

Exercise walk-through

3.7

Total Fertility Rate

AP Environmental Science

Fertility and the demographic transition

Total fertility rate

(TFR) is children per woman.

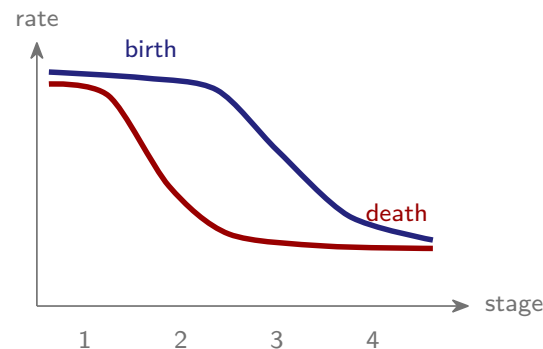
- **replacement**

$$\approx 2.1$$

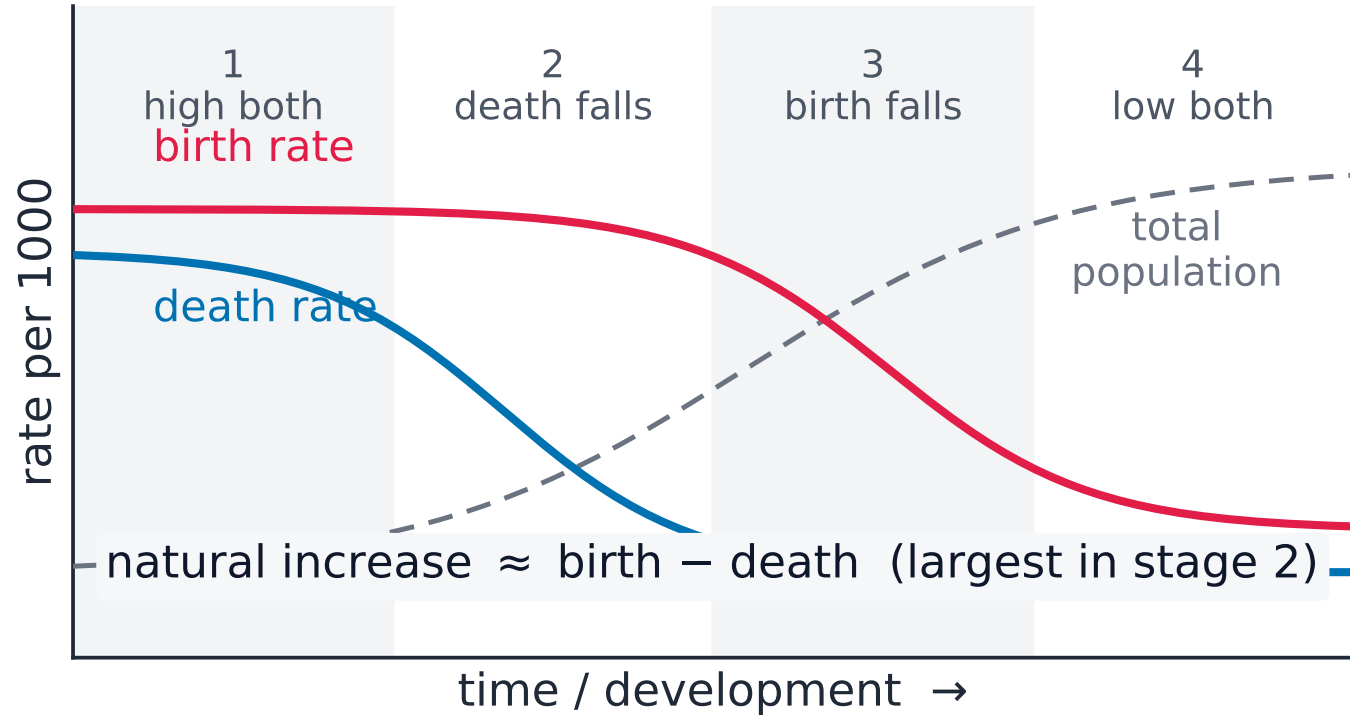
- **doubling time (rule of 70):**

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

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

Human Population Dynamics

Human population growth depends on **birth rate**, **death rate**, and **migration**.

Rapid growth strains resources and increases the **ecological footprint** .

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.

Generalist and Specialist Species

A **generalist** can live in many habitats and eat many foods (raccoon, cockroach) – flexible, so it copes well with change.

A **specialist** needs specific conditions or foods (panda, koala) – efficient in a stable habitat but very vulnerable if that habitat changes.

Exercises 2.1-2.3

2.1 Define total fertility rate.

[1]

2.2 What is the approximate replacement-level TFR?

[1]

2.3 A country has a TFR of 1.5. Will its population grow or decline (long-term)?

[1]

Exercises 2.1-2.3

2.1 Define total fertility rate.

[1]

2.1

- The average number of children a woman is expected to have in her lifetime
-

2.2 What is the approximate replacement-level TFR?

[1]

2.2

- About 2.1
-

2.3 A country has a TFR of 1.5. Will its population grow or decline (long-term)?

[1]

2.3

- Decline

Exercise 3.1

3.1 A TFR above 2.1 leads to a population that

[1]

☐

A grows

B stays exactly constant

C declines

D disappears

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3.1 A

- grows

Exercise 3.2 (a)

3.2 Country X has a TFR of 4.5; country Y has a TFR of 1.8.

(a) State which population is growing and which is declining.

[2]

Exercise 3.2 (a)

3.2 Country X has a TFR of 4.5; country Y has a TFR of 1.8.

(a) State which population is growing and which is declining.

[2]

(a)

- Country X (TFR 4.5) is growing; country Y (TFR 1.8) is declining

Exercise 3.2 (b)

3.2 Country X has a TFR of 4.5; country Y has a TFR of 1.8.

(b) State one factor that lowers TFR.

[1]

Exercise 3.2 (b)

3.2 Country X has a TFR of 4.5; country Y has a TFR of 1.8.

(b) State one factor that lowers TFR.

[1]

(b)

- Any one: education of women, family planning access, urbanization

Exercise 3.3

3.3 Explain why the replacement-level TFR is slightly above 2, not exactly 2. [2]

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3.3

- Two children replace the two parents, but some children die before reproducing, so a little above 2 is needed to keep the population stable