

## POPULATION PYRAMIDS EXPLAINED

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**H**OW MANY BOYS/GIRLS are there aged between 15 and 19 in the UK? What is the percentage of females over the age of 70? What is the percentage of children under 15 compared with the number of adults aged 15–65? All these questions can be answered by looking at population pyramids.

### What are population pyramids?

Population pyramids are diagrams that show how many males and females there are in different age groups in a particular year. Therefore they can show the structure of the population of a whole country or of an individual

settlement at a point in time.

Population pyramids are useful because they can be drawn for different years so that changes in the population structure can be seen. The numbers of people in different age groups will vary according to the birth rate and death rate of the area. So as a country develops, changes in the structure of the population can be seen. As well as natural changes in birth and death rates, other factors, such as migration, affect the number of people living in an area. This unit explores the shapes of population pyramids, and how and why they change over time.

### What are the characteristics of a population pyramid?

Population pyramids consist of two graphs (one for males and one for females) drawn side by side. The pyramid is drawn for age groups five years apart. It has a stepped appearance depending on the numbers of people in each age group. From the shape of the pyramid, information on birth and death rates can be suggested. The width of the base, angle of the sides, and height and width of the apex, are important clues. Look at Figure 1, which shows how to interpret the basic shape of the population pyramid.

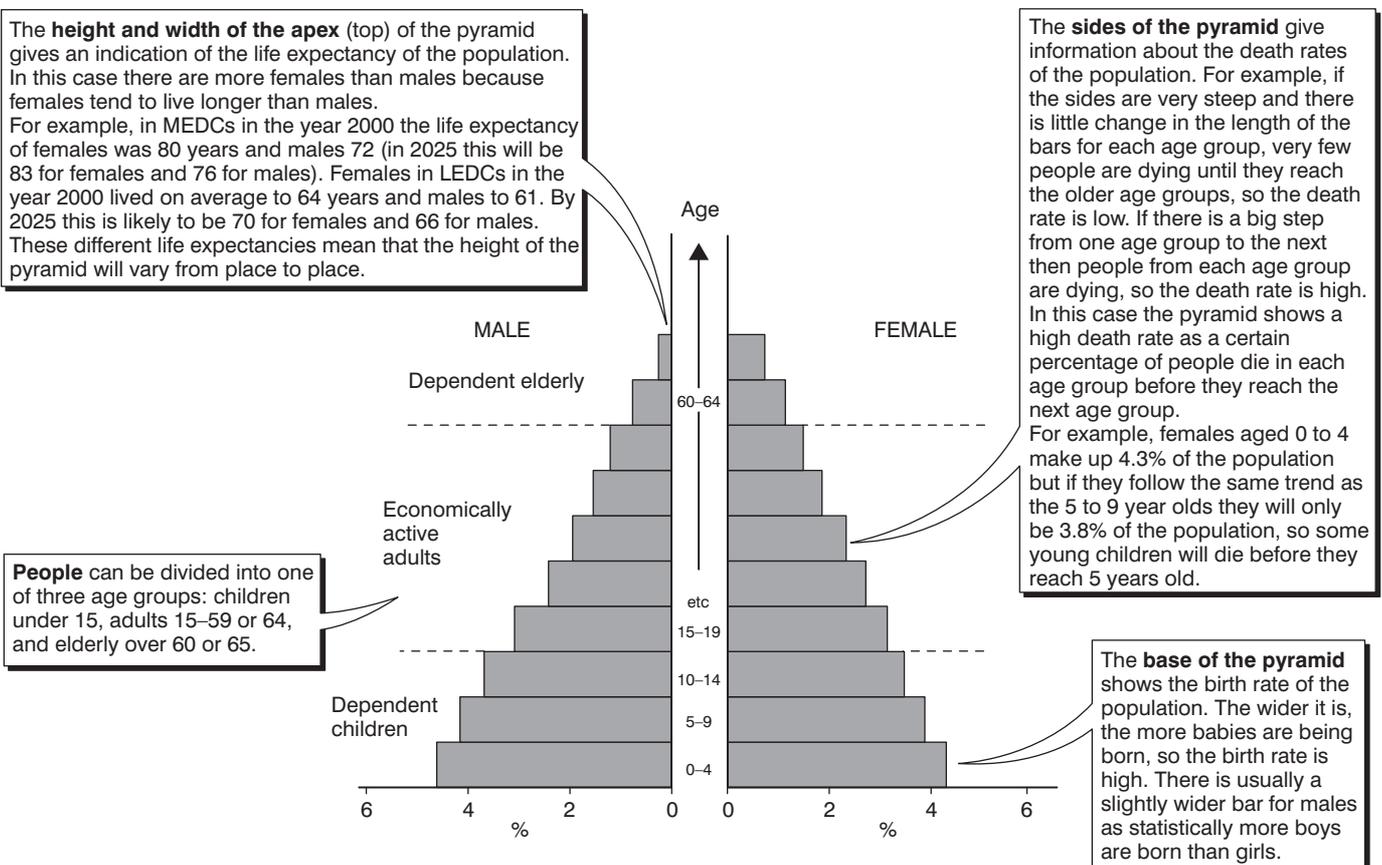


Figure 1: Interpreting a population pyramid

$$\text{Dependency ratio} = \frac{\% \text{ (or number) of children under 15} + \% \text{ (or number) of elderly over 60}}{\% \text{ (or number) of economically active adults aged 15-59}} \times 100$$

## The dependency ratio

To describe the structure of the population it is convenient to look at how many children, adults and elderly people there are. The actual ages chosen to define 'children' and 'elderly' may vary from country to country but generally 'children' are under 15 years and 'elderly people' are over 60. The adults (economically active people between 16 and 59) pay taxes and help to support children and elderly people. So a comparison of the numbers or percentage of children and elderly with the number or percentage of adults may be used to plan facilities and make provision for the future.

The dependency ratio can be worked out using the formula set

out above. The answer is the number of children and elderly people who depend on 100 adults. The higher the number the more people the adults have to support. LEDCs tend to have a high dependency ratio, and MEDCs a lower one, which helps strengthen the economy.

In some countries, especially LEDCs, the dependants are mainly children while in MEDCs they are mainly the elderly. Knowing that the population is youthful will help governments to plan medical services, schools and other amenities related to children. An ageing population requires different types of medical services, housing provision, pensions and social facilities for the elderly.

## The sex ratio

Another calculation that is commonly used is to compare the number of males and the number of females. This is called the sex ratio and is quoted as the number of males to 100 females. At birth the average ratio is 103. This is because 103 males are born to every 100 females. This number gradually evens out in other age groups and the sex ratio for older age groups tends to be much lower because there are fewer males compared with females. For example, in MEDCs the sex ratio for people over 65 years is 66, ie there are 66 males for every 100 females, because females tend to live longer.

Knowledge of the sex ratio may be important for a country, as it has social implications. An imbalanced ratio may require some government action to restore the balance, or services and facilities have to be provided that are suitable for the numbers of males/females in the country.

## Population pyramids in LEDCs and MEDCs

A comparison of pyramids from LEDCs and MEDCs shows the differences in the age and sex structure of the population very clearly. Look at Figure 2, which shows the population pyramids of Madagascar and Australia. Each of these two countries has a population under 20 million but they have very different population structures. Their birth and death rates are very different and this has resulted in the contrasting shapes.

Australia is an MEDC and compared with Madagascar (an LEDC) it has a pyramid with:

- a narrower base, showing a lower birth rate
- steeper sides, indicating a lower death rate
- a wider apex, showing a longer life expectancy
- fewer children but more elderly dependants.

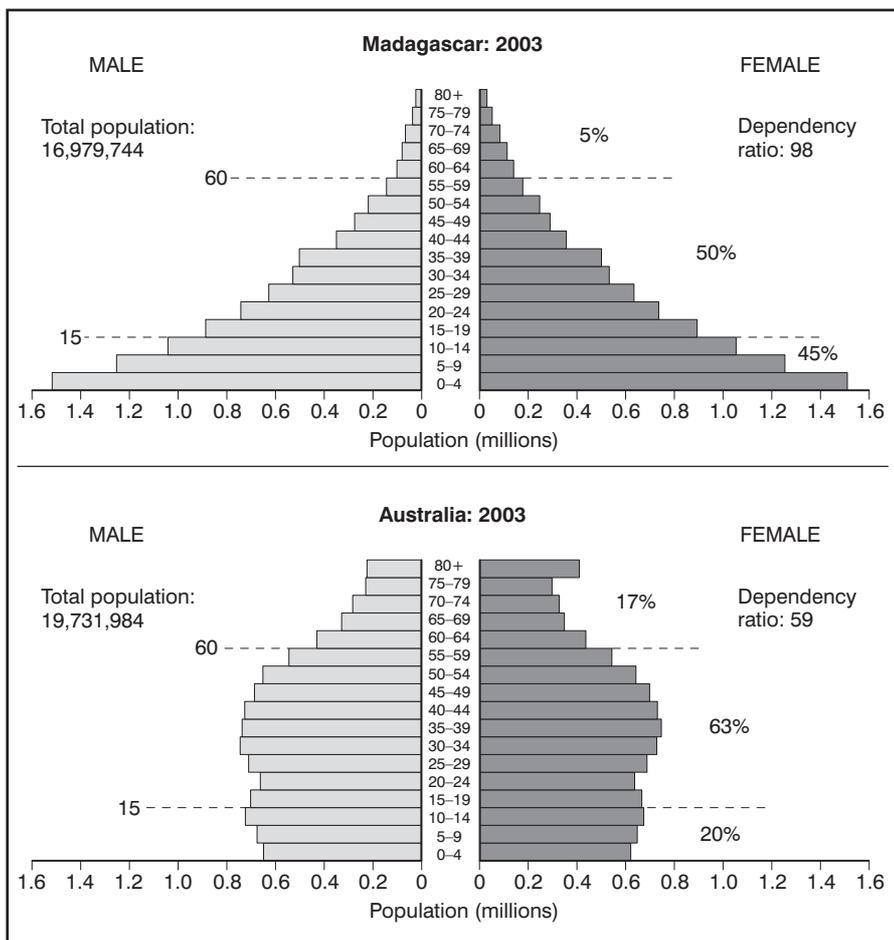


Figure 2: Comparing population pyramids of an LEDC and an MEDC

## Why are some population pyramids very oddly shaped?

Besides showing evidence of birth and death rates, population pyramids also indicate events such as war, epidemics and migration that may have resulted in the loss or gain of people in particular age groups. Look at Figure 3, which shows two population pyramids where migration of young males for work has affected the population structure of the country. This has made the pyramids lopsided and resulted in an imbalanced sex ratio. In 2025 the 35–39 age group is predicted to have a ratio of 364. That means there will be 364 males for every 100 females!

Interpretation of population pyramids is based on suggestions, and there may be more than one reason for the actual population structure. A closer look at the country, its history and population policies will give you a more accurate explanation of the structure.

## Case Study

### China

China introduced its **one child policy** in 1980 when it was feared that its population growth would exceed the country's ability to provide for the people. Famine and poverty would result if strict measures were not introduced to ensure that couples only had one child. Most couples want to have a boy as their single child, and this has resulted in the abandoning and even killing of some of the girl babies.

The first children born under this policy are now aged around 23, and these single children are starting to have their own 'one child'. Look at Figure 4 and compare the pyramids. Note how the population will change from a youthful one to an ageing population, and that the dependency ratio is gradually increasing.

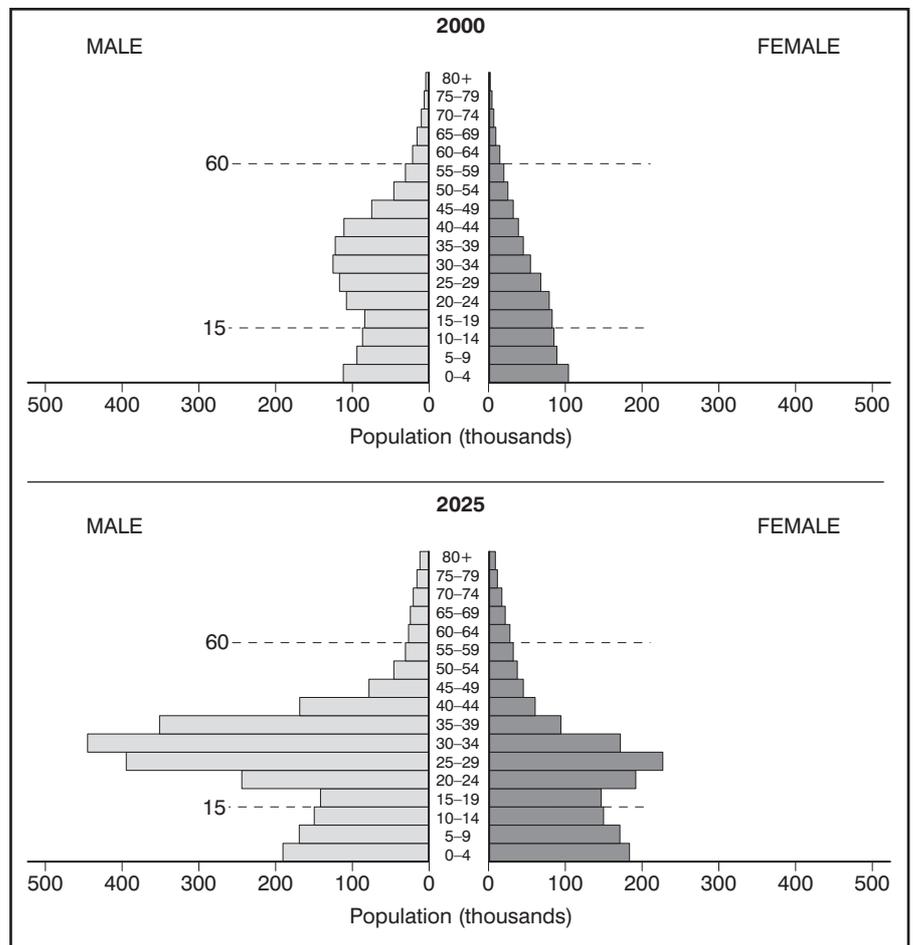


Figure 3: Migration evidence in population pyramids: Kuwait 2000 and 2025

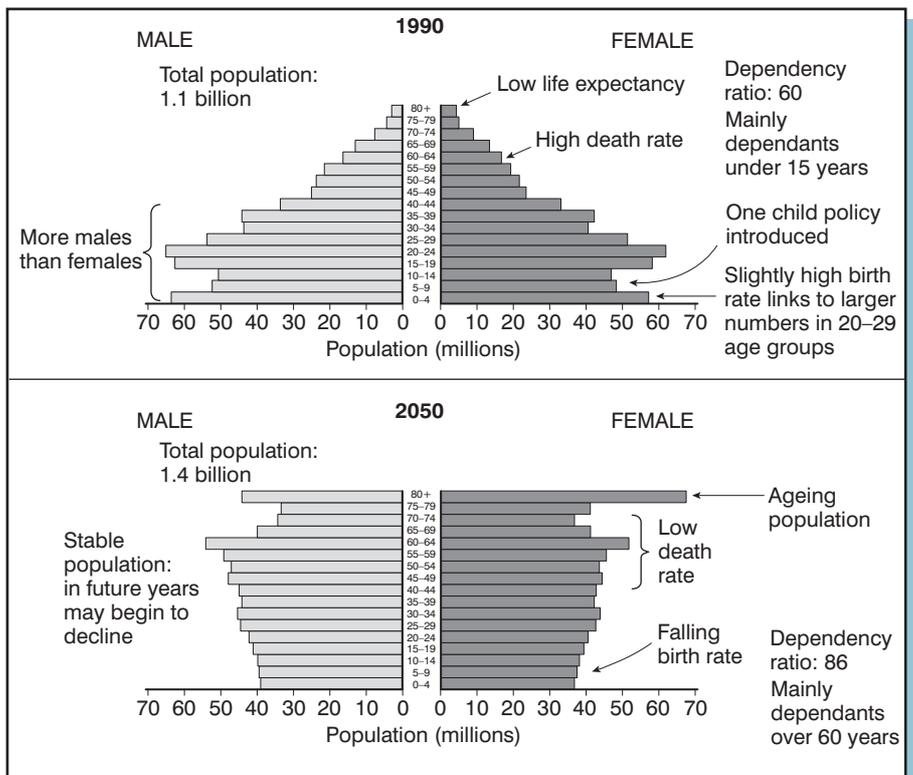


Figure 4: Population pyramids for China, 1990 and 2050

## Conclusion

Population pyramids are a useful tool for geographers because they can show a lot of information

about a population. Interpreting them may be a challenge, but remember that there may be several valid reasons to explain their variations in shape.

# Activities

- Using the data in Figure 5 for France and Ghana, draw two population pyramids. Use the same scale and draw them side by side so that it is easy to compare the two.
  - Describe the differences between the two pyramids.
  - Suggest two reasons why there are slightly more people in the 30–55 year age group in France.
  - Add up the total number of males and females under 15 years old. Which country has the greatest percentage of children?
  - Add up the total number of males and females over 60 years old. Which country has the greatest percentage of elderly people?
  - Work out the dependency ratios for the two countries by using the formula shown on page 2. Which country has the higher dependency ratio?
  - Choose *one* of the countries. In a group, discuss what you would recommend if you were working for the government planning for the future needs of the population. Consider medical, housing, educational and entertainment facilities.
    - Share these ideas with another group that has considered the other country. Which country is likely to have the greatest challenge in the future? Suggest reasons why.

2 Look at the population pyramid for Kuwait in the year 2000 in Figure 3.

- How do you know that the bulge in the 30–39 age group is a result of migration rather than a higher birth rate 30 years before?
  - Compare the characteristics of the typical migrant in 2000 with those in 2025.
- What problems might there be as a result of the imbalanced sex ratio?
  - How could this problem be reduced?

3 Look at Figure 6.

- What does the pyramid reveal about the trend in the birth rate in the UK?

Age groups	France 2003		Ghana 2003	
	% males	% females	% males	% females
0–4	3.1	2.9	6.6	6.5
5–9	3.1	3.0	6.7	6.6
10–14	3.2	3.1	6.7	6.6
15–19	3.3	3.1	6.0	5.9
20–24	3.3	3.2	4.5	4.4
25–29	3.3	3.2	4.0	4.0
30–34	3.7	3.6	3.5	3.6
35–39	3.6	3.6	2.9	2.9
40–44	3.5	3.6	2.4	2.5
45–49	3.4	3.6	2.0	2.1
50–54	3.5	3.5	1.3	1.4
55–59	2.9	2.3	0.8	1.1
60–64	2.1	2.2	0.8	1.0
65–69	2.0	2.3	0.7	0.8
70–74	1.8	2.3	0.5	0.5
75–79	1.4	2.1	0.3	0.3
80+	1.4	2.9	0.2	0.3

Figure 5: France and Ghana: population data 2003

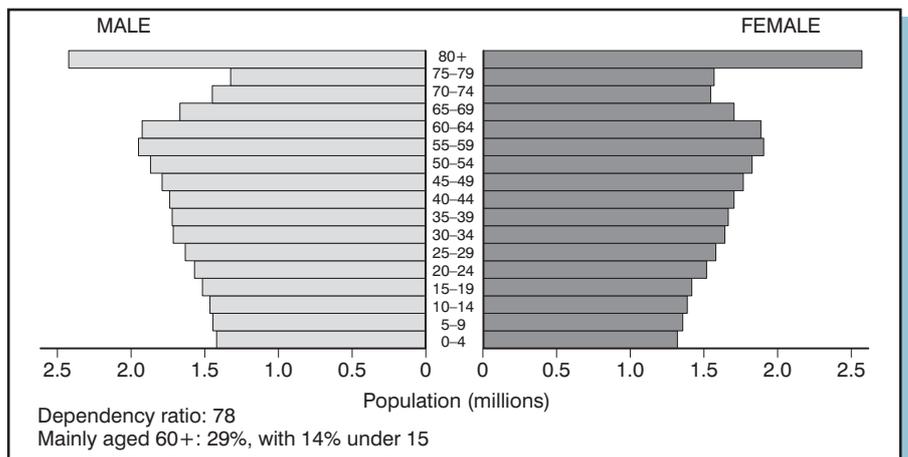


Figure 6: Population pyramid for the UK, 2050

- What effect might this have on the economy? And on schools?

## Extension work

4 Use the website: [www.census.gov/ipc/www/idpyr.html](http://www.census.gov/ipc/www/idpyr.html) and select the International Data Base (IDB) or population pyramid section. Choose a country and look at the dynamic population pyramids that illustrate how the population changes over time. Select specific years and produce a case study on the population structure over time. How have the birth and death rates changed? Look up information to find out if there have been population policies that have

helped to alter the birth and death rates. Have any other incidents, such as war, affected the structure of the population in your chosen country? Print selected pyramids to illustrate your findings.

5 Find information on the age structure and sex ratios of the population in the area in which you live, using information from: [www.statistics.gov.uk](http://www.statistics.gov.uk) or a local council website. Describe and explain the characteristics you have discovered. Are the facilities in your area suitable for the structure of the population? What would you advise the local council to do in planning for the future needs of the population in your area?