8.1 Population, urban systems and indicators

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS immigration • indicator

Objective

Population, urban systems and indicators. Original classroom practice for IB HL; not an official IB paper.

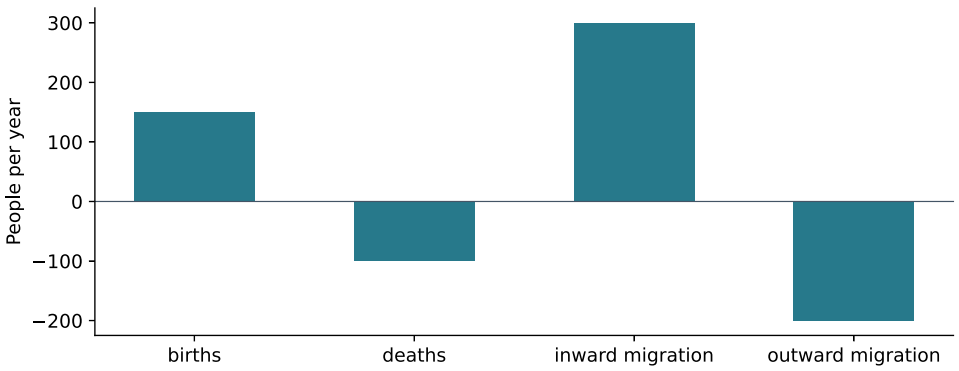
1 Key knowledge and worked examples

■ 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 well-being.
- immigration: Movement into a population.
- indicator: A measure of a specified condition.



■ 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 = 150/10,000×100 = 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.

2 Practice

2.1 Which contributes positively to population change? Choose one answer.

- **A** Emigration
- **B** Deaths
- **C** Immigration [1]

2.2 A population of 2,000 grows by 40 in a year. Find percentage growth. Show the relation, substitution and units. [2]

2.3 Decide whether this claim is true and justify: Population change = births - deaths + immigration - emigration. [2]

2.4 Movement into a population: write the technical term. [1]

3 Exam-style questions

3.1 A fictional town starts at 5,000. Births80, deaths60, immigration150 and emigration70 occur in one year. Find final population and growth percentage. [4]

Solutions

2.1 C Immigration adds people to a population, so it contributes positively; emigration and deaths remove people. Births and immigration are the two positive terms in the population balance.

2.2 growth percentage=40/2,000×100=2%peryear.

2.3 True. True. 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.

2.4 immigration. immigration means Movement into a population.

3.1 Change=80−60+150−70=100; final5,100; growth2%. Projecting this rate assumes stable rates and constraints; one year does not establish that assumption.