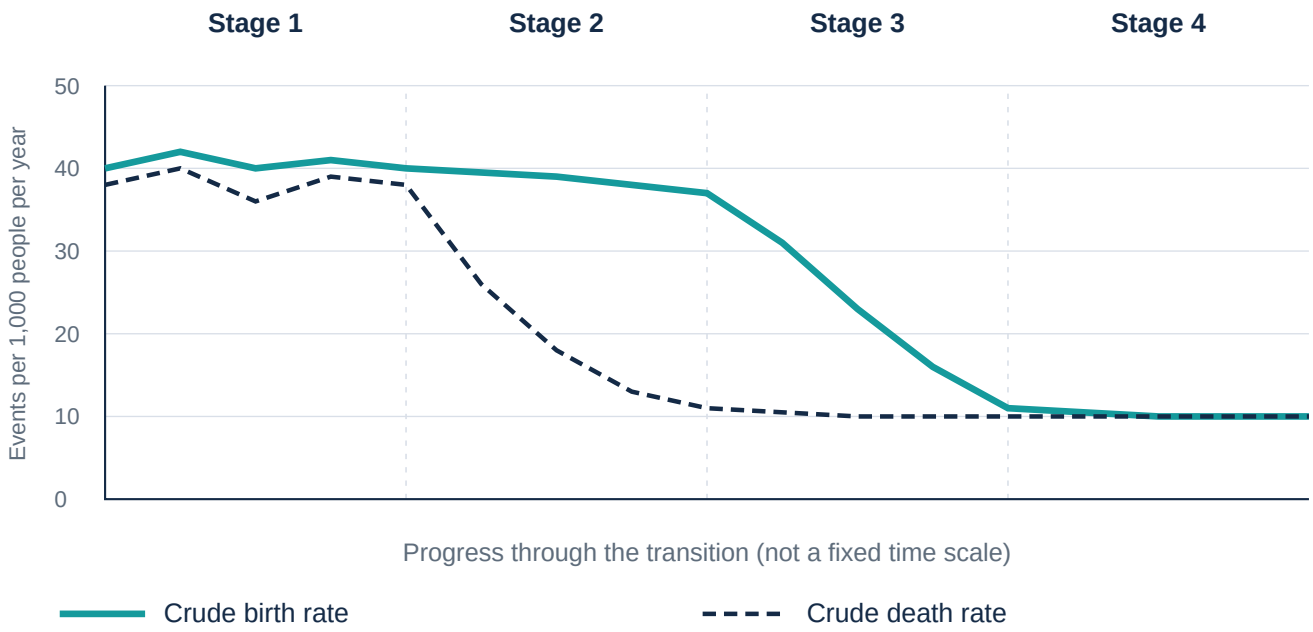
From high rates to low rates

The demographic transition describes a shift from high birth and death rates toward lower rates as a society develops. The APES framework uses a four-stage model.

1. READ THE RATE CURVES TOGETHER



2. THE VERTICAL GAP INDICATES NATURAL INCREASE

When the birth-rate curve is above the death-rate curve, births exceed deaths. The gap becomes large when mortality falls before fertility. As the birth rate later falls toward the death rate, natural increase slows. Migration is not included in this gap.

3. RATE CURVES ARE NOT A POPULATION-SIZE CURVE

A falling birth rate does not necessarily mean a shrinking population. If births still exceed deaths, natural increase remains positive. In the model, low growth in Stage 4 follows a period of population expansion; it does not undo that expansion.

Four-stage framework: College Board, EIN-1.D.1. Graph values are illustrative.
Mortality-fertility sequence: PRB, Population Handbook.

Scope: College Board AP Environmental Science CED, Topic 3.9, p. 73.

Explain each stage, not just its name

The key sequence is mortality decline followed by fertility decline. Health, education, economic opportunities and reproductive choices help explain why the two changes need not happen together.

1. PREINDUSTRIAL: HIGH BIRTH AND DEATH RATES

Births and deaths are both high and may fluctuate, so long-term growth is usually slow. Limited sanitation, nutrition and medical care can keep mortality high. High infant mortality and the economic role of children can contribute to larger desired families.

2. TRANSITIONAL: DEATH RATE FALLS FIRST

Safer water, improved sanitation, food supply and health care reduce deaths. Birth rates remain relatively high while fertility preferences and access to family planning change more slowly. The widening gap produces rapid natural increase.

3. INDUSTRIAL: BIRTH RATE FALLS

Education, employment opportunities, urban living costs, improved child survival and voluntary contraception can support smaller families or later childbirth. Death rates remain low. Births still commonly exceed deaths, but the gap narrows and growth slows.

4. POSTINDUSTRIAL: BOTH RATES ARE LOW

Low birth and death rates are close together, so natural increase is small or near zero. The population is often older. Total population can still grow through net immigration, and population momentum can delay stabilization after fertility declines.

Course comparison: less-developed settings tend to have higher infant mortality and more children in the workforce. These broad associations are not universal traits of every country, household or individual.

Development, infant mortality and child workforce: College Board, EIN-1.D.2.
Stage descriptions: OpenStax, Introduction to Sociology 3e 20.1.

Scope: College Board AP Environmental Science CED, Topic 3.9, p. 73.

Use evidence and state the limits

Compare both birth and death rates, describe how they change, and connect the pattern to a mechanism. Avoid assigning a stage from one number or a country label alone.

1. WORK A TRANSITION EXAMPLE

Observation	CBR	CDR	Natural increase
Earlier	34	12	2.2%
Later	18	9	0.9%

Invented data. CBR and CDR are events per 1,000 people per year.

$$\text{Earlier RNI (\%)} = \frac{34 - 12}{10} = 2.2\% \text{ per year}$$

2. EXPLAIN WHAT CHANGED

The later RNI is (18 - 9) / 10 = 0.9%. Births have fallen more than deaths, so the natural-increase gap narrowed. This is consistent with movement toward a later transition stage, but a longer trend gives stronger evidence. Natural increase remains positive; migration could alter total growth.

3. THE MODEL IS A FRAMEWORK, NOT A TIMETABLE

Countries differ in the speed and path of change. Migration, inequality, conflict, disease and policy can disrupt the pattern. Stage boundaries are approximate. Some extended models add a fifth stage for sustained below-replacement fertility or decline; the APES core model has four stages.

Planning connection: a changing age structure can shift demand from schools toward jobs, housing and later-life services. Smaller family sizes do not automatically lower environmental impact: consumption per person, technology and resource management also matter.

Interpreting and testing the model: PRB, A Contemporary Look at a Classic Model.
Development and changing population needs: PRB, Population and Development.

Scope: College Board AP Environmental Science CED, Topic 3.9, p. 73.