

Human populations and urban systems

International Baccalaureate · IB Diploma · Environmental Systems and Societies · SL

Scope and prerequisites

This handout covers selected SL topics for the course first assessed in 2026; it is not the whole syllabus.

Prerequisites: read the stated quantities and units, and use arithmetic and the model conditions below.

The examples are original and fictional: they are not real measurements or real student investigations.

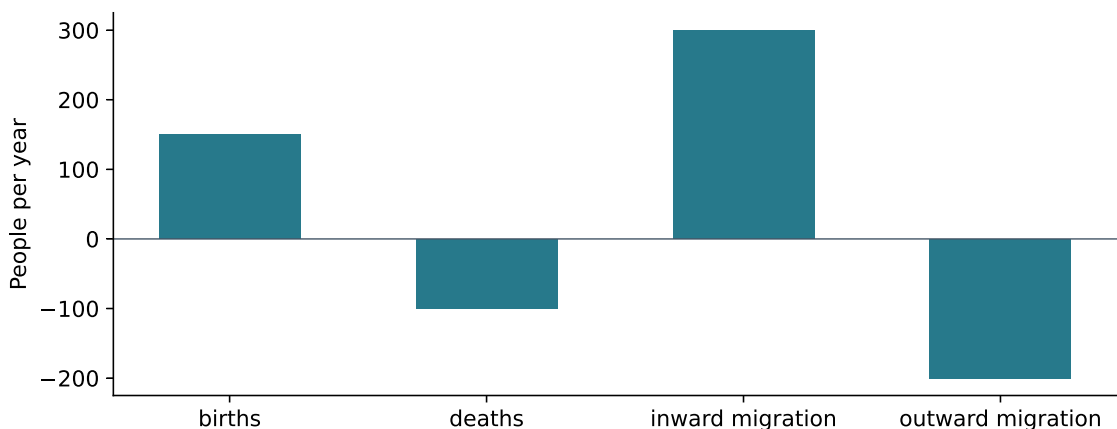
Population, urban systems and indicators

■ What would explain this observation?

- A city can grow because people move into it even when births equal deaths. Population change has several flows.

■ Build the model

- Population change depends on births, deaths, **immigration** and emigration.
- Urban systems exchange energy, materials and waste with a wider region.
- A sustainability **indicator** measures a specified feature rather than total wellbeing.
- immigration: Movement into a population.
- indicator: A measure of a specified condition.



$$\text{Change} = \text{births} - \text{deaths} + \text{immigration} - \text{emigration} = +150 \text{ people, } 1.5\% \text{ of } 10,000$$

■ Choose evidence that can test it

- Compare rates with a common denominator and interval.
- An average can hide unequal access to services.
- At HL, evaluate how economic incentives, legal responsibilities and ethical priorities change an urban management proposal.

In the lab: Use published demographic and city-service data with dates and definitions. Protect privacy when collecting local opinions. Compare the same geographical boundary rather than mixing an urban core with a whole metropolitan region.

■ Work from known quantities

- Known: a city has 10,000 people; births 150, deaths 100, immigration 300 and emigration 200 in one year.
- Change = $150 - 100 + 300 - 200 = 150$.
- Growth percentage = $150 / 10,000 \times 100 = 1.5\%$.

Your turn: A population of 2,000 grows by 40 in a year. Find percentage growth.

■ Check the conclusion and its limits

- A projected population is conditional on assumptions.
- Urban growth does not automatically mean improved health, income or environmental quality for every resident.

Not true: Population growth depends only on births and deaths. Population change = births - deaths + immigration - emigration. A country with more deaths than births can still grow through net immigration, so births and deaths alone do not decide it.

Key:

- Population change depends on births, deaths, immigration and emigration.
- Compare rates with a common denominator and interval.
- Watch for: A projected population is conditional on assumptions.

■ Write from 1 percent growth

- A population of 5,000 has 90 births, 40 deaths, 30 immigrants and 30 emigrants in one year.
- Find the percentage growth. Population change is not births and deaths alone.