Slopes

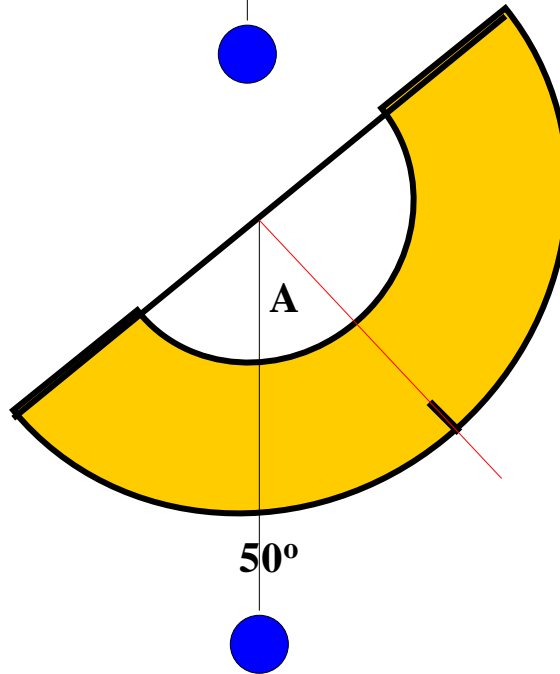


Clinometer

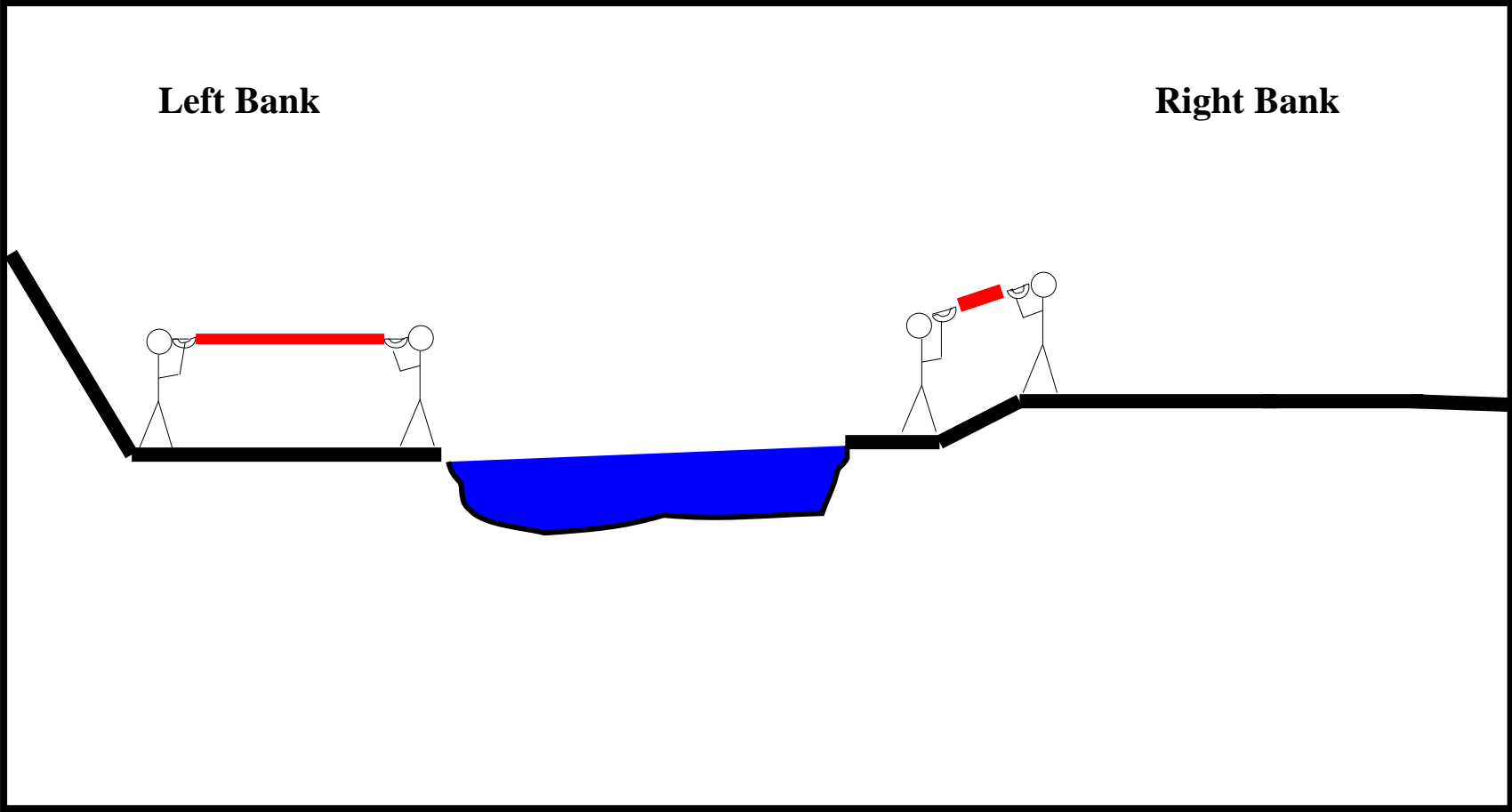
Zero degrees



Forty degrees



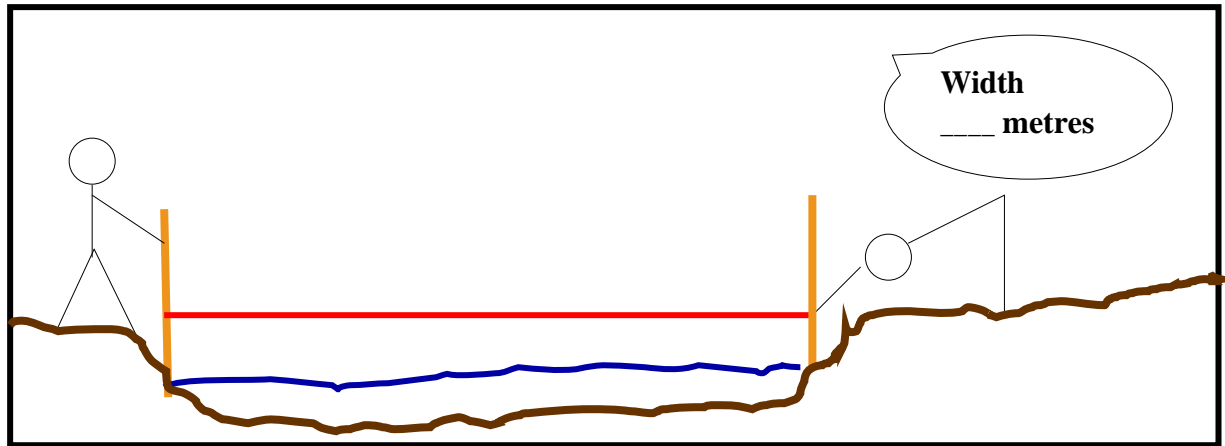
Angle A equals
 90° minus 50°



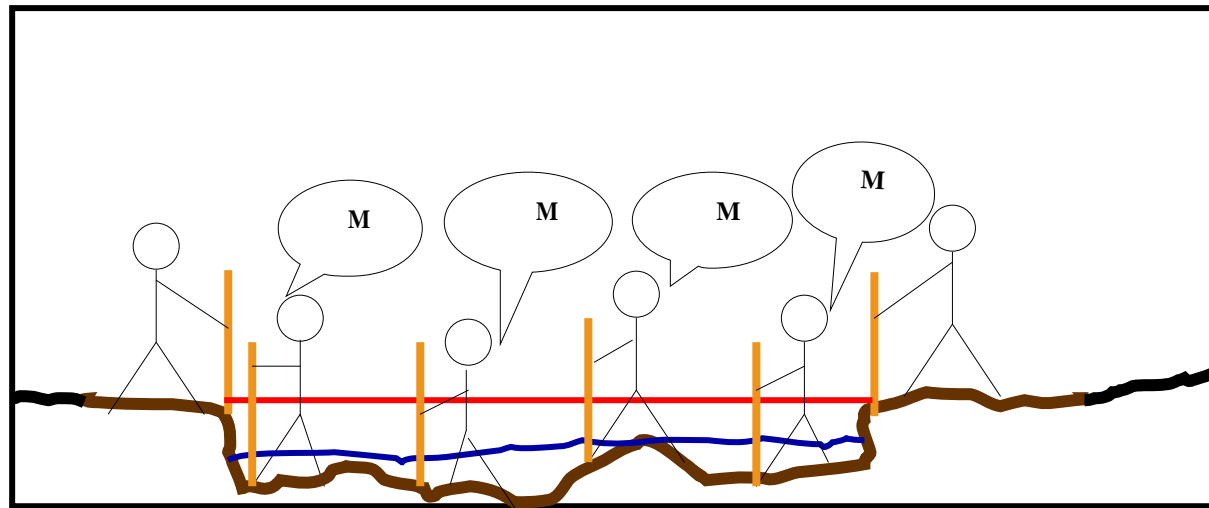
Measuring Discharge

- To calculate discharge of a river you need the following information:
 - the width
 - the average depth
 - the distance the river travels in a second
- The above measurements should all be in metres

Width

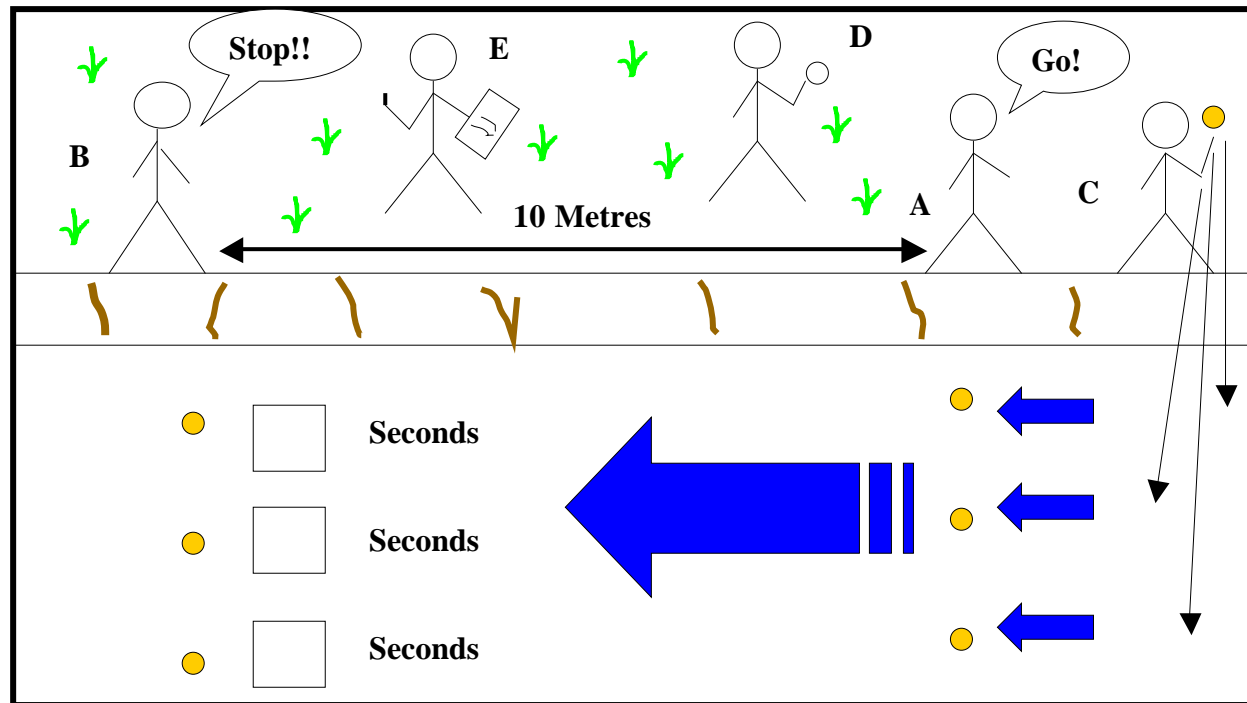


Depth



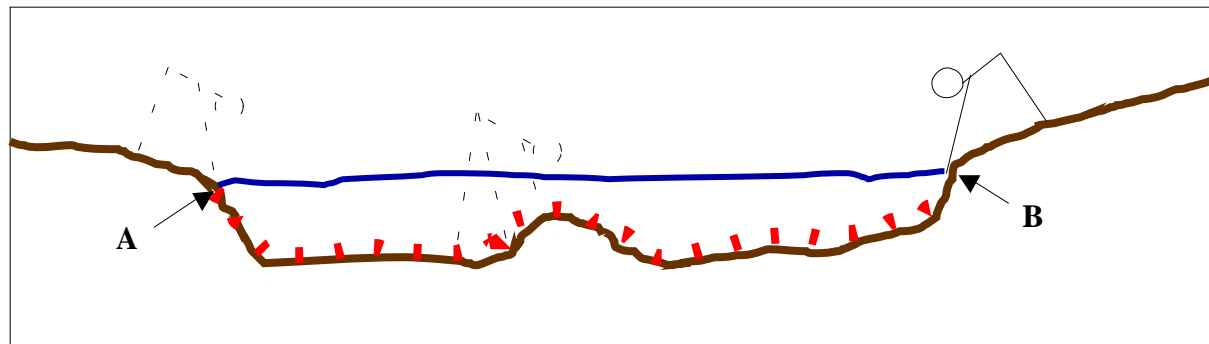
Speed

C throws oranges - A shouts 'go' - D starts watch
B shouts stop - E records time



Channel Efficiency

- Place the chain along the bed of the river from A to B
- Make sure the chain covers all the ups and downs of the bed
- Take the chain out of the river
- Lay the chain out in a straight line
- Measure the length of chain with a measuring tape
- This is the wetted perimeter



Chain 

Sinuosity

- Identify where the direction of the curve changes
- Mark these points with ranging poles

or

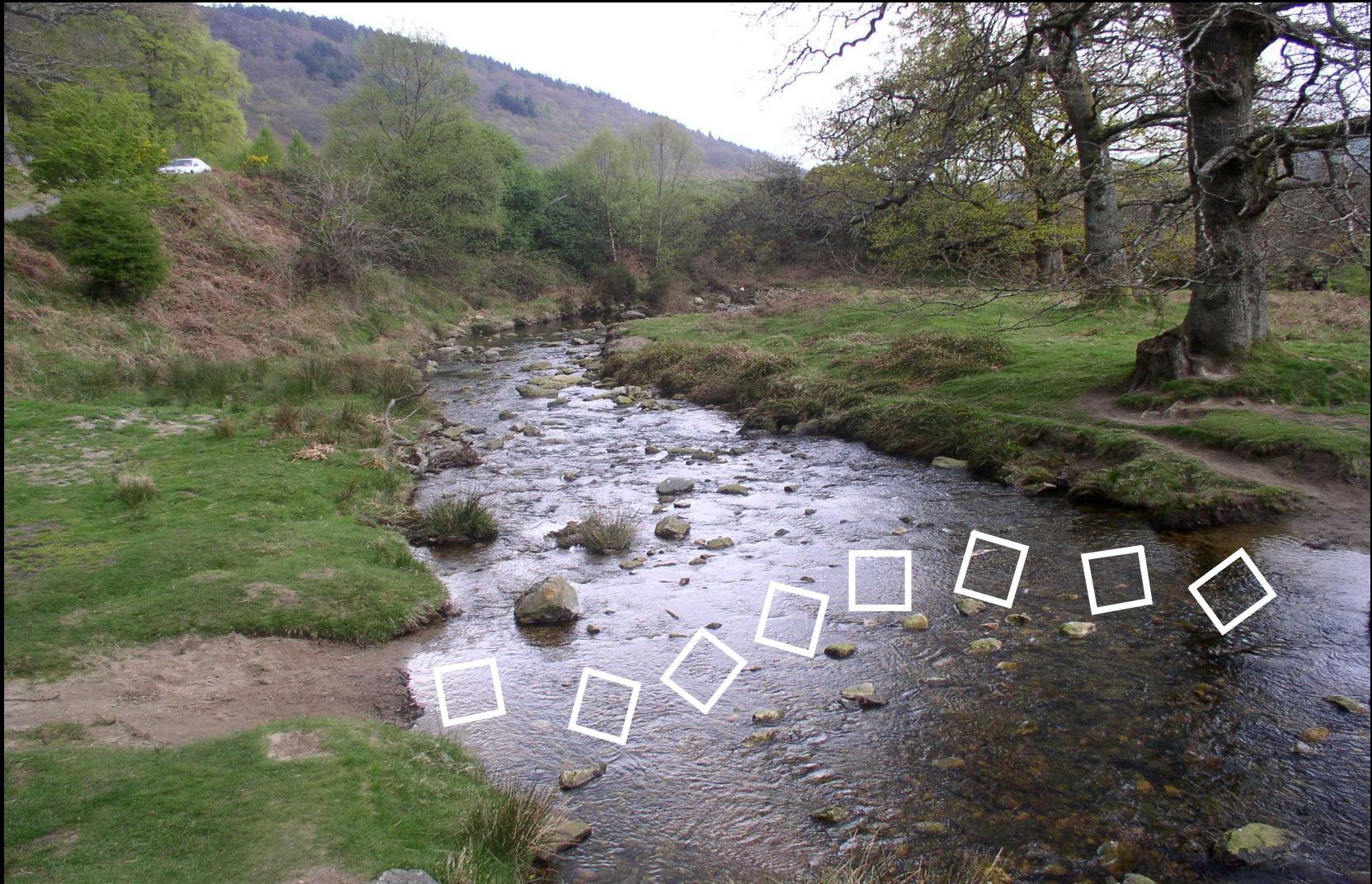
Get 2 students to stand at the points to mark them

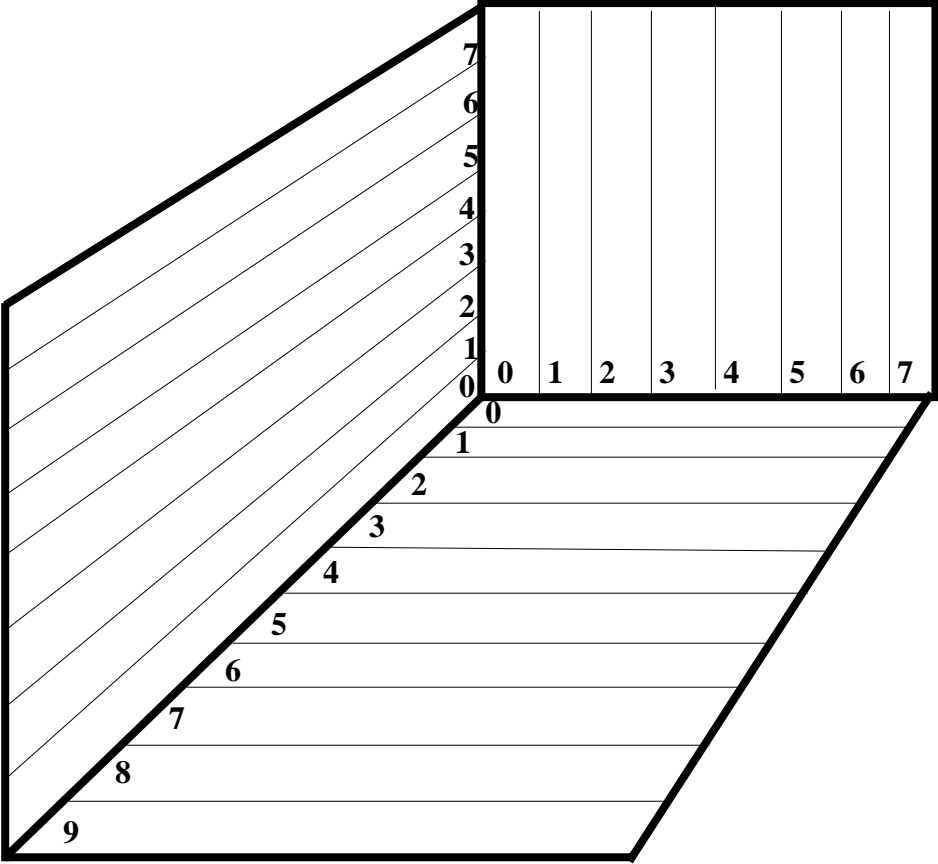
- Measure the straight line distance between the points
- Measure the curved distance between the points
- Measurements can be paced where the curves are large

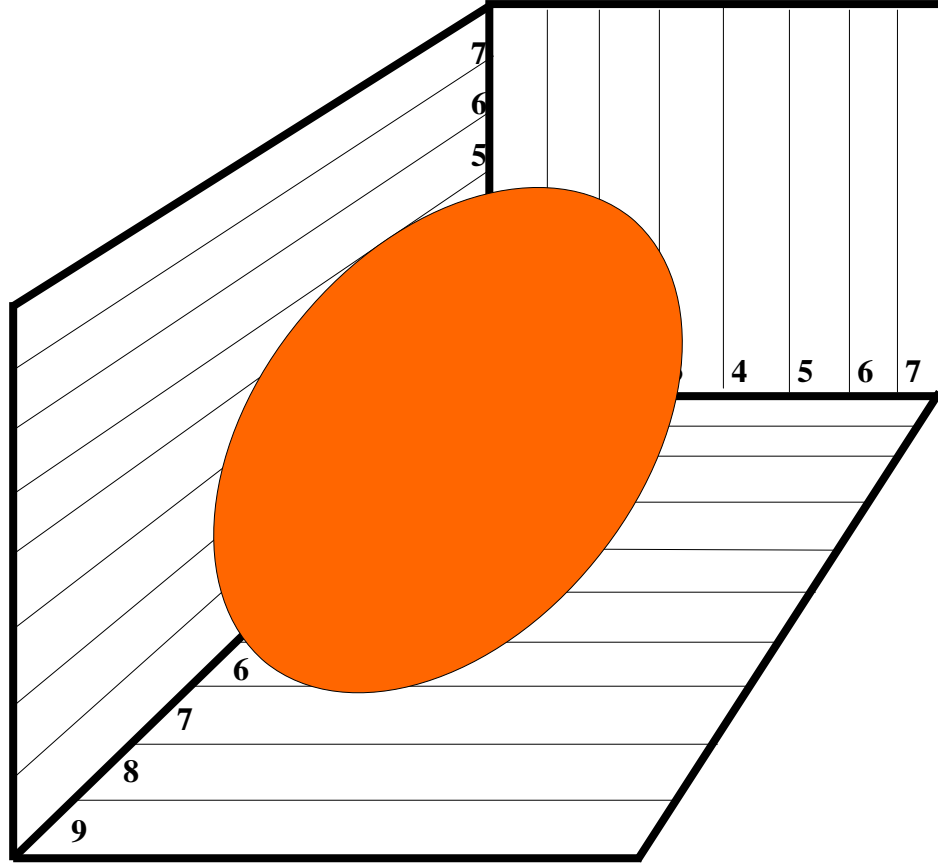


Load Analysis

- Wade into the river
- Throw a quadrat randomly onto the bed
- Lift the grains which touch the corners of the quadrat
- Bring them to the bank
- Measure their long, short and medium axes in the pebbleometer
- Repeat the process until you have measured 30 grains







Concluding Fieldtrip

- Check that all activities have been completed
- Do as many calculations as possible while moving between sites or on the bus
- Keep all worksheets and record sheet for processing and proof of work no matter how worn
- Gather up record sheet and fieldsketches
- Evaluate the fieldwork

Evaluation

- What problems did you face doing the fieldwork?
- Did all the equipment work?
- Had you prepared yourself well enough?
- What did you do well?
- What could be improved?
- What needed further study?