

Exercise walk-through

3.9

Demographic Transition

AP Environmental Science

Fertility and the demographic transition

Total fertility rate

(TFR) is children per woman.

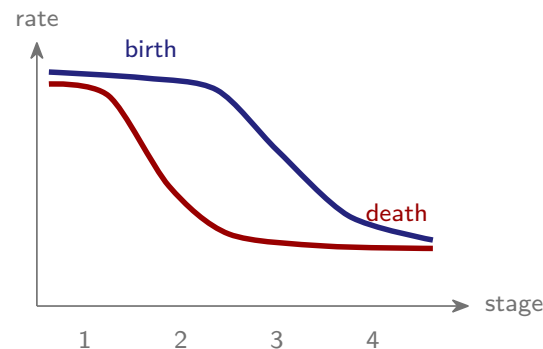
- **replacement**

$$\approx 2.1$$

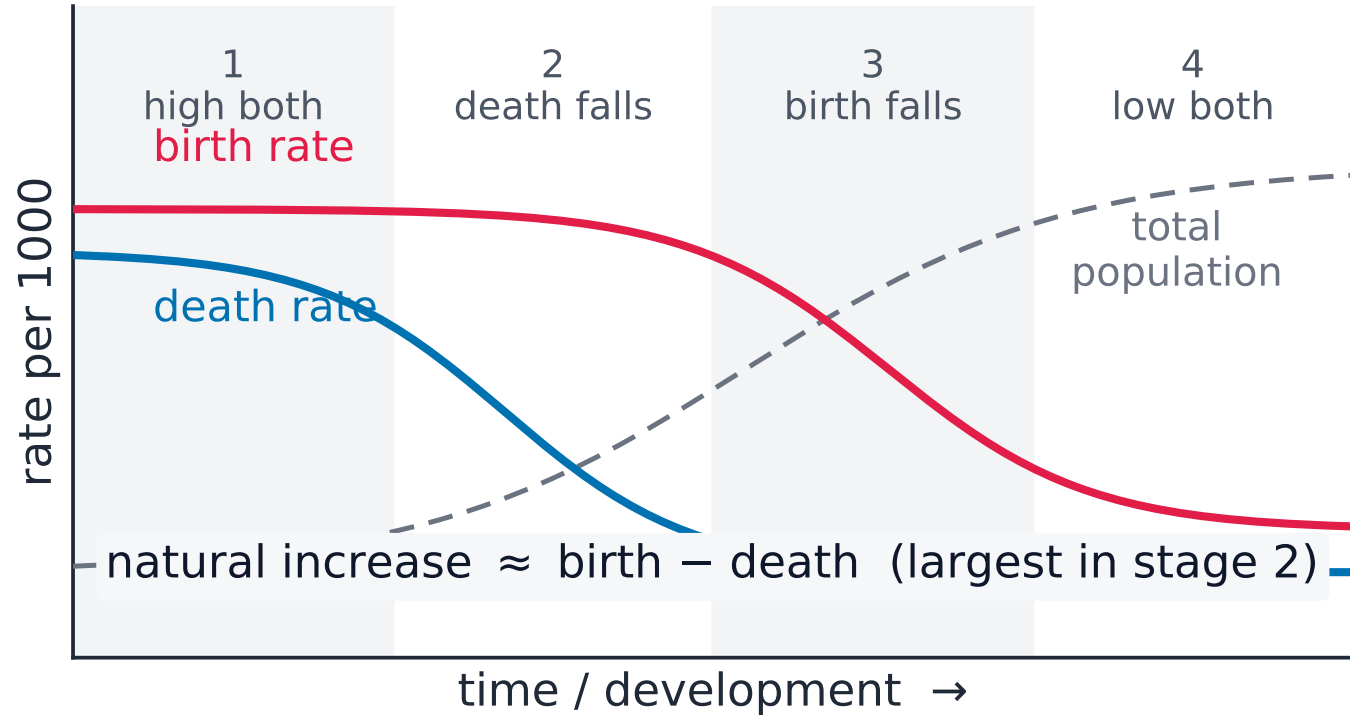
- **doubling time (rule of 70):**

$$t = \frac{70}{r}$$

As a country industrializes, deaths fall first, then births – the **demographic transition**.



The four stages of the demographic transition



The four stages of the demographic transition

Exam tips

- Use the **rule of 70**: doubling time $\approx 70 \div \text{growth-rate}(\%)$; a growth rate is (births — deaths) per 1000 $\div 10$.
- Read **age-structure diagrams**: a wide base predicts rapid growth, even bars a stable population.
- Contrast **r-selected** (many offspring, little care) and **K-selected** (few, much care) strategies.
- Know the **demographic transition** stages and what lowers birth rates (education, family planning, development).
- A falling **growth rate** still means growth — the population only shrinks when deaths exceed births.

Exercises 2.1-2.3

2.1 In Stage 1, what are the birth and death rates like? [1]

2.2 In which stage is population growth fastest? [1]

2.3 What happens to the birth rate in Stage 3? [1]

Exercises 2.1-2.3

2.1 In Stage 1, what are the birth and death rates like? [1]

2.1

- Both high
-

2.2 In which stage is population growth fastest? [1]

2.2

- Stage 2 (transitional)
-

2.3 What happens to the birth rate in Stage 3? [1]

2.3

- It falls

Exercise 3.1

3.1 A country with low birth and low death rates and a stable population is in [1]

☐

A Stage 1

B Stage 2

C Stage 3

D Stage 4

Exercise 3.1

3.1 A country with low birth and low death rates and a stable population is in [1]

☐

A Stage 1

B Stage 2

C Stage 3

D Stage 4

3.1 D

- Stage 4

Exercise 3.2 (a)

3.2 A developing country's death rate has dropped sharply, but its birth rate is still high.

(a) State the stage.

[1]

Exercise 3.2 (a)

3.2 A developing country's death rate has dropped sharply, but its birth rate is still high.

(a) State the stage.

[1]

(a)

- Stage 2

Exercise 3.2 (b)

3.2 A developing country's death rate has dropped sharply, but its birth rate is still high.

(b) Explain why its population is growing rapidly.

[2]

Exercise 3.2 (b)

3.2 A developing country's death rate has dropped sharply, but its birth rate is still high.

(b) Explain why its population is growing rapidly. [2]

(b)

- Deaths have fallen but births remain high, so the gap between them is large and the population grows rapidly

Exercise 3.3

3.3 Explain how development (education and family planning) moves a country from Stage 2 to Stage 3. [2]

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3.3

- Education (especially of women) and access to family planning lower the birth rate, so the birth–death gap narrows and growth slows, moving the country into Stage 3