Options and fieldwork (option themes menu; geographic inquiry and sampling)

International Baccalaureate · IB Diploma · Geography · SL

Options and fieldwork

IB Diploma Programme Geography SL (first assessment 2019; 2017 guide). This topic equips the THEMES menu and the INTERNAL ASSESSMENT: the seven option themes (SL schools teach two; each kit below gives the scope, one anchor concept and one place example) and the fieldwork inquiry cycle with its sampling strategies and statistics. The worked numbers are original and reconciled.

Must-know for options and fieldwork:

Family	Content
freshwater	drainage basin; storm hydrograph: rising limb, peak, lag time
coasts	erosion/deposition landforms; hard vs soft management
extreme	glacial and hot-arid processes; opportunity versus challenge
hazards	plate margins; risk = hazard × exposure × vulnerability
tourism	Butler's model; carrying capacity; Venice overtourism
food/health	epidemiological transition; famine and food systems
urban	land-use models; megacities; regeneration
fieldwork	question, hypotheses, sampling: random, systematic, stratified; r_s, χ^2

The seven option themes

FRESHWATER: the **drainage basin** is the unit of study; the **storm hydrograph** plots discharge against time – rising limb, peak, falling limb, and LAG TIME (storm to peak): urban basins shorten the lag and steepen the peak (concrete sheds water). Management runs from HARD engineering (dams, embankments) to SOFT (afforestation, river restoration, floodplain zoning), traded off against cost and ecology.

OCEANS AND COASTAL MARGINS: waves erode (hydraulic action, abrasion) and deposit (spits, beaches); landforms pair process with rock structure (headlands and bays, stacks). Coastal management: hard (groynes, sea walls – shifting the problem downdrift) versus SOFT (beach nourishment, MANGROVE planting) versus MANAGED REALIGNMENT – letting the coast adjust where defence costs exceed asset value (a frequent evaluation case).

EXTREME ENVIRONMENTS: glacial processes (erosion by ice, transport, deposition: troughs, moraines) and hot-arid processes (wind and flash floods – dunes, wadis); each environment read as opportunity (tourism, minerals) against challenge (water, access, fragility).

GEOPHYSICAL HAZARDS: **plate margin** mechanics (constructive, destructive, conservative) drive volcanoes, earthquakes and tsunamis; hazard risk = hazard magnitude × exposure × vulnerability – which is why the same magnitude devastates one city and spares another (2011 Tōhoku: magnitude 9.0, world-class warning saved most lives; the tsunami still overwhelmed defences). Park's response curve models the human recovery arc.

LEISURE, TOURISM AND SPORT: tourism's global growth; the **Butler model** traces a destination from exploration through involvement, development and consolidation to stagnation, then decline or rejuvenation; **carrying capacity** and overtourism (Venice's day-tripper caps) demand management (limits, dispersal, pricing).

FOOD AND HEALTH: food systems from farm to table; famine as access failure (topic 02's pillar logic); the **epidemiological transition** – deaths shift from infectious diseases (stage 1) to chronic degenerative diseases (late stages) as development proceeds – with obesity rising where calories cheapen. Health indicators (life expectancy, infant mortality) track the transition.

URBAN ENVIRONMENTS: urbanisation and the growth of **megacities** (10 million plus); land-use models (Burgess's concentric zones, Hoyt's sectors – descriptions to test, not truths); urban stress (housing, congestion, waste) and regeneration (brownfield renewal, transport investment) as the response pair.

Fieldwork: geographic inquiry and sampling

The IA (25% at SL) is a FIELDWORK REPORT on primary data the student collects. THE CYCLE: a FIELDWORK QUESTION (place-specific and answerable) with one or more HYPOTHESES (testable, directional; for statistics, a NULL hypothesis of no relationship); METHODS chosen to match the question, with a RISK ASSESSMENT and ETHICS; DATA COLLECTION by SAMPLING, since a census is impossible: **Random sampling** (every point equally likely – unbiased, may miss clusters), **Systematic sampling** (every nth point or along a transect – even coverage, risks matching a periodic pattern) and **Stratified sampling** (proportional samples per known sub-zone – representative of structure, needs prior knowledge); point, line and quadrat frames; then PRESENTATION (maps, graphs), ANALYSIS, CONCLUSION and EVALUATION (limitations and modifications).

ANALYSIS runs from descriptive summaries (means, medians and the interquartile range) to statistical tests. SPEARMAN'S RANK measures a monotonic association. For eight pairs with no tied ranks, an exact two-sided test at the 5% level has a critical

absolute value of about 0.738. A reported $r_s = 0.714$ (rounded) is below this threshold, so do not reject the null hypothesis of no rank association; this does not prove that no association exists. State the sample size, treatment of ties, alternative hypothesis and test method. For a chi-squared independence test on a 2 x 2 count table, the degrees of freedom are 1. With independent observations and sufficiently large expected counts, $\chi^2 = 5.2 > 3.84$ rejects independence at the 5% level. Check these assumptions before using the chi-squared approximation.

> **Worked example.** Question: does pedestrian density fall with distance from the city-centre plaza? Hypothesis: density declines with distance. Method: systematic sampling – counts per 2 minutes at every 100 m along four transects (stratified by direction). Analysis: a scatter graph with Spearman's rank; evaluation: one rainy hour, four transects, morning only – the modifications name themselves.

Checklist

- Hydrograph anatomy with the urban lag-time effect; hard vs soft flood management (freshwater).
- Erosion/deposition process-landform pairs; groyne consequences vs managed re-alignment (coasts).
- Glacial and arid process pairs; the opportunity/challenge frame (extreme).
- Margin types with their hazards; the risk product with the Tōhoku contrast (hazards).
- Butler's stages in order; carrying capacity and Venice-style management (tourism).
- Epidemiological transition stages; famine as access failure (food and health).
- Burgess and Hoyt read as models to test; megacity growth, stress and regeneration (urban).
- The fieldwork cycle end to end; the three samplings' strengths and costs; the r_s and χ^2 decisions with critical values (fieldwork).

Boundary notes: option papers reward SPECIFIC PLACES at a stated scale, and the fieldwork criterion set marks EXPLAINED method choices and correctly executed statistics. All worked numbers are original.