Changing population (core: population distribution - changing population)

International Baccalaureate · IB Diploma · Geography · HL

Changing population

IB Diploma Programme Geography HL (first assessment 2019; 2017 guide). This topic covers the first unit of the **core** , *Changing population*, which SL and HL students both study. It has three parts: where people live and why, how populations change, and the challenges and opportunities this brings. Paper 2 tests the core with structured questions, a visual source and an essay. The examiners like calculations from data, so each section below shows one.

In 2024, 9.54 million babies were born in China and 10.93 million people died. The population fell for the third year in a row, to 1.408 billion. Fifty years earlier, China's problem was the opposite: too many births. In one lifetime the country has moved from fast growth to decline. This topic gives you the tools to explain such a change and to judge what governments can do about it.

Must-know for this topic:

Part	Key content
distribution	physical and human factors; density; megacities; core and periphery
measures	birth and death rates; natural increase; doubling time; fertility
change	the demographic transition model; population pyramids; dependency ratio
policy	ageing and youthful populations; pro- and anti-natalist policies
migration	push and pull factors; refugees; internal migration; impacts

Where people live

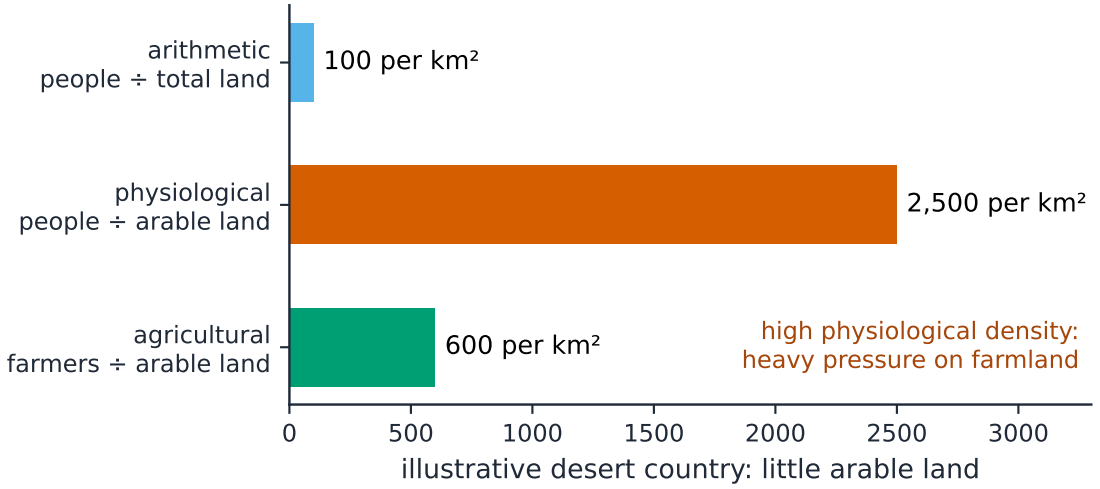
Population distribution is the pattern of where people live. It depends on **physical factors** (climate, water, relief and soil) and **human factors** (jobs, transport, history and government policy). In China, about 94% of people live east of the "Hu Line", a line drawn from Heihe in the north-east to Tengchong in the south-west, on about 43% of the land. The west is high, dry and cold.

Population density is people per square kilometre:

$$\text{density} = \frac{\text{population}}{\text{area}}$$

Dividing by farmland instead of total area gives the **physiological density**

, which shows the pressure on the land that grows food.



The same population gives very different densities depending on which land you divide by

People also move towards cities. A **megacity** has more than 10 million people; there were 33 in 2018 (UN), including Shanghai, Beijing, Chongqing and Guangzhou. Inside a country, a rich, well-connected **core region** (such as the Yangtze River Delta) attracts people, money and ideas from a poorer **periphery** .

Measuring population change

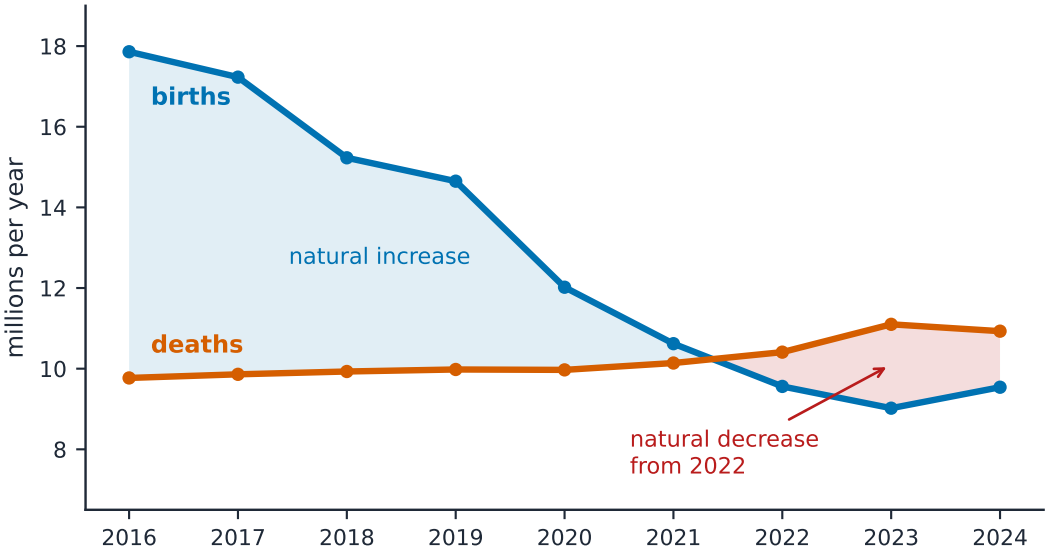
Measure		Meaning
crude birth rate	(CBR)	live births per 1,000 people per year
crude death rate	(CDR)	deaths per 1,000 people per year
natural increase		CBR minus CDR
total fertility rate (TFR)		the average number of children a woman has

A TFR of about 2.1 is the **replacement level** : each generation just replaces itself. China's TFR is about 1.0; Niger's is about 6.

> **Worked example.** A country has a CBR of 24 and a CDR of 8 per 1,000.

- Natural increase $= 24 - 8 = 16$ per 1,000 $= 1.6\%$ a year.
- **Doubling time** $\approx 70 \div$ growth rate in $\% = 70 \div 1.6 \approx 44$ years.

Total change also includes **net migration** : people arriving minus people leaving.



China's births and deaths, 2016–2024: natural decrease began in 2022

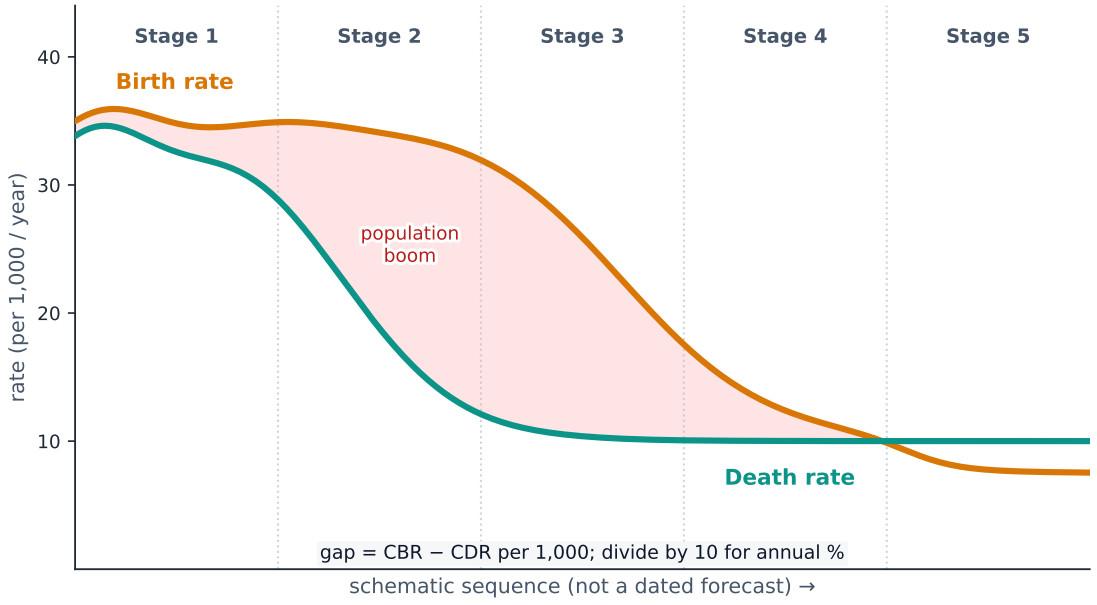
From the graph: in 2024, natural change in China was $9.54 - 10.93 = -1.39$ million.

How populations change

The demographic transition model

The **demographic transition model** (DTM) shows how birth and death rates change as a country develops:

Stage	Birth rate	Death rate	Growth	Reason
1	high	high	slow	disease, little medicine
2	high	falling fast	very fast	clean water, vaccines, more food
3	falling	low	slowing	education for women, cities, contraception
4	low	low	very slow	children cost a lot; people choose small families
5	very low	low or rising	falling	an ageing population (Japan, China)

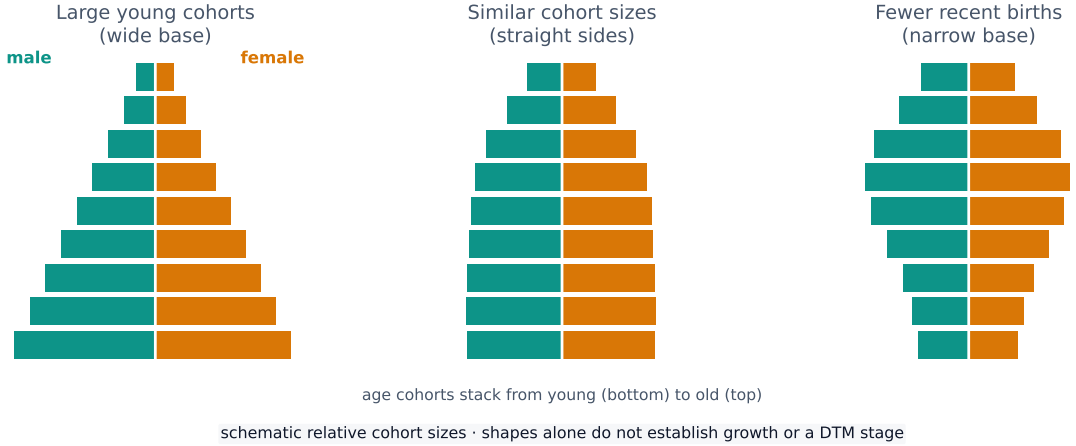


Demographic transition: death rates fall before birth rates, and the gap is population growth

The model is based on European history. It does not include migration, and it does not say how long each stage lasts: China passed through stages 2 to 4 in about 50 years, much faster than Britain.

Population pyramids and dependency

A **population pyramid** shows the number of males and females in each age group. A wide base means many young people; straight sides mean similar numbers at each age; a narrow base means few recent births.



A wide base means large young cohorts; straight sides mean similar cohort sizes

The **dependency ratio** compares people of non-working age with people of working age:

$$\text{dependency ratio} = \frac{\text{aged 0–14} + \text{aged 65 and over}}{\text{aged 15–64}} \times 100$$

> **Worked example.** A town has 20,000 people aged 0–14, 15,000 aged 65 and over, and 70,000 aged 15–64. Dependency ratio = (20,000 + 15,000) ÷ 70,000 × 100 = 50. Every 100 people of working age support 50 dependants.

When birth rates fall, a country for some years has many people of working age and few dependants. This can speed up growth: the **demographic dividend** . China's fast growth from the 1980s used this dividend; it is now ending.

Challenges and policies

Ageing populations have more older people: Japan had about 29% of its people aged 65 and over in 2023. Problems: fewer workers, more spending on pensions and health care. Opportunities: older people care for grandchildren and volunteer, and "silver" industries grow. **Youthful populations** need schools and jobs; without jobs, young people may migrate or become frustrated.

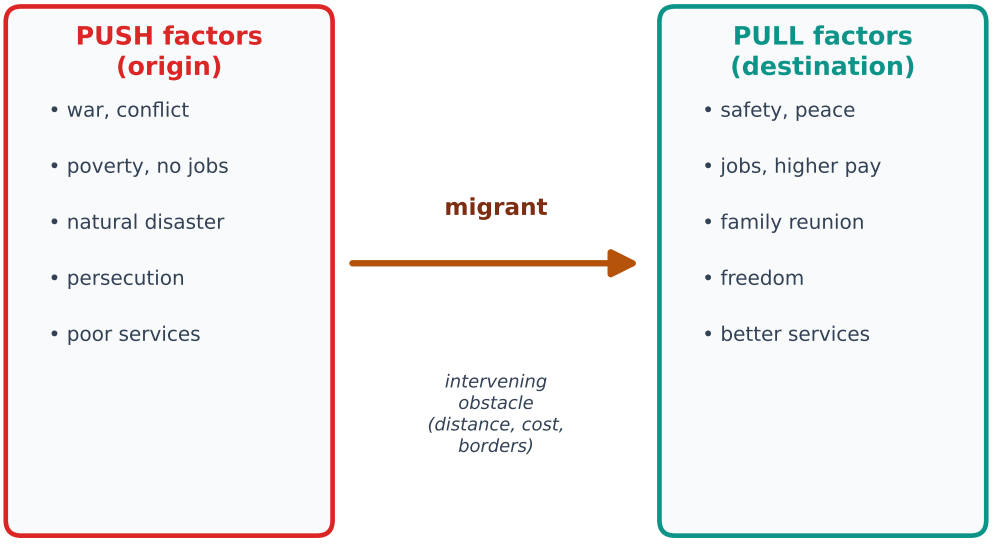
Governments respond with policies:

Policy	Aim	Example
anti-natalist policy	fewer births	China's one-child policy, 1980–2015
pro-natalist policy	more births	China's two-child (2016) and three-child (2021) policies; France's family payments
ageing policy	support an older population	China began slowly raising the retirement age in 2025

Policies on births work slowly. China allowed three children in 2021, but births kept falling, because housing, education and childcare are expensive and many young people marry later. China's **sex ratio at birth** was also unbalanced: about 111 boys per 100 girls in the 2020 census, against a natural level of about 105.

Migration

Migration is a long-term move from one place to another. It can be **internal** or **international** , and voluntary or forced.



Push factors at the origin, pull factors at the destination, and intervening obstacles between

Push factors drive people away; **pull factors** attract them; **intervening obstacles** such as cost, distance and borders stop some people. There were about 280 million international migrants in 2020 (UN). A **refugee** has crossed a border to escape persecution or war; an **internally displaced person** (IDP) has fled but stayed inside their own country.

China has one of the largest internal migrations in history: the 2020 census counted about 376 million people living outside the area where their household is registered, most of them from villages to cities in the east. Under the **hukou** system, many migrants could not easily use schools and health care in their new city, which is slowly changing.

Migration has effects on both places:

	Place of origin	Destination
benefits	**remittances** (money sent home); less unemployment	workers for factories and services; younger population
problems	loss of young workers; children left with grandparents	pressure on housing and services; tension with local people

Checklist

- Distribution: physical and human factors; the Hu Line; arithmetic and physiological density; megacities; core and periphery.

- Measures: CBR, CDR, natural increase, TFR and replacement level 2.1; doubling time ($70 \div 1.6 \approx 44$ years); China's -1.39 million in 2024.
- The DTM: five stages with reasons, and two limits.
- Pyramids; the dependency ratio (worked example 50); the demographic dividend.
- Ageing and youthful populations; anti- and pro-natalist policies; the sex ratio at birth.
- Migration: push, pull and obstacles; refugees and IDPs; China's 376 million internal migrants and hukou; effects at origin and destination.