Exercise walk-through

3.1
Fieldwork preparation: supported rehearsal

International Baccalaureate · IB Diploma · Geography · SL

Extreme environments

- **Extreme environments** are cold (high mountains, polar and glacial areas) or dry (hot deserts).
- Ice erodes valleys into a U shape and leaves piles of rock called **moraines** .
- In hot deserts, wind builds dunes and rare flash floods cut steep valleys called wadis.
- People see these places as both **opportunities** (minerals, tourism, solar energy, scientific research) and **challenges** (cold or heat, little water, poor access, a fragile environment).

Geophysical hazards

- The Earth's surface is broken into **tectonic plates** that move a few centimetres a year.
- Most volcanoes and earthquakes happen at **plate margins** :
- **Hazard risk** grows with three things: how strong and frequent the hazard is, how many people and buildings are in its path (**exposure**), and how easily they are harmed (**vulnerability**).
- Poverty, weak buildings and poor warning systems raise **vulnerability**.

$$\text{risk} = \text{hazard} \times \text{exposure} \times \text{vulnerability}$$

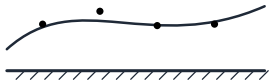
Fieldwork: geographic inquiry and sampling

- The fieldwork report is worth 25% at SL and 20% at HL.
- It is a report of up to 2,500 words, marked out of 25, on **primary data** that you collect yourself in the field.
- You cannot measure everything, so you take a sample:
- **Worked example.** Question: *Does the number of pedestrians fall with distance from the central square?* **Hypothesis**: pedestrian numbers fall as distance increases.

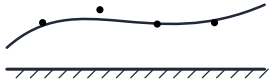
$$r_s = 1 - \frac{6\sum d^2}{n(n^2-1)} = 1 - \frac{6 \times 158}{8 \times 63} = 1 - \frac{948}{504} \approx -0.88$$

Exercises 2.1·2.2

2.1 Label a storm hydrograph: name the axis, the peak and the lag time. [2]

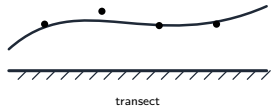


2.2 State the hazard-risk product and use it to explain why an earthquake of one magnitude can devastate one city and spare another. [2]



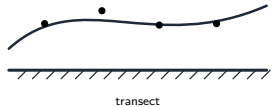
Exercises 2.1·2.2

2.1 Label a storm hydrograph: name the axis, the peak and the lag time. [2]



2.1 Axes: discharge (cumecs) against time; the PEAK is the maximum discharge (1); the LAG TIME runs from the storm's peak rainfall to the hydrograph's peak discharge (1).

2.2 State the hazard-risk product and use it to explain why an earthquake of one magnitude can devastate one city and spare another. [2]

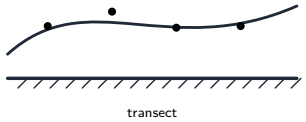


2.2 Risk = hazard magnitude × exposure × vulnerability (1): identical magnitude devastates where exposure and vulnerability are high (dense settlement, weak buildings) and spares the prepared, well-built city – Tōhoku's warning system cut deaths despite magnitude 9.0 (1).

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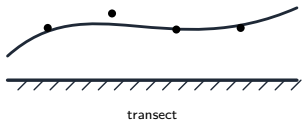
Exercises 2.3·2.4

2.3 Place the first four stages of the Butler model in order. [2]



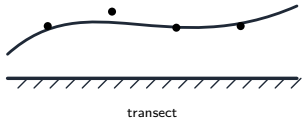
2.4 Classify each as random, systematic or stratified sampling:

(a) a count every 50 m along a beach transect; (b) grid points drawn from a random-number table; (c) two quadrats per each of three known vegetation zones, in proportion. [3]



Exercises 2.3·2.4

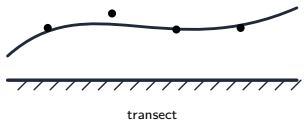
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2.3 Exploration, involvement, development, consolidation (2 – 1 for three in order).

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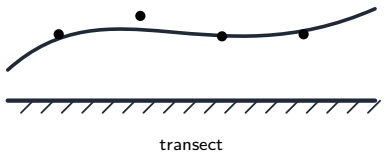
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2.4 (a) Systematic (1); (b) random (1); (c) stratified (1).

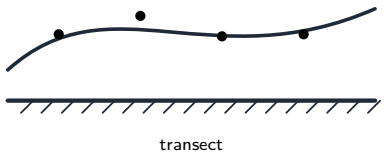
Exercise 2.5

2.5 A study of 8 pairs with no tied ranks reports Spearman $r_s = 0.714$ (rounded). For an exact two-sided test at 5%, use the critical absolute value 0.738. State the statistical decision. [3]



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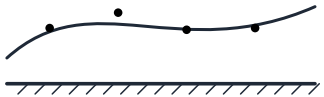
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2.5 The observed absolute value $0.714 < 0.738$ (1), so the association is not statistically significant in this exact two-sided test at 5% (1). Do not reject the null hypothesis of no rank association (1); this does not prove that no association exists.

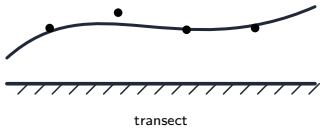
Exercise 3.1

3.1 *(Fieldwork design style.)* Design a fieldwork inquiry into whether pedestrian density falls with distance from a city-centre plaza: state the question, a directional hypothesis, the sampling strategy with a reason, and two evaluation points with their named modifications. [6]



Exercise 3.1

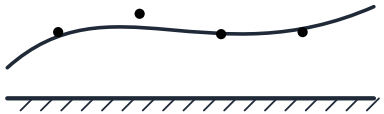
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3.1 Question: does pedestrian density decline with distance from the plaza? (place-specific, answerable) (1). Hypothesis: pedestrian density per 2-minute count falls with each successive 100 m from the plaza (directional, measurable) (1). Sampling: systematic, with counts at every 100 m along four transects (one per compass direction) give even coverage of the distance gradient; the transects stratified by direction guard against one street's bias (2). Evaluation: one rainy hour biases counts downward – repeat across days and times (1); four transects may miss the pedestrianised street – add transects where a pilot shows flow, or stratify by street type (1). (Method marks reward choices WITH reasons.)

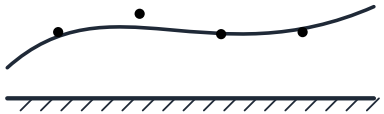
Exercise 3.2

3.2 *(Urban option style.)* A city's outlying district shows a ring of nineteenth-century terraced housing inside a sector of light industry. Explain how Burgess's and Hoyt's models each account for the pattern, and one limitation of using either model. [4]



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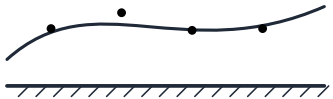
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3.2 Burgess: concentric zones – a ring of older terraced housing sits in the zone of transition/inner city around the centre, industry included with it (2). Hoyt: sectors, not rings – light industry grows outward along a transport sector (canal, rail), with working-class housing beside it, explaining the terraces sitting inside an industrial sector rather than a neat ring (1). Limitation: both are early twentieth-century descriptions of particular cities – modern decentralisation, commuting and regeneration break the rings, so the models are starting points to test against data, not rules (1).

Exercise 3.3

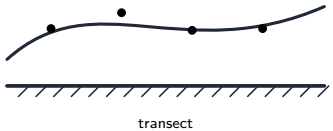
3.3 *(Coasts option style.)* "Managed realignment is surrender." Evaluate realignment against continued hard defence for a low-value agricultural coastline. [3]



transect

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3.3 Realignment is planned adjustment, not surrender: where the land is low-value farmland, the defence cost of hard engineering exceeds the asset protected, and realignment creates intertidal habitat and a buffer that absorbs surge (1). Hard defence protects the immediate line but transfers erosion downdrift and commits rising maintenance as sea level rises (1). Judgement: for low-value coastlines the economics and ecology favour realignment; for cities, the asset value still justifies defence – the choice follows the value at risk (1).

Local review guidance: state statistic, critical value and decision in that order; every method choice carries a because; (R1 3.2/3.3) models and strategies evaluated against place evidence, not recited. Authored classroom guidance.