

IGCSE Geography

Course plan

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Topic 1

World population growth

Introduction

Since the beginning of the twentieth century the world has experienced a 'population explosion'. In the last 40 years alone the total world population has doubled in size. Today there are over seven billion people living on Earth and the population is still increasing. In this topic, we will look at how and why the world's population has risen so rapidly and whether or not this rapid rate of growth is likely to continue in the future.

You will probably need 3 hours to complete this topic.



Objectives

In this topic, you will learn about:

- how the world's population has changed over time
- the 'population explosion'
- factors influencing population growth
- variations between the population growth of different countries/ areas of the world
- how the world's population is likely to change in the future.

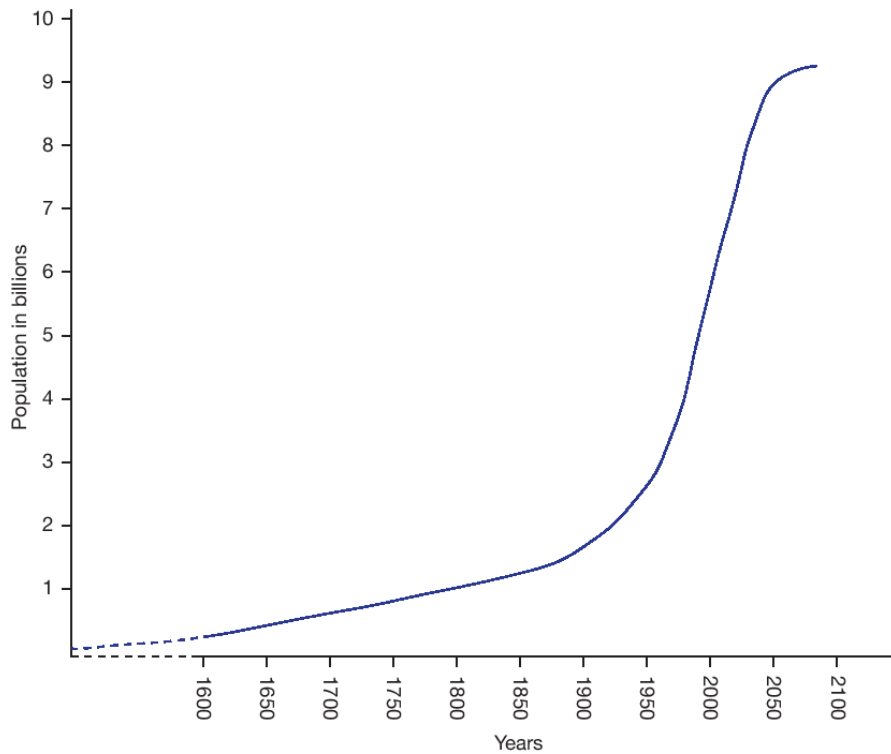
How has the total world population changed over time?

The first humans appeared on earth around 3–4 million years ago but for many thousands of years the world's population grew extremely slowly. As recently as two thousand years ago there were still only 250 million people on Earth and it took until 1650 for the total world population to reach 500 million. Between 1700 and the year 2000, however, the number of people living on Earth increased

tenfold. Not only has the size of the world's population changed, so too has its rate of growth.

Study Figure 1.1, which shows how the total population of the world has changed over time.

Figure 1.1 World population growth



Activity 1

(Allow 15 minutes)

Describe the changes shown on the graph in Figure 1.1. (You should use data from the graph to support your statements.)

You should have noted the following:

- The population has increased over time until today, when the total world population is over 7 billion
- The rate of population growth increased until the year 2000, since when the rate of growth has begun to slow down.
- Between 1630 and 1830 the number of people living on Earth doubled to reach its first billion. Since then, the population has grown at an exponential, or ever-increasing rate – there has

been a population explosion. Each succeeding billion has been reached more quickly than the last until today when there are more than seven billion people inhabiting the Earth (see Table 1.1).

Table 1.1 World population growth in billions

Year	Population to the nearest billion (1000 million)	Number of years taken to add each billion
1650	half a billion	
1800	1	
1927	2	127
1960	3	33
1975	4	15
1987	5	12
1999	6	12
2011	7	12
2024?	8?	13?
2040?	9?	16?
2061?	10?	21?
2100?	11?	39?

Source: compilation from various statistics, e.g. UN statistics US Census Bureau

Activity 2

(Allow 15 minutes)

- How many years did it take for the population to increase from:
 - 1 to 2 billion?
 - 2 to 4 billion?
 - 3 to 6 billion?
- Between which years did the time taken for the world's population to increase by one billion halve?

3 Do the figures shown in the table suggest that the world's population will continue to increase in the future? Give reasons for your answer.

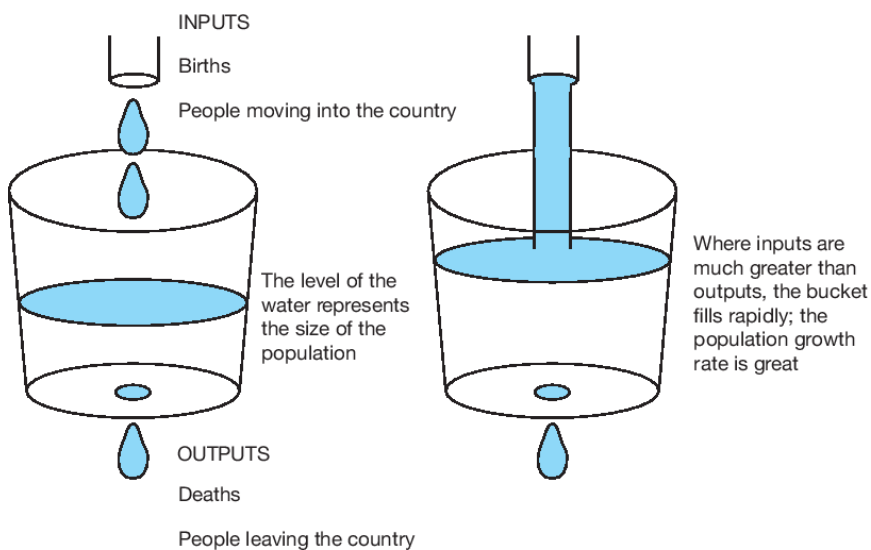
- 1 (a) It took 127 years for the population to go from 1 to 2 billion.
 (b) It took just 48 years for it to double from 2 to 4 billion.
 (c) The population doubled from 3 to 6 billion in less than 40 years (less than the average human lifespan).
- 2 The time taken to add the next billion people halved between 1960 and 1975. This was when the fastest growth occurred.
- 3 Since 1975, although the population of the world has continued to grow, the rate at which it is increasing has begun to slow down. It is now beginning to appear that the population of the world will stabilise at around 11 billion by the end of century, i.e. it may never double again.

So why has there been a population explosion since 1850 and why does the rate of population growth since 2011 appear to be slowing down? To answer these questions we need to look at the factors influencing population change.

Components of population change

The mechanisms that cause a population to grow or decline can be summarised in a simple flow diagram as shown in Figure 1.2 below.

Figure 1.2 Components of population change



The rate at which the population of a country/area changes will depend on the balance between:

- the number of births or deaths (natural change)
- the number of people leaving and entering the country/area (net migration).

In Figure 1.2, if the tap is turned on full so that water enters the bucket faster than it can escape through the hole, then the water level rises. The greater the difference in the speed of water entering compared to water escaping, the faster the water level will rise. Similarly, the greater the difference between the number of people being born or moving into a country (immigration) and those dying or leaving a country (emigration) the faster the population will increase, i.e.:

Population growth/decline = natural change (births – deaths) + (emigration – immigration)

Activity 3

(Allow 15 minutes)

- 1 Complete the table below to show how the total population of countries A and B changes during the year.

	Country A	Country B
Total population at the beginning of the year	50 000 000	30 000 000
Number of births	9000	5000
Number of deaths	8000	7000
Natural change	?	-2000
Immigration	1000	9000
Emigration	3000	1000
Net immigration	-2000	?
Population change (natural change plus net immigration)	?	+ 6000
Total population at the end of the year (population at the beginning of the year – total change in population)	49 999 000	?

2 Look at the words in italics in the following paragraph and underline the correct option.

- (a) In Country A the population of the country has *decreased/increased* naturally but due to the large amount of *emigration/immigration* the overall population of the country has *decreased/increased*.
- (b) In Country B the population has *decreased/increased* naturally but due to the large amount of *emigration/immigration* the total population has *decreased/increased*.

- 1 Country A natural change = +1000
 Country B net migration = +8000
 Country A population change = -1000
 Country B total population = 30 006 000

- 2 (a) In Country A the population of the country has increased naturally but due to the large amount of emigration the overall population of the country has decreased.
- (b) In Country B the population has decreased naturally but due to the large amount of immigration the total population has increased.

As you can see from Activity 3, the effect of migration on the growth or decline of the population of a country can be considerable. However, at a global level, population change is caused only by changes in birth and death rates, i.e. by natural change.

Factors influencing natural change

The rate at which the world's population changes, i.e. the speed with which it grows or declines, depends on the difference between the rate at which people are being born (the birth rate) and the rate at which they are dying (the death rate). We can express this as a simple equation:

Rate of natural change (population growth/decline) = birth rate - death rate

Birth rate

This is the number of births that occur in any one year per 1000 head of population. For example, if a county's birth rate is 11 per 1000 this means that, on average, for every 1000 people in the

country 11 people are born each year. This figure is sometimes expressed as a percentage, e.g. a birth rate of 11 per 1000 would be expressed in percentage terms as 1.1 per cent ($\frac{11}{1000} \times 100$).

Death rate

The death rate is the number of deaths in any one year per thousand head of population. So if a country's death rate is 6, this means that, on average, for every 1000 people in the country, six people die each year (0.6 per cent).

The rate of natural change is the difference between the crude birth rate and the crude death rate. Using the examples given above the natural rate of change would be five per 1000 (11 minus 6) or 0.5 per cent.

Activity 4

(Allow 10 minutes)

Complete the following table to show the birth rates, death rates, and rates of natural change of each of the countries as both ratios and percentages (Country A has been completed for you).

Country	Birth rate per 1000	% birth rate	Death rate per 1000	% death rate	Rate of increase per 1000	% rate of natural increase
A	11	1.1%	3	0.3%	8	0.8%
B	26			1.0%	16	1.6%
C	22	2.2%	9	0.9%		

B: % birth rate = 2.6%

B: Death rate per 1000 = 10

C: Rate of increase per 1000 = 13

C: % rate of natural increase = 1.3%

Some other terms that you might find useful to know when studying population change are:

- **infant mortality rate:** the number of children who die each year before they are 1 year old, measured per 1000 live births
- **life expectancy:** the average number of years that a newborn infant can expect to live under current conditions.

Using rates of change rather than actual numbers makes it easier to compare the growth of population in countries/areas of the world with different-size populations.

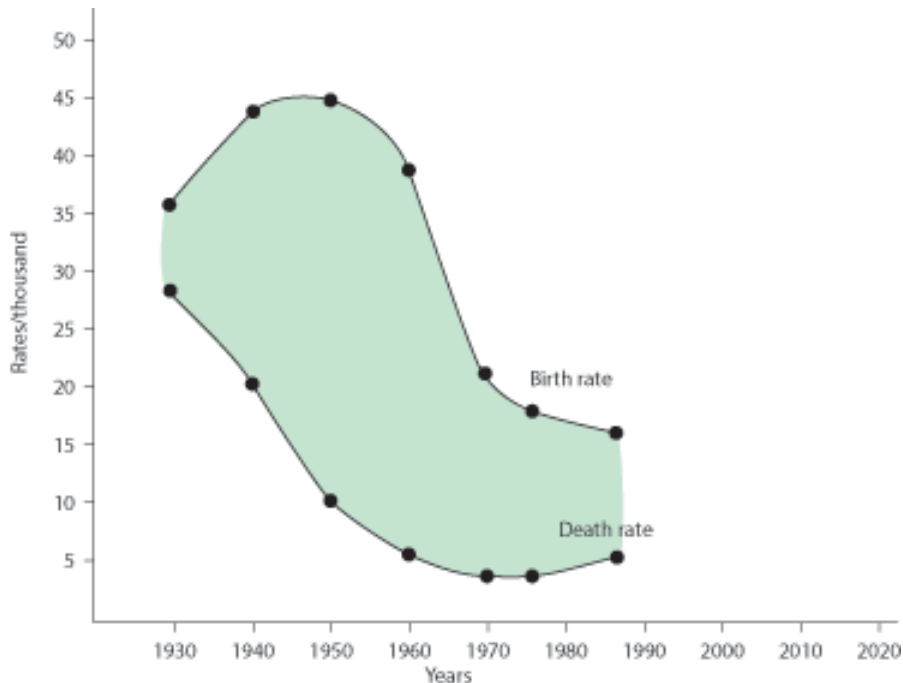
The effect that differences between the birth and death rate have on the rate of natural change of a population can be seen more easily using a graph.

Activity 5

(Allow 15 minutes)

Below is a graph of birth and death rates in Singapore.

Figure 1.3 Singapore birth and death rates 1930-2016



Complete it using the figures listed in the following table.

Date	Birth rate	Death rate
1990	14.0	4.7
2000	13.7	3.9
2016	8.4	4.8

- 2 What does the shaded area of the graph represent?
- 3 In which year did the population increase the most? Give reasons for your answer.
- 4 Use the information from the graph to write a sentence or two describing the changes in the growth of Singapore's population between 1930 and 2016. (Make sure that you describe the changes in all three of the rates shown on the graph, i.e. birth rates, death rates, and rates of natural increase.)

You will find feedback to this activity at the end of the topic

Study hint

It is the difference between the birth and date rate that is important in determining the speed at which a population grows, not the rate itself. So for example, in countries where both the birth rate and death rate are high, the population will increase only slowly.

Self check 1

(Allow 15 minutes)

- 1 What is meant by the term 'population explosion'?
- 2 Between approximately which years did the world's population explosion occur?
- 3 Explain the difference between the following pairs of terms and phrases:
 - (a) emigration : immigration
 - (b) death rate : life expectancy
 - (c) birth rates : infant mortality rates
 - (d) natural change : net migration

(e) the rate of population growth : the actual population growth.

You will find feedback to self checks at the end of the section.

How has population growth varied geographically?

Figure 1.1, earlier in this topic, shows how the population of the world has increased over time but it does not show how the growth that has occurred has varied from one country or area to another. The growth of the world's population since 1800 has not been equal; at different points in time some areas of the world have grown faster than others. Two main stages of growth can be recognised.

■ Stage 1: 1800–1950

The industrial revolution that occurred during the late nineteenth and early twentieth century began in Western Europe and the USA and it was these more economically developed countries (MEDCs) that initially experienced the fastest population growth. Technological developments improved food security and with better nutrition resistance to disease increased, life expectancy rose and both death rates and infant mortality started to fall.

■ Stage 2: 1950 to the present day

As standards of living in Western European countries and the USA continued to improve, birth rates in these countries declined and the growth of population began to slow down. Developments in technology and medicine also caused a decline in death rates in most countries around the world. (We will look at the reasons for these changes in more detail in the next topic.) In those countries that were the least developed (LEDs), the birth rate remained high, with fewer children dying and life expectancy rising, so population growth in these countries was extremely rapid (see Table 1.2). Between 1950 and 1960 the population of some of the world's less economically developed countries grew at a rate of 3% per year (a doubling time of around 23 years). This is a rate much higher than that experienced by the USA and countries in Western Europe even in their fastest phase of growth.

Table 1.2 Birth and death rates for selected countries

Country	Continent	Crude birth rate 1960	Crude death rate 1960	Crude birth rate 2015	Crude death rate 2015
UK	Europe	18	12	12	9
Portugal	Europe	24	11	8	11
Botswana	Africa	47	16	25	8
Chad	Africa	46	27	45	14
Nigeria	Africa	46	26	39	13
Bangladesh	Asia	49	20	19	5
India	Asia	42	22	20	7
Japan	Asia	17	8	8	10
Singapore	Asia	38	6	10	5
USA	North America	24	10	12	8
Brazil	South/Central America	43	13	15	6
Mexico	South/Central America	46	12	18	5

Source: <http://data.worldbank.org>

Current and future population growth

The rate of growth of the world's population peaked at around 2.4% in the mid 1960s and since then it has almost halved. In many areas of the world, birth rates are now declining faster than was originally predicted, particularly in newly industrialised countries (**NICs**), e.g. Malaysia, China, Singapore.

However, growth rates remain high in some parts of the world, e.g. sub-Saharan areas of Africa, the Middle East and South and Central America (see Table 1.3).

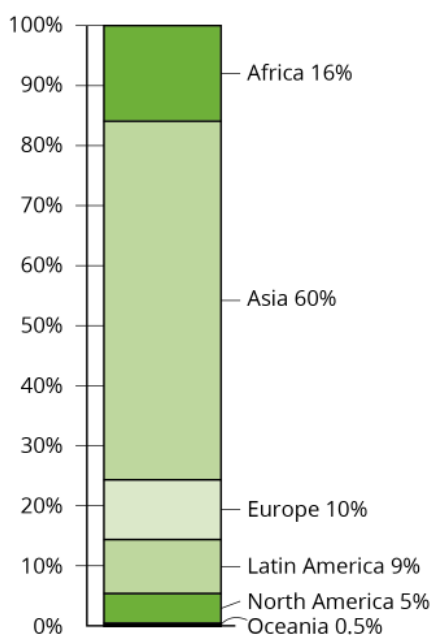
Table 1.3 Birth and death rates for the year 2015/16 for some major world areas

Country	Birth rate 2015	Death rate 2015	Percentage rate of change 2016
World	21	9	1.2%
Middle East and North Africa	24	5	1.7%
Sub-Saharan Africa	37	10	2.7%
South Asia	21	7	1.3%
East Asia	14	7	0.7%
South and Central America	17	6	1.5%
North America	12	8	0.6%
Europe and Central Asia	12	10	0.5%
Singapore	Asia	38	6

Source: <http://data.worldbank.org/indicator>

LEDCs and NICs not only have the fastest rates of population increase, they also contain over 80% of the world's population (see Figure 1.4). In future almost 95% of the world's population growth will be in these countries, while the proportion of population living in MEDCs will stay roughly the same as it is now, or even decline.

Figure 1.4 Percentage of the world's population by continent



Source: <https://www.statista.com/statistics/237584/distribution-of-the-world-population-by-continent>

Activity 6

(Allow 10 minutes)

Study Table 1.3 and Figure 1.4 above.

Which area of the world had the:

- fastest rate of population growth in 2015/16?
- slowest rate of population growth in 2015/16?
- greatest percentage of the world's population in 2015/16?
- smallest percentage of the world's population in 2015/16?

Your answers should be as follows:

- Sub-Saharan Africa had the fastest rate of growth.
- Europe had the slowest rate.
- Asia had the greatest percentage of the world's population in 2015/16.
- The USA had the smallest percentage of the world's population in 2015/16.

Did the figure for Europe surprise you?

Study hint

Remember that the rate of population change of a country or area, unlike that of the world, depends not just on natural change but also on the balance between the number of people moving into and out of the country or area (migration). If the death rate is higher than the birth rate then the natural rate of change can be negative. This does not necessarily mean, however, that the population of the area or country concerned will decrease.

Future population numbers

Although Africa has the fastest rate of population growth, the greatest percentage of the world’s population currently lives in Asia. As a result, the majority of the people added to the world between now and 2025 are likely to be Asian. By 2050 only around 12 per cent of the world’s population will live in countries currently classified as MEDCs, and China and India will be the world’s two largest countries in terms of population.

Even if the birth and death rates in LEDC countries continue to drop, the total world population is still predicted to rise by around 3 billion between now and 2048. Can you think why?

There are two main reasons:

- 1 The population of the world is now more than double the size that it was in 1950, and is still increasing. So even though the rate of growth of population has decreased, the actual number of people added to the world’s population each year is still likely to be high. In 2007, for instance, the number of people added to the world’s population was around 94 million. If you find this difficult to understand then consider the following examples.

Year	Total world population	Growth rate	Number of people added to the world’s population
1962	3.1 billion	2.19	69.5 million
2015	7.3 billion	1.2	87.6 million

Source: US Census Bureau International Database 2005/
<https://esa.un.org/unpd/wpp>

- 2 It takes around 20 to 30 years for any children that have been born to reach the age when they themselves will have children, so the population will continue to grow for some years after the rate of growth has declined. While the rate of growth of the world's population peaked in the mid 1960s, the number of people added to the world's population did not begin to decline until 1987, since when it has risen again. The tendency for the population to go on growing after the rate of growth has fallen is known as **demographic momentum**.

Self check 2

(Allow 15 minutes)

- 1 Explain why:
 - (a) the population of countries in Africa, Asia and Latin America has grown more quickly between 1950 and the present day than those of Western Europe and the USA did between 1850 and 1950
 - (b) in 2025, in terms of their population, India and China will be the largest two countries in the world
 - (c) the world's population will continue to grow in the next 30–50 years.
- 2 Why is it important when studying the world's population growth to look not just at rates of growth but also at the actual number of people added to the population each year?

You will find feedback to self checks at the end of the section.

Summary

- The world's population has passed through three phases of growth:
 - Until 1650 growth was very slow.
 - From 1650 onwards the rate of growth increased and from around 1850 until the year 2000 there was a population explosion.
 - Since then the growth of the world's population has begun to slow down and may begin to stabilise by 2050.

- The population of a country is affected by both natural change and migration: the population of the world is affected only by natural change.
- Despite the decrease in the rate of world population growth, the population is likely to go on increasing for the next 40 to 50 years.

Key terms

birth rate: the number of births per 1000 people in any one year

death rate: average number of deaths per 1000 people in any one year

demographic momentum: the tendency for the population to go on growing after the rate of growth has fallen

emigration: movement out of home country

exponential growth: growth which is ever-increasing

immigration: movement into a country from abroad

infant mortality rate: the number of children per 1000 people that die before the age of one year

LEDC: less economically developed country

life expectancy: the average number of years that a new born infant can expect to live under current conditions

MEDC: more economically developed country

natural change: the difference between the crude birth rate and the crude death rate

net migration: difference between in- and out-migration for an area

NIC: newly industrialised country

population explosion: a significant and ever-increasing growth in population

References



US Census Bureau statistics: <http://esa.un.org/unpp/p2k0data.asp>

US Census Bureau International Database 2005:
www.singstat.gov.sg/statistics

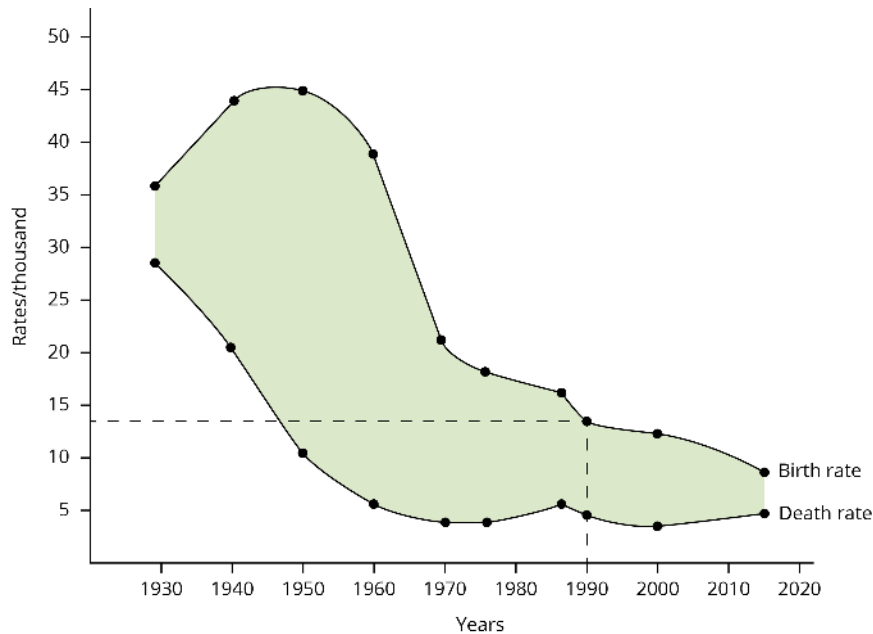
www.indexmundi.com/facts

<http://data.worldbank.org/indicator>

<https://www.statista.com/statistics/237584/distribution-of-the-world-population-by-continent>

Feedback to activities

Activity 5



- The shaded area on the graph represents the rate of natural increase of the population.
- The population increased the most in 1950 because the difference between the birth rate and death rate was at its greatest.
- In 1930, population growth was slow as both the birth rate and the death rate were high, i.e. the rate of natural increase (as shown by the shaded area) was only small. Between 1930 and 1950 the birth rate rose to its highest level of 45 per 1000 while the death rate decreased rapidly leading to a high rate of natural increase (35 per 1000). Between 1950 and 1975, death rates and birth rates both fell and the rate of natural increase (13 per 1000) was much smaller. Since then, the birth rate has continued to fall while the death rate has decreased slightly and then risen again so that in 2016 there was a low rate of natural increase, i.e. population growth had slowed down.

What next?

We hope this sample has helped you to decide whether this course is right for you.

If you have any further questions, please do not hesitate to contact us using the details below.

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