3.3 Unit AS 3: Fieldwork Skills and Techniques in Geography

In this unit, students become actively involved in collecting geographical data first-hand through fieldwork. Students identify geographical questions and issues, select appropriate sources and methods and establish effective approaches to inquiry in their geographical studies.

There are opportunities for students to use a range of technologies, including GIS.

Assessment for this unit is a written examination that includes both short and resource-based questions. Students must provide and submit a word-processed summary statement and table containing primary data. For more details, see Section 6.

The start of this section has a detailed list of the skills and techniques that students need to know.

Content	Learning Outcomes
Fieldwork skills and techniques	Students should be able to: (i) identify geographical questions and issues, select appropriate sources and methods, and establish effective approaches to inquiry in their geographical studies; (ii) show awareness of fieldwork safety both in preparation and in the field by: — completing investigative work safely in the field; — showing awareness of hazards and risks and demonstrating how their planning involves discussing strategies to avoid accident or injury while collecting data; and — describing contingencies they have made for dealing with accidents while in the field; (iii) choose and evaluate appropriate sampling techniques (pragmatic, random, systematic, stratified, point, line or quadrat) for an investigation or survey and justify their choice; and (iv) use a range of techniques to identify, select and collect quantitative and qualitative evidence from primary and secondary sources.
Fieldwork skills and techniques (cont.)	Students should be able to: (v) describe and evaluate the data collection methods selected for geographical investigation; (vi) organise, record and present evidence in cartographic, diagrammatic and graphical form, making use of ICT and GIS where appropriate; (vii) choose and apply appropriate statistical techniques to their own data and/or data presented to them (formulae and statistical tables and graphs will be provided); (viii) describe, analyse, evaluate and interpret evidence and draw conclusions; (ix) evaluate their methods and approaches to enquiry and the limitations of the evidence collected and conclusions drawn;
Topic for investigation	(i) choose an issue, hypothesis or question for investigation related to or arising from study as part of Units 1 or 2; (ii) identify appropriate sources and methods for collecting data individually, in small groups or as a class, from both primary and secondary sources (for example databases, maps, texts or census data – please note that census data is acceptable as primary or secondary data);
The written report and table of data	(i) provide and submit a word-processed summary statement of approximately 100 words, which must include: — a brief outline of the location of the study; and — a summary of its aims or hypotheses; and (ii) provide a table or spreadsheet containing primary data along with this statement (please note that the table must allow for some statistical and graphical techniques to be applied to it, as questions may be set that require this information to be used).

Your Specification

Data processing

Students must also develop their data processing skills. They must be aware of Geographical Information Systems (GIS) to assist geographical understanding.
At AS and A2 levels, students must develop the ability to:

- construct, analyse and interpret dot, flow line, choropleth and isoline maps;

- draw annotated sketch maps;

- construct, analyse and interpret scatter graphs, line graphs, bar graphs, pie charts, proportional graphs and triangular graphs;

- use methods of statistical analysis including mean, median, mode and range, Spearman's rank correlation, nearest neighbour analysis and, for A2 level only, chi-squared and location quotient; and

- improve their investigative skills by collecting and processing data from relevant secondary and/or primary geographical sources (for A2 only).

Please note that all mapping, drawing and graphical techniques should follow geographical conventions with regard to title, key, scale, frame and direction arrow.

The Examination

Question 1: 30 marks based on **your** fieldwork.

Question 2: 30 marks based on skills and techniques using secondary data sources.
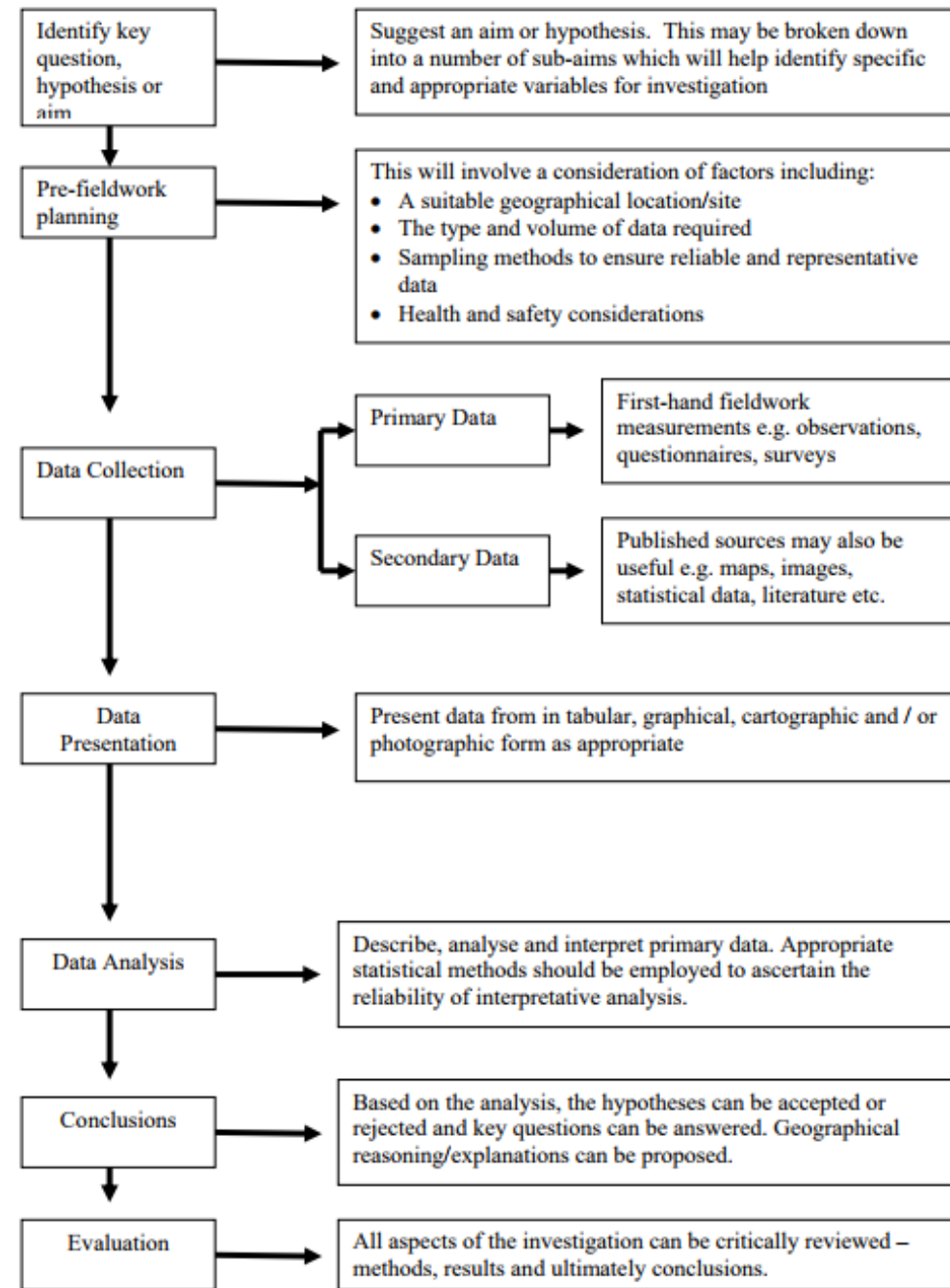
Question 1: Fieldwork

Topic for Investigation

Your investigation must be based on sound geographical theory which relates to some part of the specification content of AS1 or AS2. Popular fieldwork investigations include:

- River studies

- Psammosere studies

You may be asked questions relating to any stage of the **Fieldwork Process**, from Planning to Evaluation.

| Identify key question, hypothesis or aim | Suggest an aim or hypothesis. This may be broken down into a number of sub-aims which will help identify specific and appropriate variables for investigation |

| Pre-fieldwork planning | This will involve a consideration of factors including:
• A suitable geographical location/site
• The type and volume of data required
• Sampling methods to ensure reliable and representative data
• Health and safety considerations |

| Data Collection | Primary Data | First-hand fieldwork measurements e.g. observations, questionnaires, surveys |
| | Secondary Data | Published sources may also be useful e.g. maps, images, statistical data, literature etc. |

| Data Presentation | Present data from in tabular, graphical, cartographic and / or photographic form as appropriate |

| Data Analysis | Describe, analyse and interpret primary data. Appropriate statistical methods should be employed to ascertain the reliability of interpretative analysis. |

| Conclusions | Based on the analysis, the hypotheses can be accepted or rejected and key questions can be answered. Geographical reasoning/explanations can be proposed. |

| Evaluation | All aspects of the investigation can be critically reviewed – methods, results and ultimately conclusions. |

5

Summary Statement and Table of Data Booklet

Centre Number

Candidate Number

For use as required:

e.g. additional data;

e.g. map.

SGG31/3
266120

GCE Advanced Subsidiary Examinations

Geography Unit 3: Fieldwork Skills and Techniques in Geography:
Summary statement and table of data

Summer 20__

cea
Rewarding Learning

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of each page.
Do not write outside the boxed area on each page.
Complete in black ink only. **Do not write with a gel pen.**
You may use an HB pencil for sketch maps.

- The summary statement must only include the title, a statement of the aim and hypotheses to be tested or questions to be answered, and details of the location of the study (a relevant map may be included).
- The table of data must include:
  - primary and secondary data essential for investigating the aim of the study;
  - data collected for all variables relevant to the proposed aim/purpose of the study;
  - quantitative data (numerical scores) to allow for graphical representation and statistical analysis;
  - qualitative data may be included if relevant;
  - normal conventions including a title with all variables clearly stated and precise units of measurement; and
  - raw data only.
- **Both candidate and teacher must sign the declaration below.**
- **The summary statement and table of data must be submitted with the examination paper.**

Teachers, centres and candidates should note that CCEA may use extracts from examination scripts/coursework material on an anonymous basis in educational presentations, materials and products.

Signature _____ (Candidate)   Date: _____

Signature _____ (Teacher)   Date: _____

13281

AS Geography Unit 3: Fieldwork Skills and Techniques in Geography

Summary Statement

Title:

_____

_____

Aim:

_____

_____

Hypotheses to be tested or questions to be answered:

_____

_____

_____

_____

_____

_____

Location:

_____

_____

_____

Table of data

Title:

_____

_____

Summary Statement

No marks awarded

Must be completed using the booklets issued by CCEA

It must include:

- the **title**;

- a statement of the **aim** and **hypotheses** to be tested; and

- brief details of the **location of the study.**

Table of Data

Primary and secondary data essential to investigate the aim of the study;

Data collected for all variables relevant to the proposed aim/hypotheses of the study;

Quantitative data (numerical scores) essential to allow for graphical presentation and statistical analysis;

Normal conventions, including a title with all variables clearly stated along with precise units of measurement; and

The inclusion of raw data only (candidates should not include averages or other statistical calculations).

The Summary Statement and Table of Data booklet **must not** contain...

- Theoretical Background
- Planning
- Data Collection
- Analysis/Interpretation
- Graph Work
- Ranked variables
- Statistical Calculations
- Conclusions
- Evaluation

Question 1

30 marks available

You should spend **30 minutes** on this section

Questions relate to all aspects of fieldwork

The Fieldwork Process

Fieldwork Planning

↓

Data Collection

↓

Graphical Presentation & Analysis

↓

Statistical Analysis & Interpretation

↓

Data Interpretation (Explanation)

↓

Geographical Conclusion

↓

Evaluation

↓

Possible Extension of Fieldwork
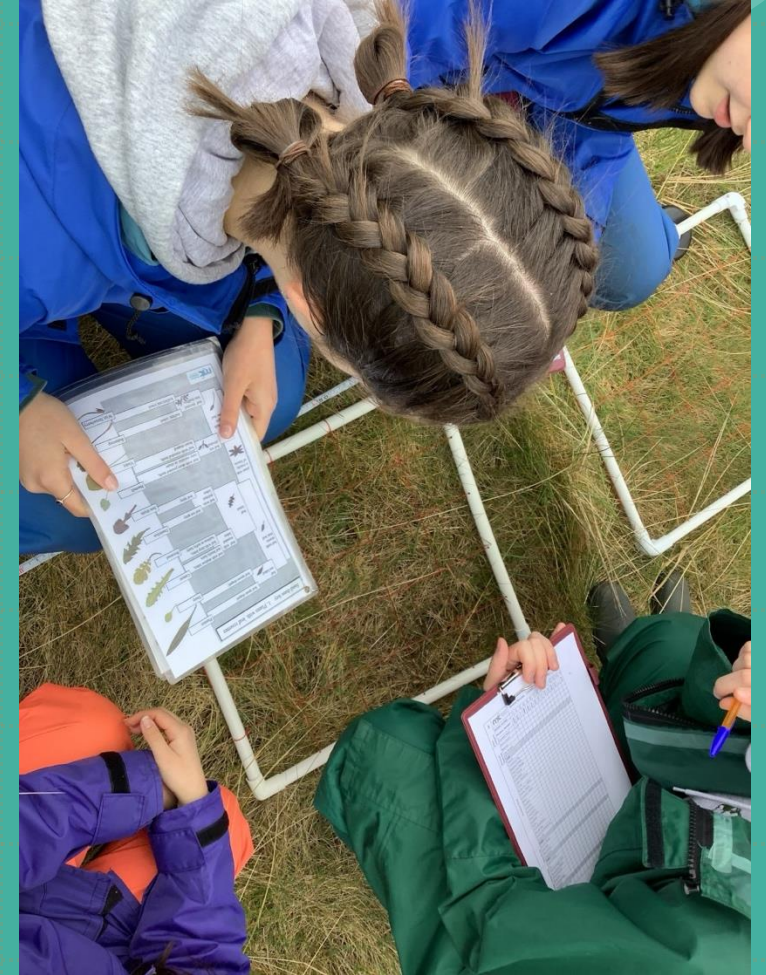
Fieldwork Planning (Context is everything)

Development of Aim/Hypotheses

- Importance in planning context

Location

- Justification of chosen study location

Health and Safety

- Identification of **specific** hazards and the **risk** involved
- Risk **minimisation** strategies and **contingency** plans

Data Sources

- Consideration of specific, named **secondary** sources

Sampling

- Describe and evaluate sampling method and sample size.

Pilot Testing

- What were the resulting modifications/improvements?

Planning Question (2024)

Select two factors from **Resource 1A** and discuss fully how they contributed to your fieldwork planning.

1 (a) Study **Resource 1A**, which shows some important factors for consideration in fieldwork planning.

Resource 1A

Fieldwork Planning

☑ Formulation of aim/hypotheses

☑ Use of Secondary Sources

☑ Risk Assessment

☑ Pilot Testing

☑ Sampling Design
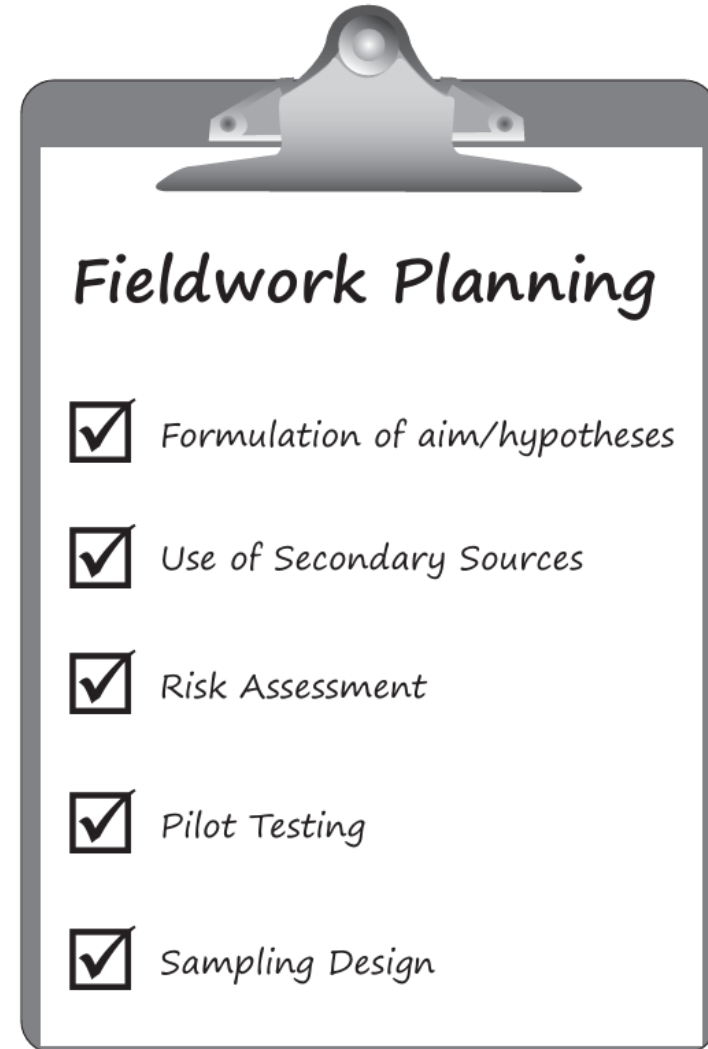
Source: Principal Examiner

Candidate's Response (Pilot Testing)

Prior to carrying out the investigation we used pilot testing on our equipment that was going to be used. From this pilot testing we decided not to use ranging poles and a float to measure velocity, but instead use a hydroprop flowmeter to make our velocity readings more accurate. We divided the channel length by 4 to achieve 3 equidistant intervals then at each interval we held the hydroprop flowmeter at 2/3 depth and recorded the time taken for the impellar to reach the end of the spindle. We then added up these three velocity readings and divided them by three to give us an average and make our results more reliable. **2/4**

Candidate's Response (Secondary Sources)

Secondary data is data collected by someone else. In our fieldwork we used a map. The map allowed us to select our sites for investigation.   **1/4**

In our fieldwork we used a 1:50000 Discovery Series map of the Coleraine Area, Sheet 4, 1999. We used this to locate Umbra Nature Reserve and establish an access point on the A2 Seacoast Road. It also allowed us to establish the starting point of our transect at the shoreline.   **4/4**

Candidate's Response (Sampling Design)

During our fieldwork planning, we had to decide how best to sample our bedload at each site along the Curly Burn River. It was decided that random sampling would be used. With regards to sample size, we discussed options of 5, 10 and 20 pieces of bedload at each site. Ultimately, we decided that 10 would allow us to calculate a representative average for the site. **3/4**

Candidate's Response (Risk Assessment)

Our teachers and field centre instructors conducted a pre-site visit to ensure that Umbra Nature Reserve was safe for fieldwork. Through class discussion, we considered a number of hazards and minimisation strategies. Uneven terrain was a hazard and could have resulted in someone falling and injuring themselves. During planning, we agreed to wear boots to provide stability and to follow our teacher's instructions about where to walk. Our instructor carried a first aid kit which could be used in the event of injury. **4/4**

Data Collection

- Description of Fieldwork Procedures
- Specific equipment used
- Frequency
- Laboratory Techniques (if relevant)

Sampling Design

Define the target population

Determine the sample **size**

Select the sampling **method:**
- Random
- Pragmatic
- Systematic
- Stratified

Complete the sampling process

Sampling Design
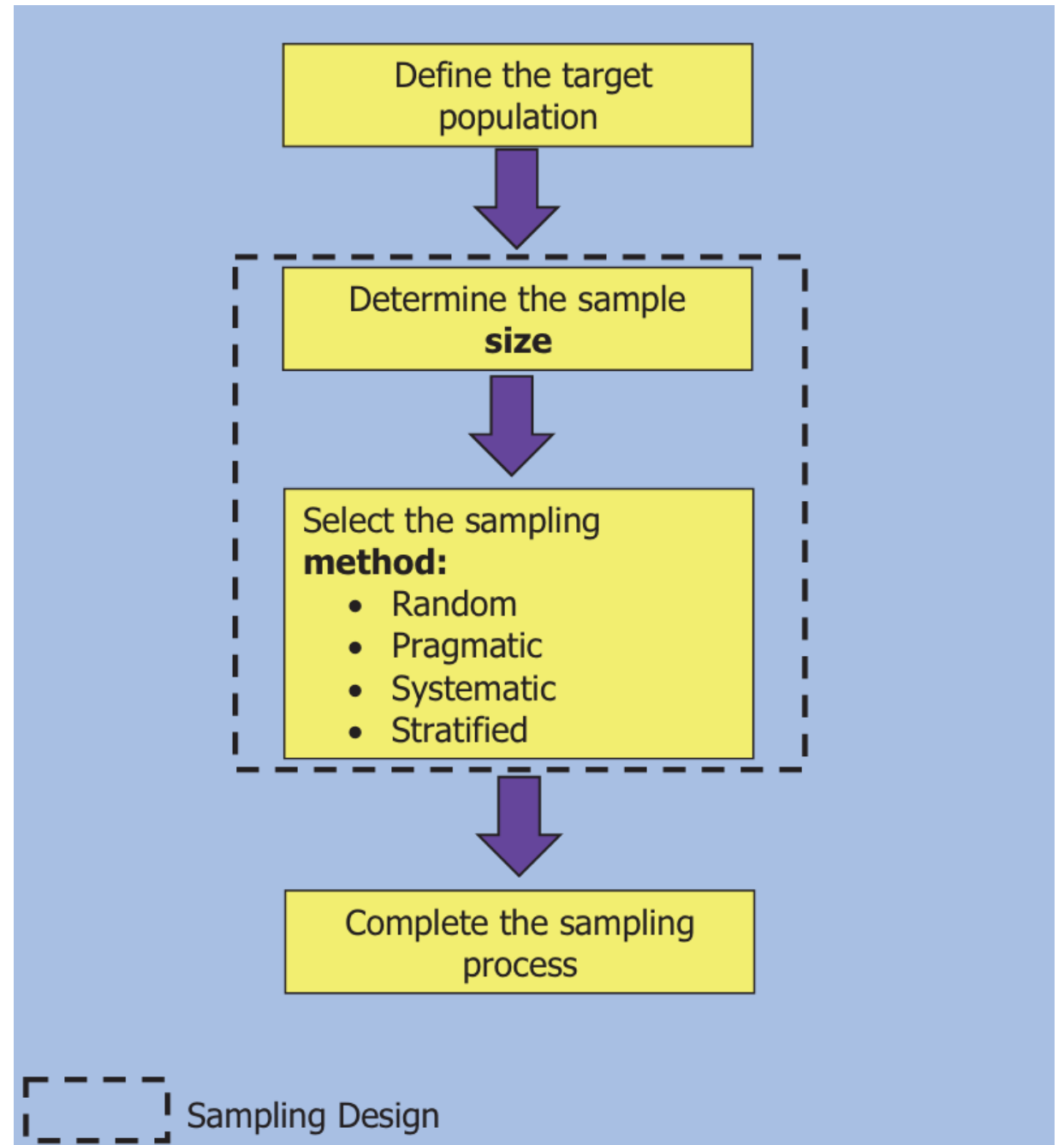
Graphical Presentation

Select an appropriate graphical technique and present some, or all, of the data displayed in your table of data. Your graph must be relevant to the aim/hypothesis of your fieldwork. [7]

Title [1]

Conventions [2]

Accuracy [3]

Method [1]

Graphical Presentation

Feedback from recent Chief Examiner report:

Well-prepared candidates competently demonstrated their graphical presentation skills and full marks were commonly awarded. Occasionally, marks were lost when:

- the title lacked accuracy or precision;
- the dependent and independent variables were confused;
- the units of measurement were omitted from the axes of the graph;
- an inappropriate line graph was plotted when the x-axis variable displayed discrete rather than continuous data;
- the scaling of the x- and y-axis failed to encompass all values;
- graph-work lacked completion or displayed some inaccuracy; and
- the candidate failed to make sufficient use of the space provided.
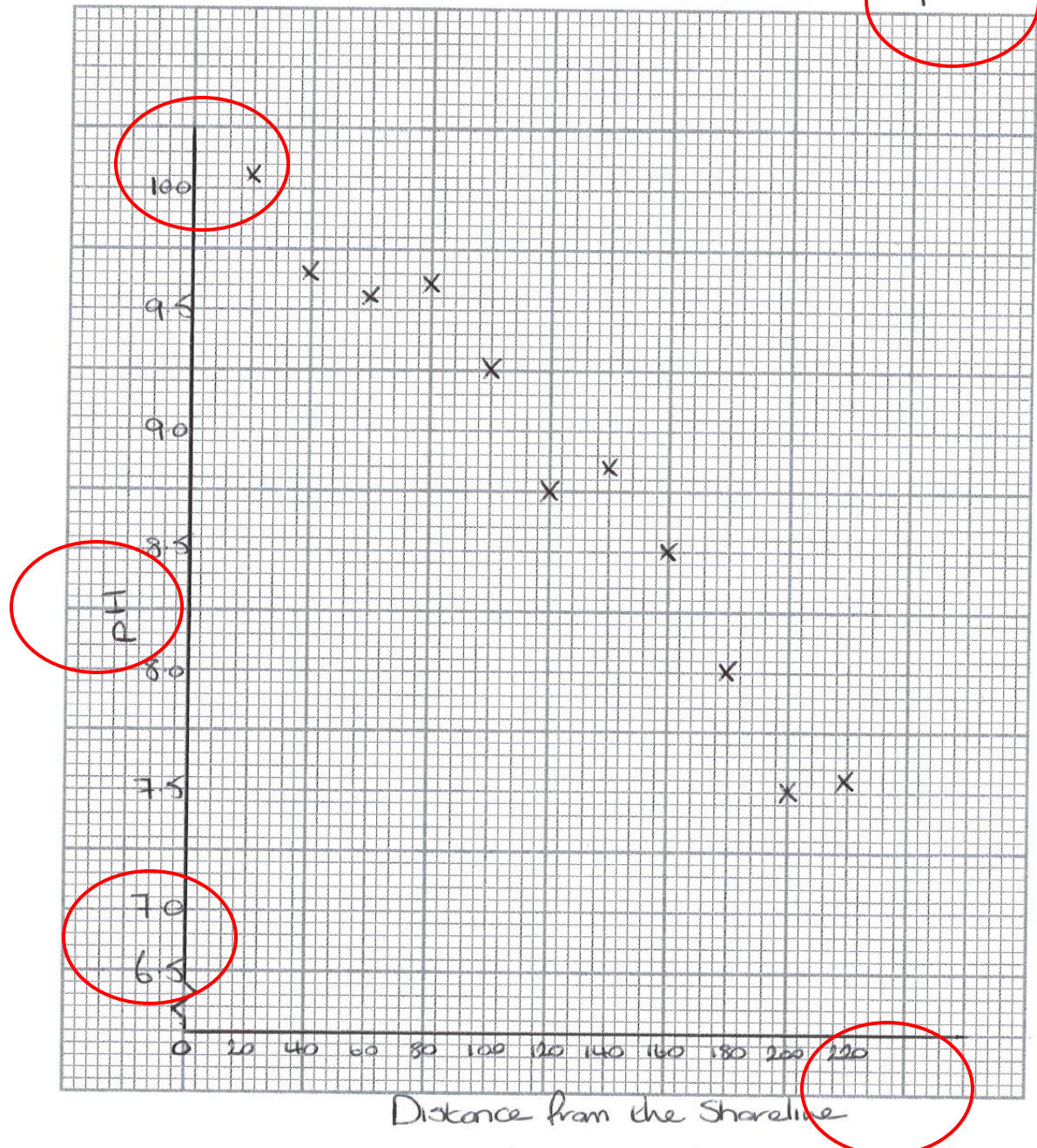
Analysis and Interpretation

Describe your graph in relation to the aim of your fieldwork and explain what it shows, with reference to relevant geographical concepts. [7]

Statistical Analysis

Most centres opt to use Spearman's Rank when completing their statistical analysis.

You can also choose from:

- Mean, median, mode and range
- Nearest Neighbour analysis

Interpretation of your Statistical Result

Explain this statistical result, in relation to your aim, with reference to relevant geographical theories or concepts. A summary of statistical significance should **not** be included. [7]

Geographical reasoning is required to support the statistical outcome and the discussion should integrate relevant theoretical concepts or models, as well as specialist terminology. The geographical reasoning provided will depend on the specific aim/hypothesis, the topic or theme investigated and the statistical outcome attained. If statistics are incomplete/not attempted from 1(c)(i), maximum L2 (if variables can be identified from answer). Summaries of statistical significance should not be credited.

Level 3 ([6]–[7])
The answer displays sound geographical reasoning with the effective integration of relevant theoretical concepts and terminology. The explanation provided is relevant to the aim of the study as well as the statistical outcome. Quality of written communication is excellent.

Level 2 ([3]–[5])
A less detailed geographical reasoning is presented with only tenuous integration of theoretical concepts. The inclusion of specialist terminology may be less well developed or more limited. Quality of written communication is good.

Level 1 ([1]–[2])
Explanation may be more simplistic or less complete. Specialist terminology may be very limited or neglected. Answers which only describe the aim/hypothesis will be at this level. Quality of written communication may be poor.

[7]

Candidate's Response

This statistical result shows that with distance downstream increasing that average bedload length decreases. For example at Site 1 (0.5km from source) average bedload was 200mm. Whereas at site 12 (16.5km from source) average bedload was 29mm. There was overall reduction of 171mm. This gave us a Rs result that showed 99% significant. Therefore we could accept the hypothesis. This is due to processes of erosion. Attrition is the load hitting off banks and bed and therefore becoming smaller. Hydraulic action is the sheer force of the water moving and causes the load to get smaller. Also, processes of transportation, traction and saltation will cause them to be smaller. This therefore fulfils our aim to investigate downstream changes and concludes that the load gets smaller.

Evaluation of Fieldwork

Study Resource 1B, which shows some important factors considered during fieldwork evaluation.

Select any two factors from Resource 1B and explain how they influenced the reliability of the data you collected and the nature of your geographical conclusions. [8]

Resource 1B

Source: Principal Examiner
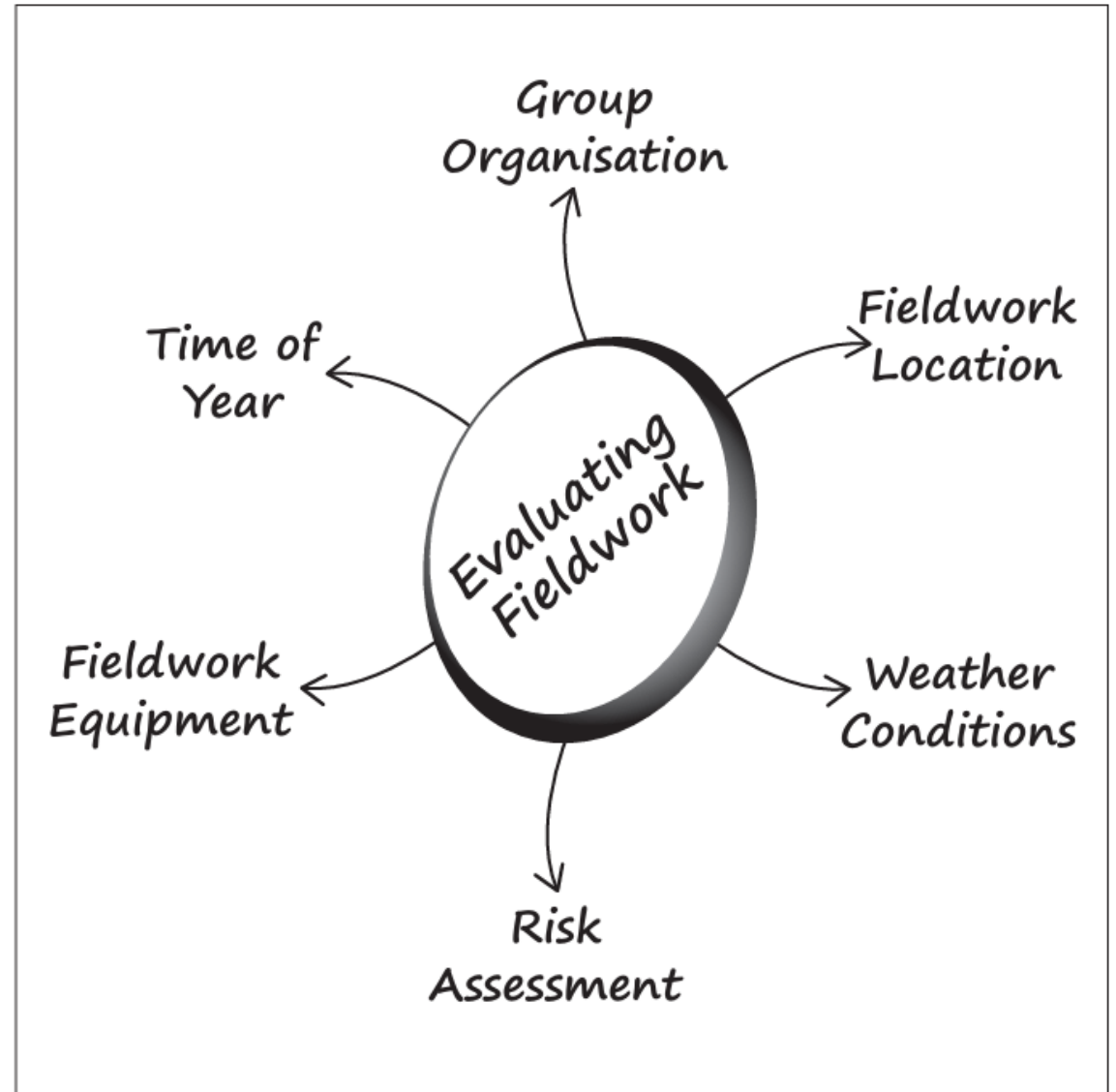
Evaluating Fieldwork

Factor [2]

Reliability [1]

Conclusion [1]

Evaluation considerations

Group organisation: did task rotation result in inconsistencies?

Fieldwork location: is there a protection status/designation?

Weather conditions: was there a change during fieldwork that resulted in inconsistencies?

Risk assessment: did a risk assessment preclude you from entering a particular site?

Fieldwork equipment: was it adequate?

Time of year: were particular species dormant?

From the Chief Examiner…

(c) This was the most poorly answered part question in the examination. Responses were obviously diverse and depended on the fieldwork undertaken. Better answers, from well-prepared candidates, involved sound critical evaluation of the chosen factor in terms of the reliability of the data collected and the nature of the geographical conclusions reached. Unfortunately, marks were often restricted for a number of reasons, including:

- failure to include clear and convincing links to the candidate's own fieldwork investigation;

- failure to note how the chosen factor influenced, either positively or negatively, the reliability of the data collected;

- failure to make reference to the nature of the geographical conclusion reached as a result of the influence of the chosen factor;

- the development of hypothetical scenarios;

- suggesting modifications and/or improvements to the fieldwork undertaken; and

- presenting suggestions which actually conflicted with their Summary Statement and Table of Data booklet.

From the Chief Examiner…

Two commonly selected factors were Time of Year and Weather Conditions. Candidates who evaluated the roles of these factors in the context of their river study usually scored low marks. With regards to Time of Year, a significant proportion of candidates suggested that conducting their investigation in winter resulted in a fuller channel and, therefore, less reliable data. In comparable vein, numerous candidates suggested that heavy rainfall resulted in a higher discharge and, therefore, less reliable data. In both cases, candidates often suggested that conducting their study in summer would yield more reliable data. Unfortunately, responses such as these could not be credited. In both cases, the data collected remains valid for the day on which they conducted their study, regardless of the season or prevailing/antecedent weather conditions.

Modification/Improvement

Describe **one** way in which your investigation could be modified or improved, and outline how this could provide a more reliable conclusion. [4]

Candidate's Response

We could have studied another river, such as the Annalong River, and compared our data with that river. This would allow us to draw stronger conclusions about the application of the Bradshaw Model to rivers in Northern Ireland.   **0/4**

THINK! Could my suggested modification or improvement be applied on the same day? Does it change my overall aim? Valid suggestions include, but are not limited to:

- Change in sampling method
- Improved group organisation
- Data collection at more sites
- An additional hypothesis

Question 2: Skills and Techniques in Geography

Question 2: Skills and Techniques in Geography

You will be required to respond to qualitative and quantitative data from secondary sources.

This question is worth **30 marks**.

You should spend approximately **30 minutes** on this question.

Question 2: Topic Areas

Data Collection

Questionnaires

Sampling:
- Random
- Stratified
- Systematic
- Pragmatic

Secondary sources:
- OS Maps
- Photographs
- Satellite Images
- Surface pressure or synoptic charts
- Remotely sensed images

Statistical Analyses

Measures of central tendency:
- Mean
- Median
- Mode

Measure of dispersion:
- Range

Spearman's Rank Correlation Coefficient

Nearest Neighbour Analysis

Graphical and Mapping Techniques

Mapping:
- Dot distribution
- Choropleth
- Isoline
- Flow line
- Annotated sketch maps

Graphical:
- Scatter
- Line
- Bar
- Pie
- Proportional
- Triangular

Questionnaires

Open and closed questions

Likert Scales

Common errors and issues

Survey considerations:
1. Time of day
2. Time of year
3. Pilot testing
4. Survey site/location

Photographs

Spearman's Rank Correlation

1 (a) Study **Resource 1A** which relates to the initial stages of a Spearman's Rank statistical test used to investigate the relationship between Gross Domestic Product (GDP) per capita and life expectancy in 2009 for a sample of 14 countries.

Resource 1A

Country	X GDP per Capita ($)	Rank X	Y Life expectancy (years)	Rank Y	d	d²
Albania	3 750	7	77	5	2	4
Australia	42 279	3	81	2	1	1
Bangladesh	551	12	66	9	3	9
Belgium	43 430	2	80	3	–1	1
Brazil	8 114	5	72	7	–2	
Chad	596	11	49	13	–2	4
Denmark	55 992	1	79	4	–3	9
Egypt	2 269	8	70	8	0	0
Haiti	667	10	61	10	0	0
Italy	35 084	4	82	1	3	
Kenya	759	9	54	11	–2	4
Mozambique	428	13	48	14	–1	1
Niger	352	14	51	12	2	4
Romania	7 500	6	73	6	0	0

Source: World Bank data $\Sigma d^2 = 50$

Resource 1B

Spearman's Rank Correlation Equation and Significance Charts

Formula: $r_s = 1 - \left(\dfrac{6\Sigma d^2}{n^3 - n} \right)$

where d = the difference in rank of the values of each matched pair
n = the number of ranked pairs
Σ = the sum of

Spearman's Rank Correlation Significance Graph and Table

Critical values for r_s
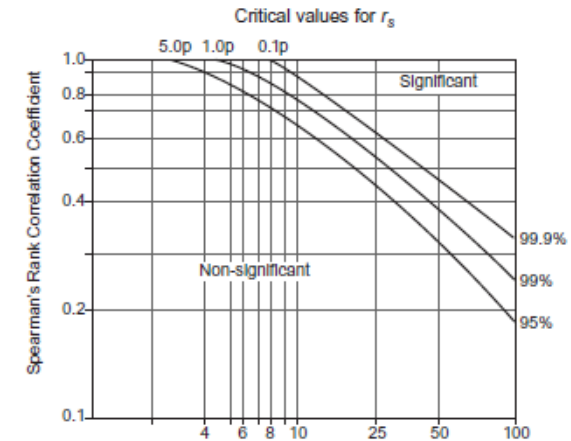
Degrees of freedom [Number of ranked pairs (n) – 2]

Critical values of Spearman's Rank Correlation Coefficient, r_s

Significance level

degrees of freedom	0.05 (5%)	0.01 (1%)
4	0.88	1.00
5	0.83	0.96
6	0.80	0.91
7	0.77	0.87
8	0.72	0.84
9	0.68	0.80
10	0.64	0.77
11	0.60	0.74
12	0.57	0.71
15	0.50	0.65

Nearest Neighbour Analysis

(b) A geographer studying service distribution in Greater Dublin, Ireland mapped the distribution of a chain of fast food restaurants within this area as illustrated in **Resource 1C** below.

Resource 1C
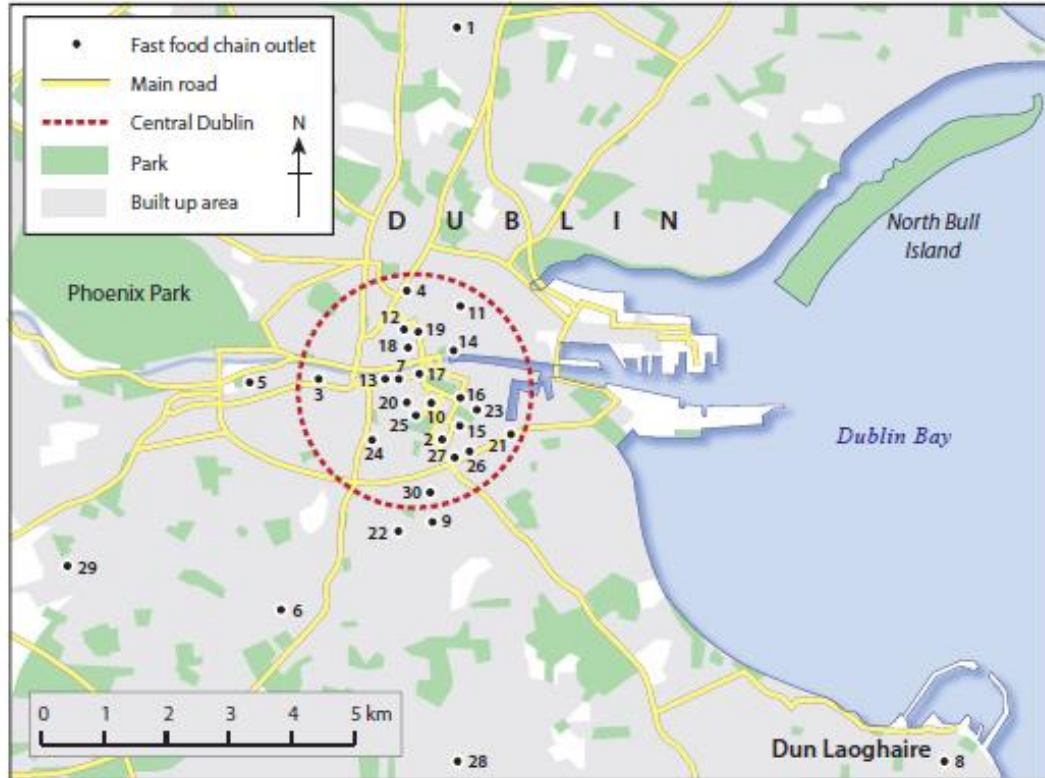
Source: Principal Examiner

(i) Using **Resource 1C** on page 5, complete **Resource 1D** by filling in the three missing values. [3]

Resource 1D

Restaurant Number	Nearest Neighbour	Distance (km)
1		4.02
2	15	0.40
3	5	1.13
4	12	0.56
5	3	1.13
6	22	2.09
7	13	1.61
8		7.57
9	30	0.48
10	20	0.32
11	14	0.72
12	19	0.16
13	7	0.16
14	17	0.64
15	2	0.40
16	23	0.32
17	7	0.32
18	19	0.40
19	12	0.16
20	25	0.24
21	23	0.72
22	9	0.56
23	16	0.32
24	25	0.72
25	20	0.40
26	27	0.16
27	26	0.16
28	6	3.62
29		3.31
30	9	0.48

Sum: 33.28

Area: 194.21 km^2

Dot Distribution Maps

Resource 1A

Number on map (Resource 1B)	Central Mexican State	Population Total
1	Federal District	8 500 000
2	Hidalgo	2 250 000
3	Morelos	1 500 000
4	Puebla	5 000 000
5	Queretaro	1 500 000
6	State of Mexico	13 000 000
7	Tlaxcalo	1 000 000

Figures rounded to nearest 250,000
Source: INEGI – Mexico population 1910–2000 by state .xls

Resource 1B

Note:
Mexico City is located within area 1
—— State boundary

USA

Bel. - Belize
Guat. - Guatemala
Hon. - Honduras

MEXICO

Area of main map

Bel.
Guat. Hon.

400 km

N

Key:

[Turn over]

0   km   100
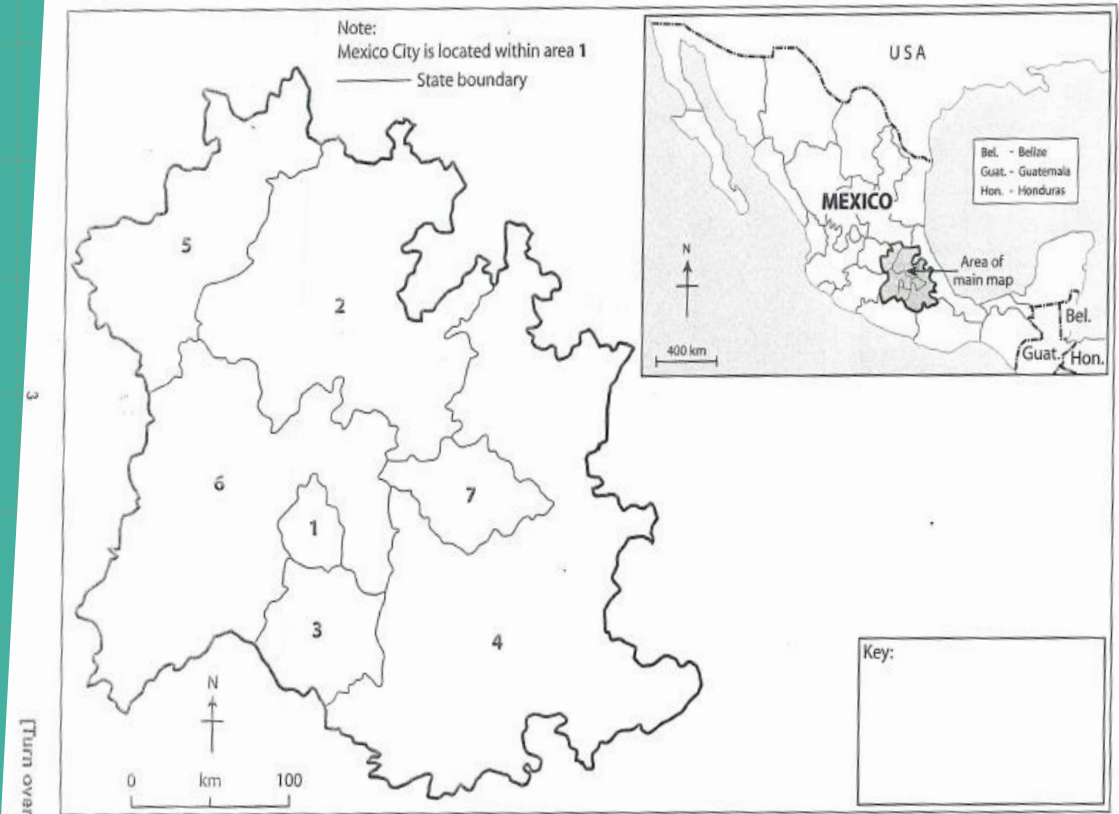
Choropleth Maps

Resource 1C

Region	Population density (people per square km)
Ecuador	47
Colombia	37
Venezuela	27
Brazil	21
Peru	21
Chile	21
Uruguay	19
Paraguay	15
Argentina	14
Bolivia	8
Guyana	3
Suriname	2
French Guiana	2
Falkland Islands	0.24

Isoline Maps/Diagrams

Resource 1A

Flow Line Maps
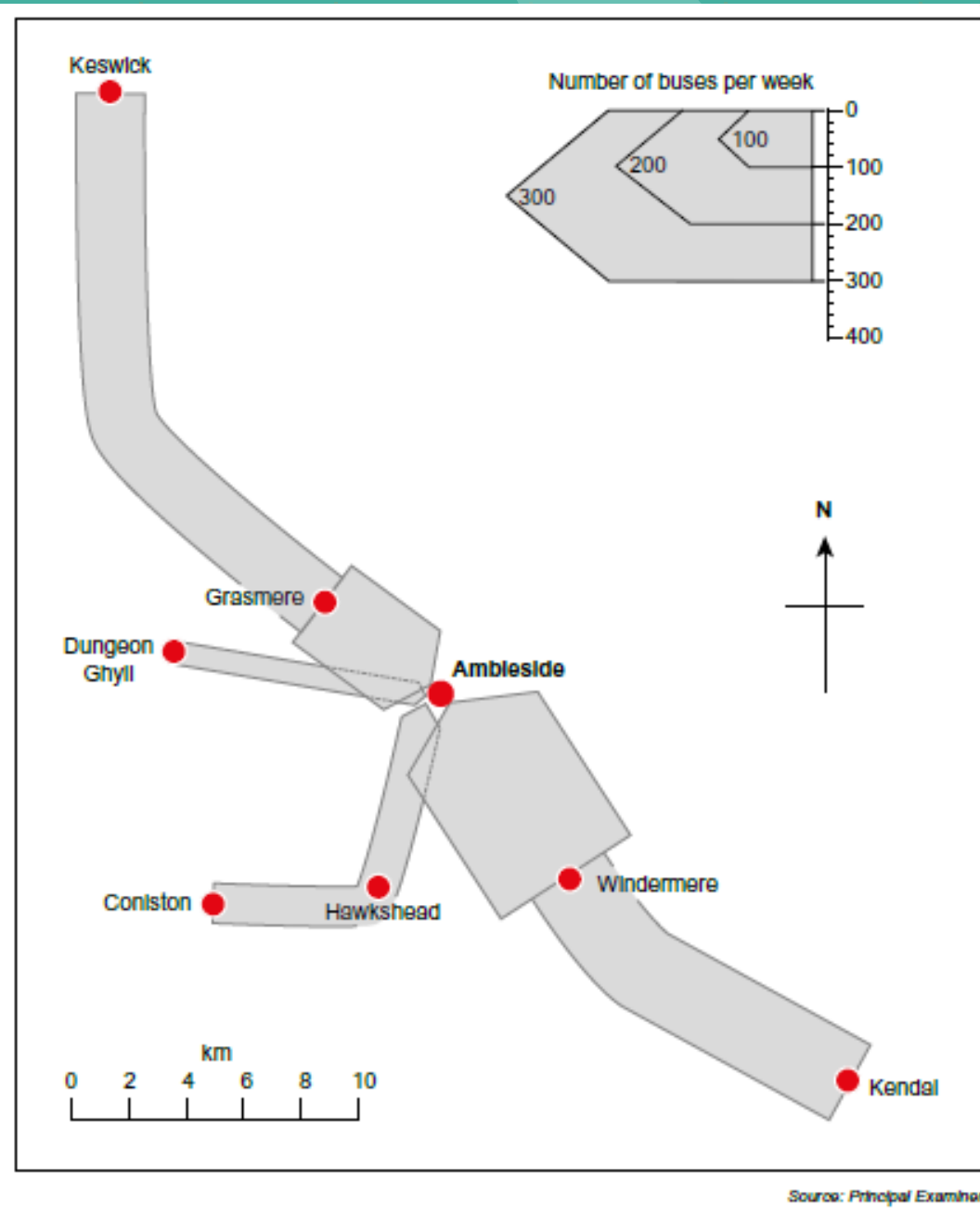
Annotated Sketch Maps
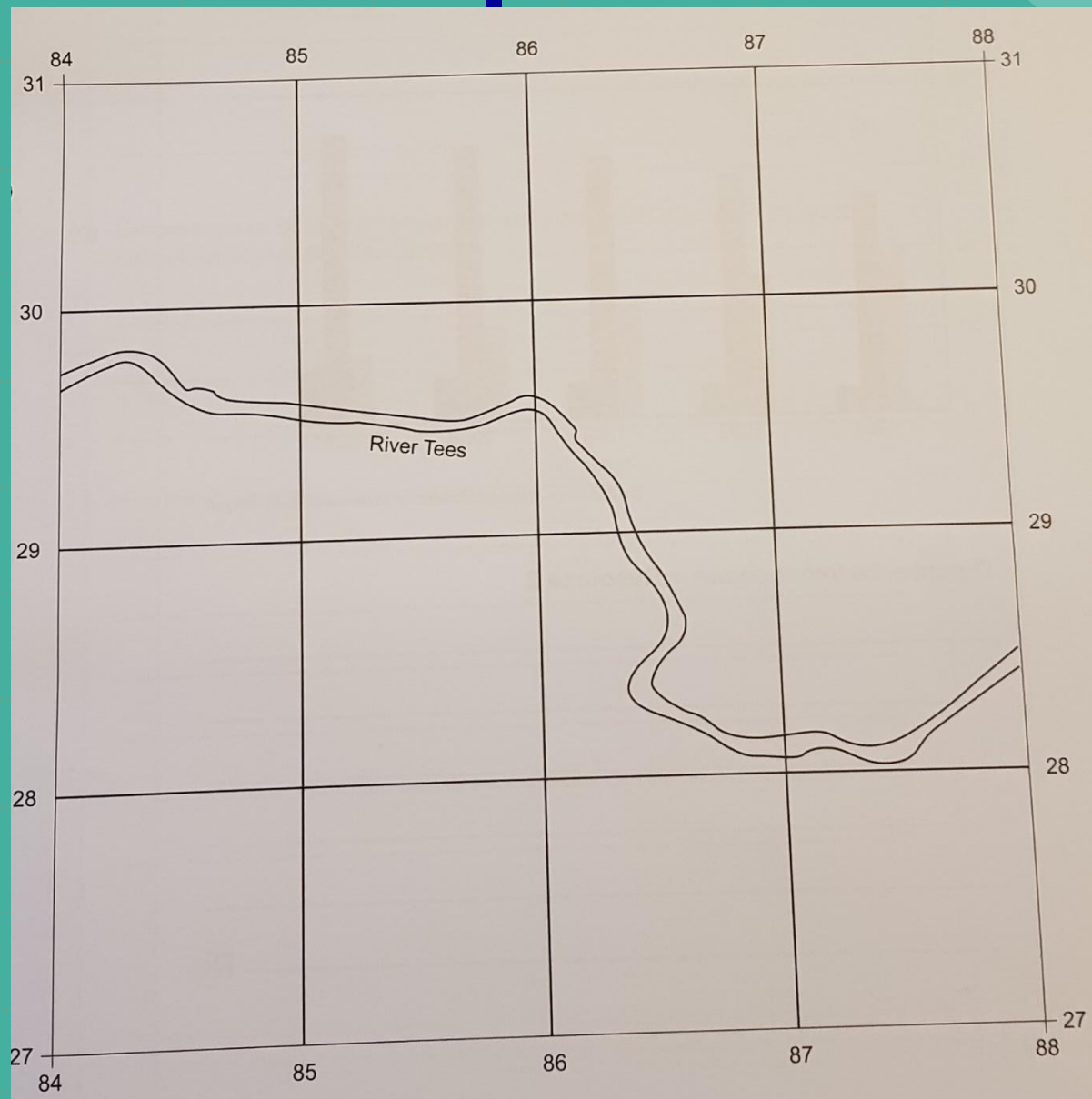
Line Graphs

Resource 1A

Site	Distance from the inside bank of the meander bend (cm)	River depth (cm)
1	0	8
2	35	10
3	70	23
4	105	31
5	140	52
6	175	56
7	210	103
8	245	92
9	280	126
10	315	149
11	350	148
12	385	143

Resource 1B

Title of graph: _____
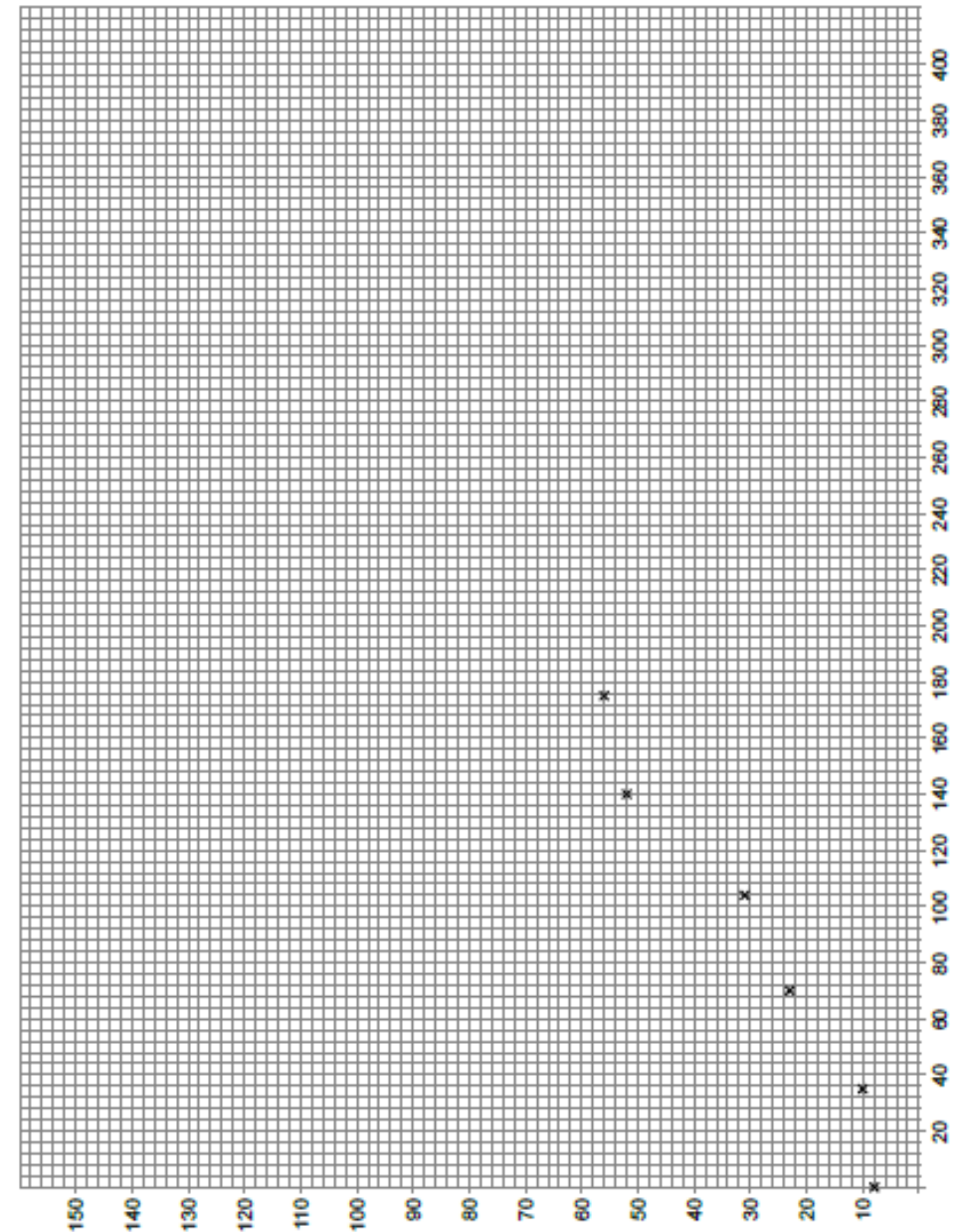
Bar Graphs
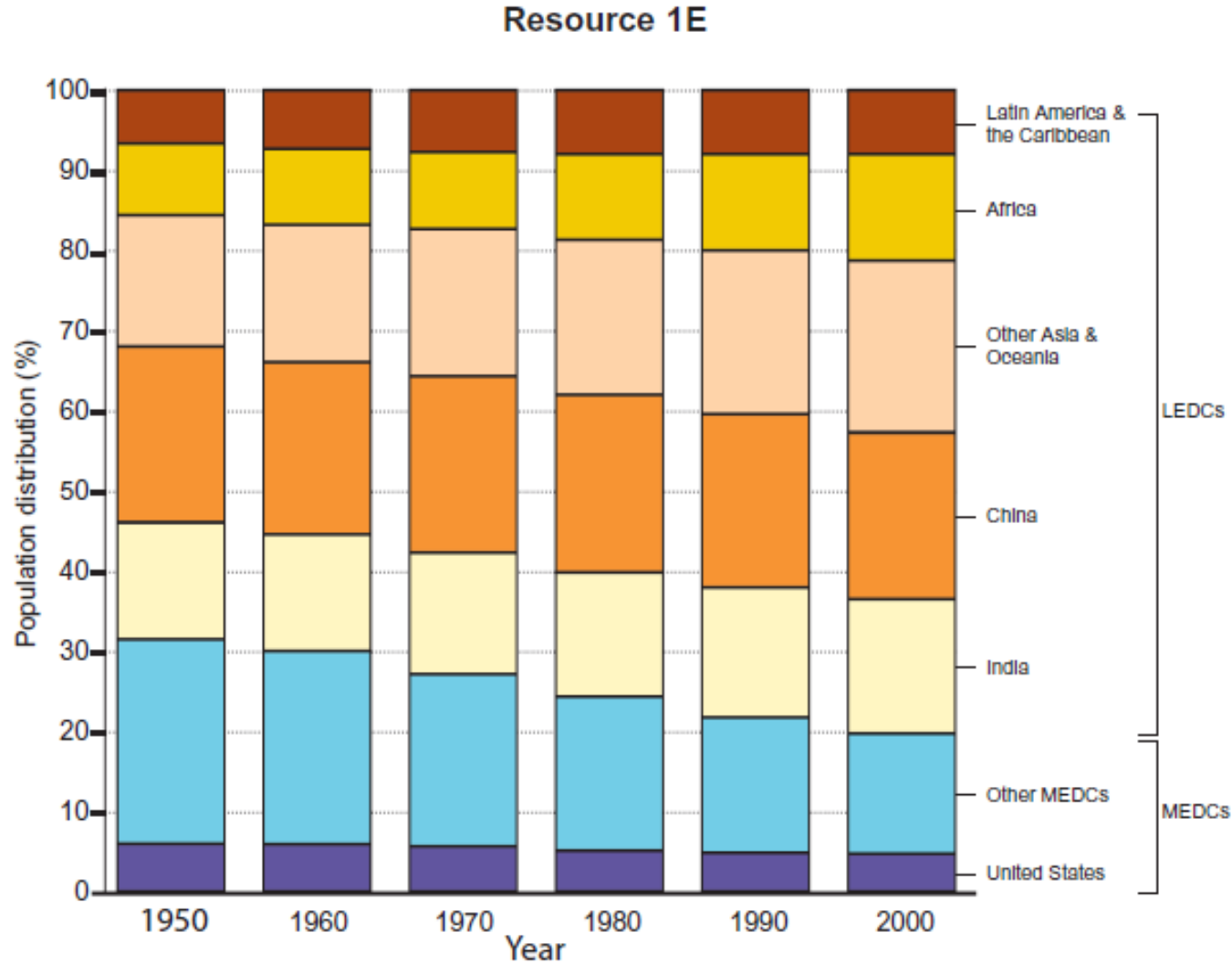
Pie Charts

Income group (dollars)	% of total households	Degrees for pie chart sector
less than 10 000	15.0	54
10 000–24 999	26.4	95
25 000–49 999	33.6	121
50 000–74 999	15.0	54
75 000–99 999	5.3	19
100 000–149 999	2.8	
150 000 and above	1.9	

Resource 1F

HOUSEHOLD INCOME ($) IN 1990
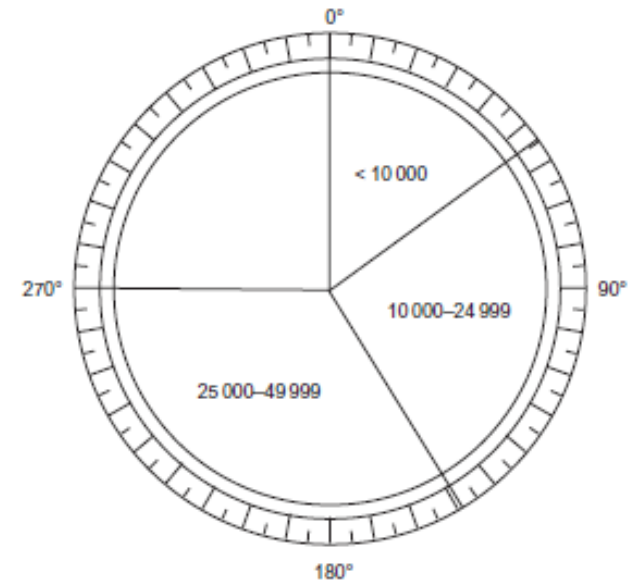
Source: www.CensusScope.org

Resource 1G

HOUSEHOLD INCOME ($) IN 2000
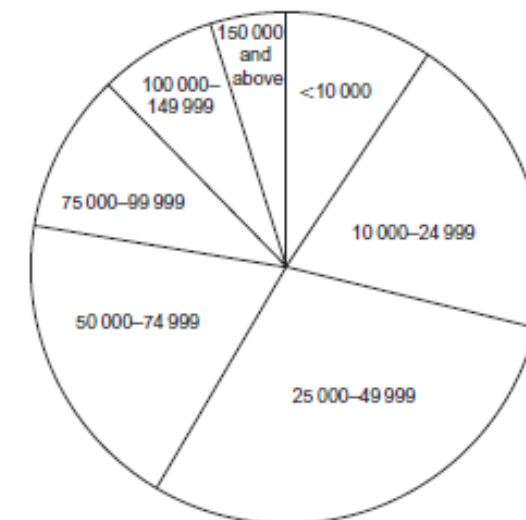
Source: www.CensusScope.org

Triangular Graphs
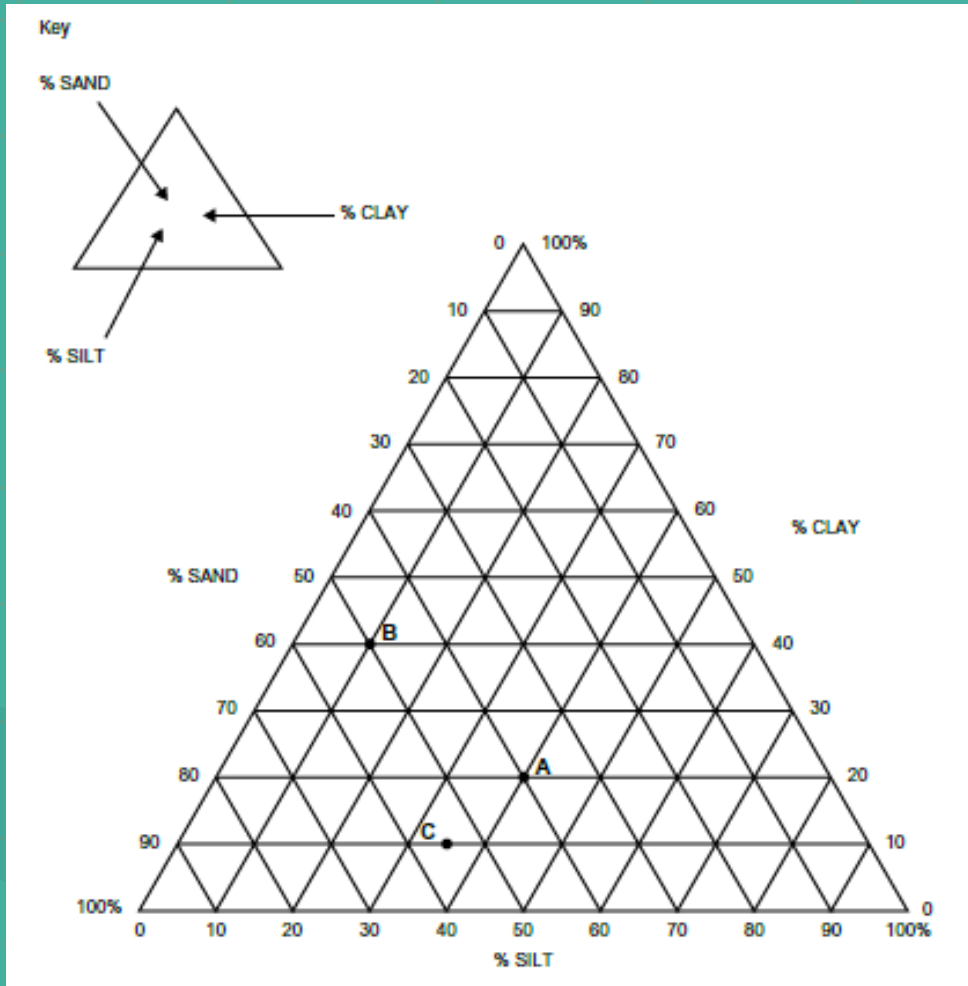
	A: LOAM	B: SANDY CLAY	C: LOAMY SAND	D: CLAY
% SAND	40			10
% SILT	40			10
% CLAY	20			80

Resource 1D

Don't neglect basic skills...

Resource 2D

Category 1 Hurricane Ian at 07:00 on 26 September 2022
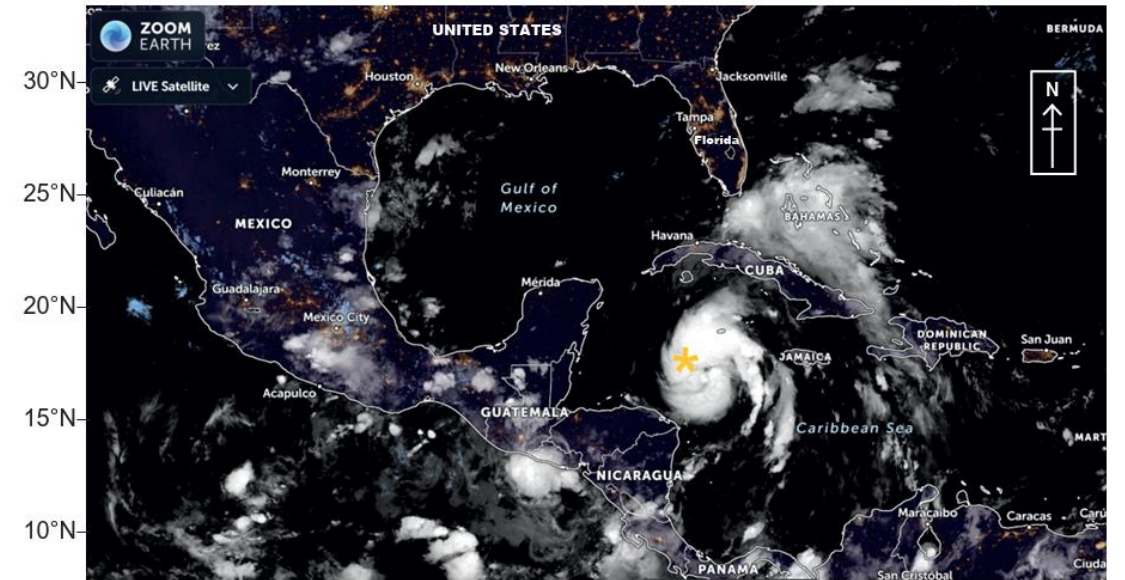
Category 4 Hurricane Ian at 16:00 on 28 September 2022
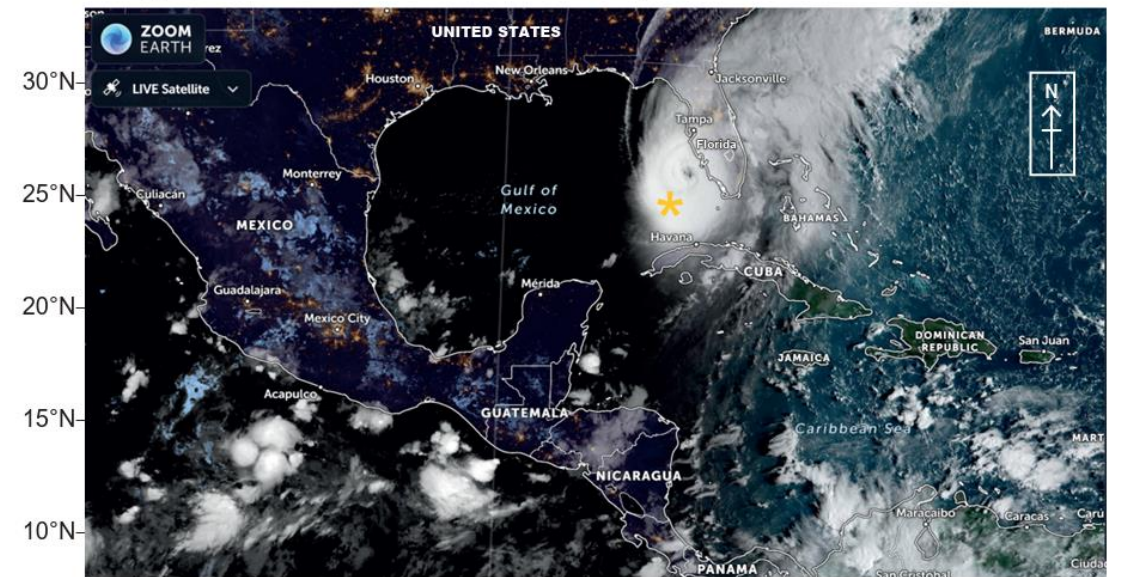
Support: CCEA Geography Microsite

Support: AS3 eGuide

CCEA
Rewarding Learning

eGUIDE//

Geography
AS3 – Fieldwork Skills and Techniques

Within the text of each section key words will be highlighted in red.

Relevant exam questions, tasks and cases studies have been provided where relevant.

The range of relevant web-based resources (sites, video, images) is limited in relation to this topic but where relevant these will be available in the text.

Support: Textbook
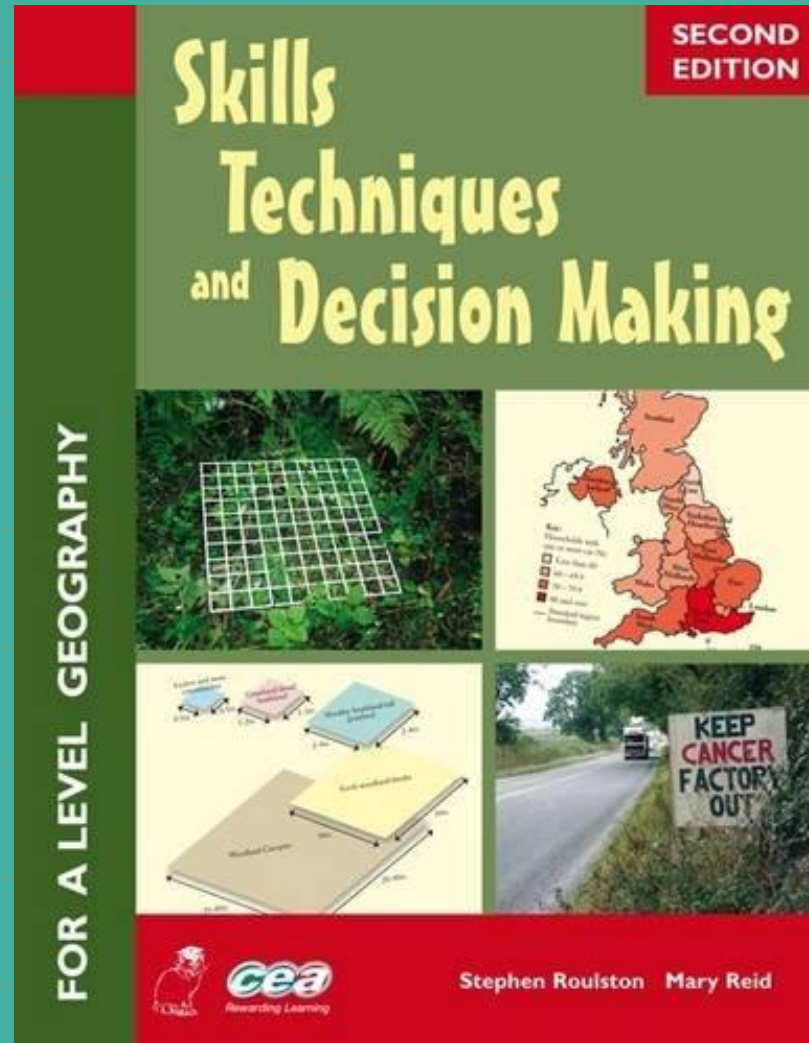
Where else can I get help/support?

- Specification
- Past Paper Examinations and Mark Schemes (2017 – 2024)
- Legacy Past Papers (AS1 Q1 and AS2 Q1)
- Chief Examiner's Reports