

SPATIAL CONCEPTS & TOWN PLANNING IN SINGAPORE

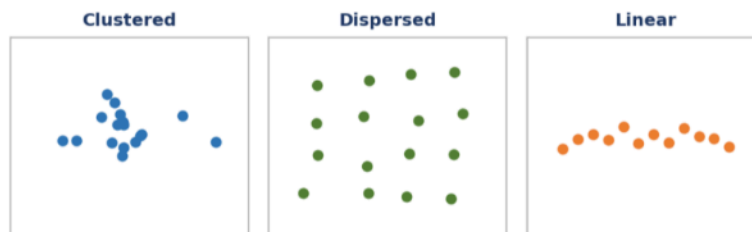
O-Level Geography (Syllabus 2260)

Geographers read the landscape by asking three questions: HOW are features arranged (**spatial patterns**)? Do two things occur TOGETHER (**spatial associations**)? And at WHAT level are we looking (**spatial scales**)? Singapore's towns are planned around these ideas — and good planning gives residents a **sense of place**.

1. Spatial Patterns and Spatial Associations

Spatial patterns — how features are arranged

A **spatial pattern** describes how features (blocks, shops, amenities) are distributed across an area. Name the pattern, then support it with evidence from the map. Common spatial patterns include:



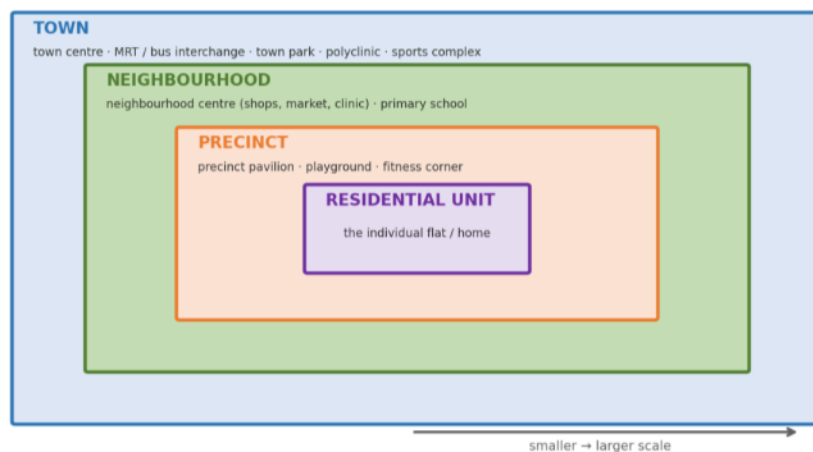
- **Clustered / concentrated:** features grouped closely together (e.g. shops packed into a town centre).
- **Dispersed:** features spread out fairly evenly (e.g. playgrounds shared across precincts).
- **Linear:** features arranged along a line (e.g. blocks strung along an MRT line or main road).

Spatial associations — do two features occur together?

A **spatial association** describes how closely the distributions of two features match. A **strong (positive) association** means they are found in the same areas; a **weak association** means they are not. Example: childcare centres and amenities are strongly associated with residential blocks, because planners place them where residents can reach them easily.

2. Spatial Scales in Singapore

Singapore's public housing is planned as a **nested hierarchy**: each scale sits inside the next larger one, and each is given amenities suited to its size.



Scale	Rough size	Typical amenities provided
Residential unit	One flat / home	The individual dwelling — the smallest scale where people live
Precinct	A cluster of blocks (~a few hundred homes)	Precinct pavilion, playground, fitness corner, void decks — spaces for daily use and neighbourly interaction
Neighbourhood	Several precincts (a few thousand homes)	Neighbourhood centre (shops, wet market, hawker centre, clinic), primary school, parks — within walking distance
Town	Several neighbourhoods (tens of thousands of homes)	Town centre, MRT / bus interchange, town park, polyclinic, sports and community hub — serving the whole town

Key idea: as the scale increases, amenities serve more people and appear less often — a playground sits in every precinct, but a polyclinic serves the whole town. This is why everyday needs are close to home and larger services are shared.

3. Town Planning Principles in Singapore

Principle	What it means	Singapore examples
Providing for nature	Bringing greenery and biodiversity into where people live, so residents can access nature close to home and the environment is healthier	Park connector network linking green spaces; Bishan–Ang Mo Kio Park with its naturalised river; rooftop and community gardens; ABC (Active, Beautiful, Clean) Waters features; trees and greenery kept within estates
Creating connections and synergies	Linking amenities, transport and people so they work together conveniently — the combined result is greater than the separate parts	Integrated hubs that combine sports, library, hawker centre and community club in one place (e.g. Our Tampines Hub); transport hubs linking MRT, bus interchange and a mall; sheltered walkways and linkways connecting homes to amenities and transport

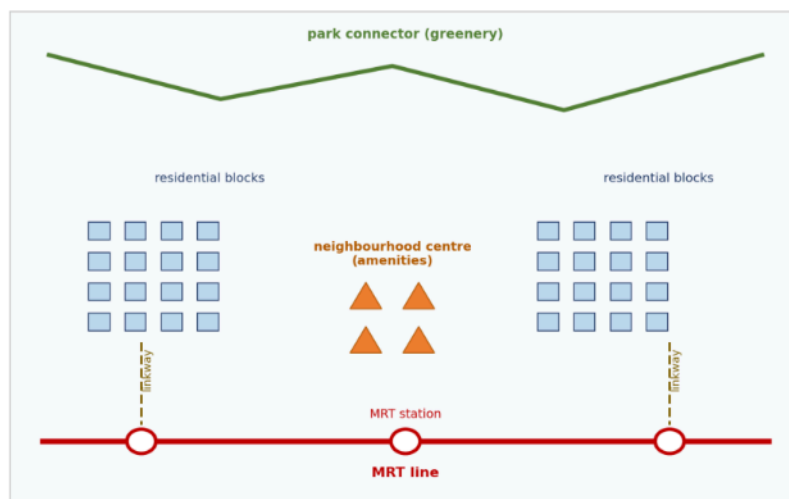
4. Sense of Place

Sense of place is the meaning, attachment and identity that people feel towards a place — the feeling that somewhere is “home” rather than just a location. Good town planning helps build it.

- **Distinctive features and landmarks** give a town its own identity and make it recognisable and memorable
- **Shared communal spaces** (void decks, hawker centres, precinct playgrounds & pavilions) let neighbours have repeated encounters, interact, build bonds and create shared memories
- **Retaining heritage** (conserved buildings, long-standing shops) creates meaning to places, build community identity
- **Belonging**: when people feel attached to their town, they are more likely to care for it and take part in community life

5. Assessment for Learning: Reading a Neighbourhood Plan

Study the simplified plan of a Singapore neighbourhood below.



Question: (a) Describe the spatial pattern of the amenities shown. [2] (b) Identify the spatial association between the amenities and the MRT station. [1] (c) Explain how this plan shows the planning principles of providing for nature AND creating connections. [3]

Sentence starters

- The amenities are ... (pattern) around the ...
- There is a ... association between amenities and MRT station, because they are ...
- The plan provides for nature through the ..., which ...
- It creates connections through the ..., which links ... to ...

Success criteria for peer/self-assessment

- ☐ In (a), I NAMED the pattern (clustered) and gave map evidence (where, near what)
- ☐ In (b), I identified the association as strong/positive, not just “they are close”
- ☐ In (c), I gave a separate example for BOTH principles (nature AND connections)
- ☐ I kept pattern (one feature) and association (two features) distinct
- ☐ I referred to the map throughout, rather than writing general statements

PEOPLE, NATURE & SUSTAINABLE LIVING

O-Level Geography (Syllabus 2260)

People and nature depend on each other. Nature gives people many **benefits**, but human activity can also **harm** nature. The goal is **sustainable living** — enjoying nature's services while keeping environment healthy, and managing hazards of city life.

1. People and Nature: Benefits and Disadvantages

Benefits (nature helps people, people help nature)	Disadvantages (people harm nature, nature harm people)
Lower air pollution / cooler air: greenery shades surfaces and releases moisture, reduce urban heat island and cool surroundings	Soil erosion: heavy footfall and the removal of plants leave soil bare, so wind and rain wash or blow it away
Removes air pollutants: plants absorb carbon dioxide and trap dust and particulates, and release oxygen — improving air quality	Soil compaction: repeated trampling presses soil down, reducing air and water in the soil so plant roots and organisms struggle
Recreational space: parks and green corridors give people places to exercise, relax and gather, improving physical and mental wellbeing	Human–wildlife conflict: as people enter habitats or feed animals (e.g. monkeys, wild boar), wildlife may become aggressive or damage property
Environmental protection: green spaces shelter biodiversity, soak up rainwater to reduce flooding, and protect soils and waterways	

2. Ecosystem Services

Ecosystem services are the benefits people obtain from ecosystems. There are four types — three we use directly, all resting on a foundation of “supporting” services.

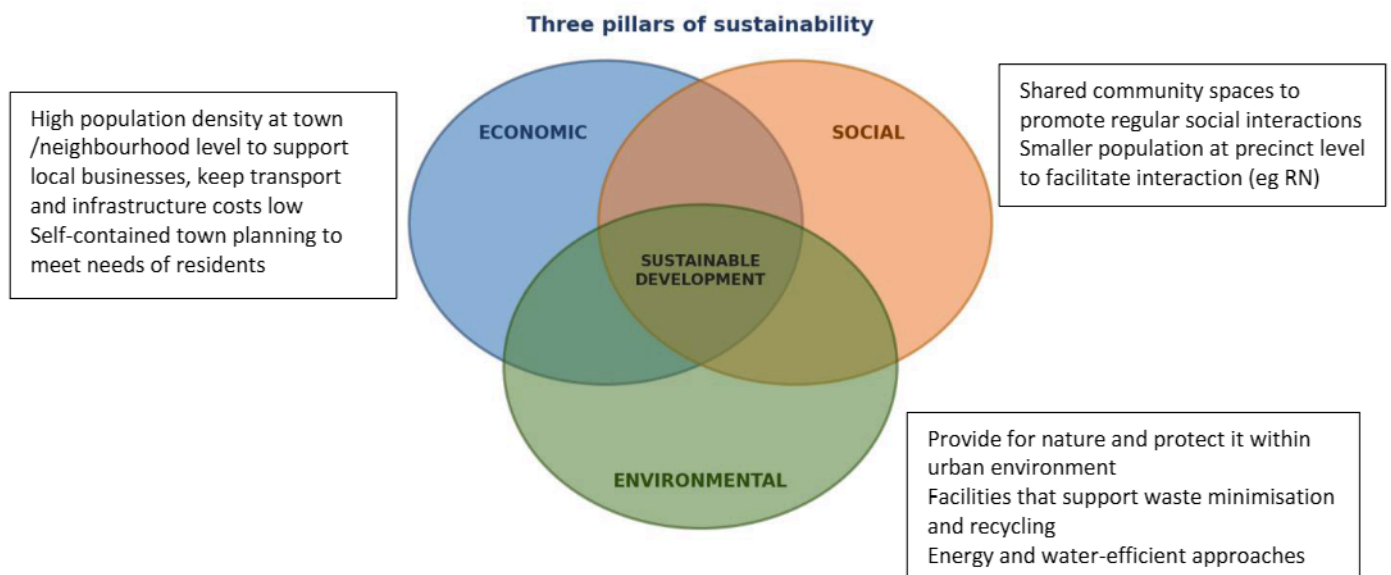
- **Provisioning:** the goods we obtain — food, fresh water, timber, medicine.
- **Regulating:** how nature keeps conditions in check — climate, air quality, flood control, water purification.

Local climate	Water purification / Flood control	Air quality
Trees provide shade, lower temp Forests transpire, increase rain, lower temp	Mangrove roots trap trash, soils trap pollutants → improve water quality Vegetation cover reduce surface runoff, prevent flash floods	Trees photosynthesize and remove pollutants from air

- **Supporting:** the behind-the-scenes processes that make the others possible —soil formation, pollination, nutrient cycling, photosynthesis.
- **Cultural:** non-material benefits — recreation, education, spiritual value, and sense of place.

3. The Three Pillars of Sustainability

Sustainable development means meeting the needs of the present without compromising the ability of future generations to meet their own needs. It balances three pillars — truly sustainable choices satisfy all three at once (the overlap).



4. Urban Hazards

Cities concentrate people and activity, which creates **urban hazards**. Each can be managed to reduce the risk.

Urban hazard	Why it occurs in cities	Impacts
Fire	Dense, high-rise housing and many electrical appliances mean fires can start easily and spread to many people	Health impacts eg burn injuries, smoke inhalation Property damage eg economic losses of goods
Air	Vehicle exhaust, industry and regional haze concentrate pollutants where many people live and work	Health impacts eg respiratory infections, heart disease Economic damage eg events/ flight cancellation
Traffic	Heavy traffic in crowded areas raises the risk of accidents and congestion, endangering pedestrians	Health impacts eg physical injuries, death

5. Caring for People and Environment

Three related ideas describe how communities protect their environment and cope with hazards:

- **Environmental stewardship:** people taking responsibility for caring for and protecting the natural environment through conservation and sustainable practices (e.g. keeping parks clean, saving water and energy, protecting greenery).
- **Disaster risk management:** reducing the risk from hazards by lowering exposure and vulnerability — through prevention, preparedness (plans, drills, warning systems), response and recovery.
- **Community resilience:** the ability of a community to resist, absorb, adapt to and recover from a hazard — built through strong social bonds, residents looking out for one another, and being prepared together.

6. Assessment for Learning: A New Community Park

A town wants to convert an empty plot next to housing into a community park with trails, a pond and open lawns.

Feature planned	Notes
Trees and lawns	Provide shade, greenery and space for recreation
Pond and wetland	Collects rainwater; attracts birds and other wildlife
Walking / cycling trails	Expected to attract many visitors daily

Question: (a) Identify one provisioning OR regulating service the park could offer. [1] (b) Explain one benefit AND one disadvantage of the park for the people–nature relationship. [4] (c) Suggest one way the park could be made more sustainable across all three pillars. [2]

Sentence starters

- A regulating service the park offers is ..., because ...
- One benefit is ...; this happens because ...
- However, one disadvantage is ..., because so many visitors ...
- To be more sustainable, the park could ..., which helps the economy by ..., people by ... and the environment by ...

Success criteria for peer/self-assessment

- ☐ In (a), I named the CORRECT type of service (provisioning or regulating).
- ☐ In (b), I gave a benefit AND a disadvantage, each with a HOW explanation.
- ☐ In (c), I linked my idea to ALL THREE sustainability pillars.
- ☐ I used correct terms (ecosystem service, soil compaction, human–wildlife conflict, stewardship).
- ☐ I referred to the park scenario, not just general points.

GEOGRAPHICAL INVESTIGATION & FIELDWORK

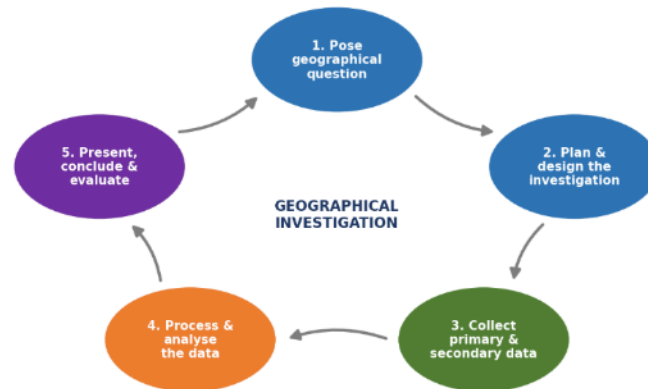
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A **geographical investigation (GI)** answers a geographical question using evidence you gather yourself. This sheet follows the whole process — from designing the study, to collecting **primary data**, to processing, analysing and presenting findings.

1. Designing a Geographical Investigation

A GI follows a cycle. Each stage feeds the next, and the findings may raise new questions.

The geographical investigation cycle



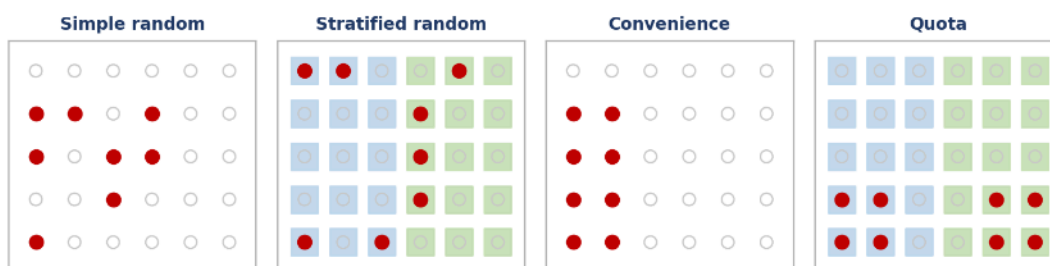
Research question vs hypothesis: a question that outlines the scope for investigation, inquisitive in nature. A hypothesis is a measurable statement consisting of one or two variables related to the scope for investigation, predictive in nature.

Primary vs secondary data: primary data is collected first-hand by you in the field (questionnaires, counts, measurements, mental maps). Secondary data is collected by others (maps, census data, reports). A good investigation often uses both.

2. Collecting Primary Data — HOW to Sample

You usually cannot survey everyone, so you take a **sample**. How you choose the sample affects how fair and representative your results are.

How the four sampling methods pick from a population (red = selected)



Method	Probable?	How you choose	Strength / Limitation
Simple random	Yes	Every person/place has an equal chance; pick using random numbers	Fair and unbiased, but may miss smaller subgroups by chance
Stratified random	Yes	Divide the population into groups (strata), then randomly sample from each in proportion	Ensures every subgroup is represented, but you must know the group sizes first
Convenience	No	Sample whoever is easiest to reach or willing to take part	Quick and cheap, but biased and often not representative
Quota	No	Set a target number for each group (a quota), then fill it by convenience	Ensures subgroups are covered and is faster than stratified, but choice within each quota still biased

Key distinction: random methods (simple random, stratified random) reduce bias; non-random methods (convenience, quota) are quicker but more biased. Stratified and quota both use subgroups — but stratified picks **RANDOMLY** within each group, while quota fills its target by **CONVENIENCE**.

3. Collecting Primary Data — WHAT Method

Questionnaires

A **questionnaire** is a set of questions used to collect information, opinions or behaviours from people. Quantitative.

- **Closed questions** (fixed options, ratings ie Likert, frequency, rating scales) are quick to answer and easy to count
- **Open questions** (free responses) give richer detail but are harder to summarise

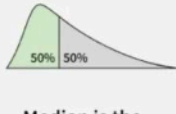
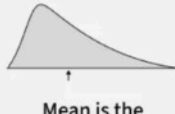
Design tips: keep questions clear and short, avoid biased wording, mix closed and open, and test questionnaire first

Mental maps

A **mental map** is a sketch map a person draws from memory to show how they picture and use a place. It reveals perceptions — which areas people know well, value, avoid, or see as landmarks — making it useful for studying sense of place and how people experience their neighbourhood.

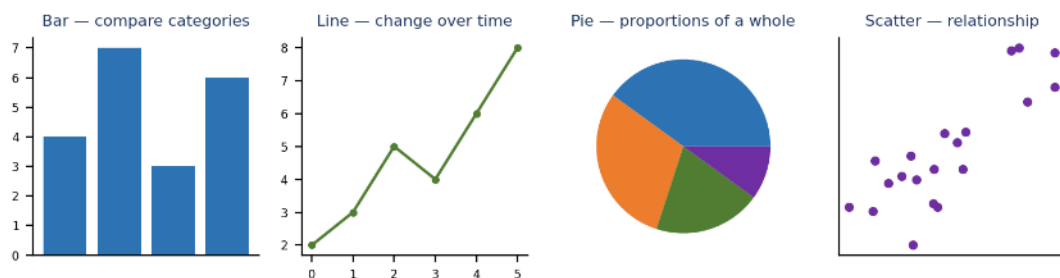
4. Processing and Analysing Data

- **Processing** = organising the raw data: tally and tabulate it, then calculate totals, averages, percentages or ratios so it is easier to work with.
- **Analysing** = making sense of the processed data: look for patterns, trends, relationships and anomalies, and compare different groups or places.
- **Ask:** what does the data show? Is there a clear pattern or trend? Are there any surprising results (anomalies), and why might they occur?

Quantitative findings	Qualitative findings
• Measure frequency eg count, percentage • Measure central tendency eg mean, median, mode MODE  Mode is the most frequent value. Vs MEDIAN  Median is the middle value. Vs MEAN  Mean is the average or norm.	• Content analysis

5. Presenting Findings — Choosing the Right Method

Match the presentation method to the **type of data** and what you want to show.



Presentation method	Best for	Example
Bar graph	Comparing amounts across separate categories	Number of visitors to different parks
Line graph	Showing change over time (continuous data)	Traffic count through the day
Pie chart / divided bar	Showing proportions of a whole (percentages)	Share of residents preferring each amenity
Located / proportional symbols on a map	Showing where things are and how much (spatial data)	Amount of litter at points along a beach
Scatter graph	Showing the relationship between two variables	Distance from town centre vs shop rents