

More recent measures to encourage couples to have more children include:

- longer maternity and paternity leave; maternity leave, on near full pay, now ranges from 20 weeks for the first child to 40 or more for the third child
- higher child benefits
- improved tax allowances for larger families until the youngest child reaches 18
- pension scheme for mothers/housewives
- reduction of 30% on all public transport for 3-child families
- child-oriented policies (e.g. provision of crèches and day nurseries; state-supported day-care centres and nursery schools are available for infants starting at the age of 3 months, with parents paying a sliding scale according to income)
- preferential treatment in the allocation of government housing.

Overall, France is trying to reduce the economic cost to parents of having children. In 2006, France overtook Ireland to become the highest fertility nation in the European Union, with an average of two babies per woman. In 2006, 830 900 babies were born – the greatest number since 1981. France is close to the replacement level of 2.1 children per woman. A moderate positive net migration adds to fertility. This net migration is virtually equivalent to a surplus of 75 000 births.

The 2009 *Population Data Sheet* put France's total fertility rate at 2.0. This compares to 1.3 in Germany, 1.9 in the UK, 1.3 in Italy and 1.5 in Spain.

Although the average age of French mothers at childbirth is still rising, it is still less than in many other European countries. Almost half of the new arrivals in 2006 were born to unmarried mothers, although increasing numbers have legally recognised civil partnerships.

Within France, the highest level of fertility is among the immigrant population. But, even for those born in France the average is 1.8 babies. French economists argue that although higher fertility means more expenditure on child-care facilities and education, in the longer term it gives the country a more sustainable age structure.

French politicians have talked about **demography** as a 'source of vitality' for the country. Some French commentators also argue that there is a better work–life balance in France compared to many other European countries.

The central population forecast, based on the stability of fertility and migration at current levels predicts stability in the population aged 60 or less, while the population aged 60 and over will increase as a consequence of the baby boom that followed World War II.

- What do you think of France's efforts to promote fertility?

Unit 3

End-of-topic questions

1 a Define

i crude birth rate

[1]

ii rate of natural increase

[1]

b i Insert on the table the four items of missing data.

[2]

ii Suggest two reasons for the considerable variations in birth rate between the five countries.

[2]

Country	Crude birth rate / per 1000	Crude death rate / per 1000	Rate of natural increase / %
USA	14	8	0.6
Japan	?	9	0.0
India	23	?	1.5
China	12	7	?
South Africa	?	12	0.9

Selected data from the 2011 World Population Data Sheet

- c i Draw an age-sex pyramid for a typical LEDC. Provide brief annotations to describe the main characteristics of your pyramid. [3]
- ii Discuss the ways in which the age-sex pyramid of a typical MEDC would be different from that of a typical LEDC. [3]

2

World region	% of urban population with improved water supply, 2008	% of rural population with improved water supply, 2008
Northern Europe	100	100
Northern America	100	94
Southeast Asia	92	80
Western Africa	81	50

Selected data from the 2011 World Population Data Sheet

- a i What do you understand by the term 'improved water supply'? [1]
- ii Describe the differences between the four world regions in improved water supply. [2]
- iii Suggest reasons for these differences. [3]
- b i What are the health benefits of an improved water supply? [2]
- ii Why do improvements in water supply bring economic benefits? [2]
- c Why are the demands on global supplies of fresh water increasing? [3]

3

	Ecological footprint in gha per person, 2007	Biocapacity in gha per person, 2007
World	2.70	1.80
United States	8.00	3.87
UK	4.89	1.34
Russia	4.41	5.75
Brazil	2.91	8.98
Egypt	1.66	0.62
India	0.91	0.51
Bangladesh	0.62	0.38

Selected data from the Global Footprint Network, 2010

gha = global hectares.

- a Define:
- i ecological footprint [1]
- ii biocapacity [1]
- b List two of the six factors that make up the ecological footprint. [2]
- c i Which countries listed on the table have an ecological footprint higher than the world average? [2]
- ii Briefly explain the reasons for such high ecological footprints. [2]
- iii Suggest why Russia and Brazil both have such a large biocapacity. [3]
- d i Using the data provided, calculate the global ecological deficit. [1]
- ii What is likely to happen if the global ecological deficit continues to increase? [3]

- ii some plants may have died; some may have been eaten [2]
- iii energy lost in respiration [1]
- iv by measuring rate of carbon dioxide produced at night [1]

b greater light intensity in tropics means a higher rate of photosynthesis; higher temperatures in tropics increase the rate of photosynthesis; tropical forests have leaves present all year so photosynthesis is higher; less energy is needed to replace leaves in evergreen forest so R is lower [4]

- c i reflection by clouds; absorption by ozone [2]
- ii $0.3/50 \times 100 = 0.6\%$ [3]

4 a i r-strategies produce large numbers of offspring and have a short lifespan; whereas K-strategies are long-lived and produce few offspring [2]

ii (any 2) suitable example (frogs, fish, weed plant); advantages: can take advantage of unstable or changing environments; parents do not care for their young; large numbers produced so that a few survive to maturity [2]

iii K-strategists tend to reproduce slowly and have few offspring so take a long time / may not recover following a disturbance [1]

b i

Time/min	Population numbers
0	1
20	2
40	4
60	8
80	16
100	32
120	64
140	128
160	256

ii graph with axes correctly labelled; time/min; population number; graph shows an exponential increase in the population. [2]

iii the curve would level off; enter the lag phase and then the plateau phase; as nutrients ran out / waste accumulated; the population would stop increasing; eventually bacteria would die [3]

5 a i a model is a simplified diagram designed to show the working of a system [1]

ii photosynthesis and primary productivity are high in the rainforest and nutrients are taken up by the plants all through the year [1]

iii an open system; because the system exchanges matter with its surroundings / natural systems are open systems [2]

iv Strengths: (any two) the model simplifies a complex system; results can be compared and discussed; inputs can be changed in a theoretical way to see what happens to outcomes [2]

Weaknesses: this model does not show the size of nutrient flows because the arrows are all the same size [1]

b i to build amino acids / proteins [1]

ii nitrogen-fixing bacteria convert nitrogen gas from the atmosphere into nitrates which can be absorbed by plants [2]

Topic 3

1 a i number of live births per 1000 population in a country or region per year [1]

ii difference between the birth rate and the death rate [1]

b i Japan - 9; India - 7; China - 0.5; South Africa - 21 [2]

ii (any 2 from the following)
lower rates of use of artificial contraception in some countries;
cultural norm of large families in some societies;
high infant / child mortality rates are a general stimulus for higher birth rates;
children as an economic asset helping with farm labour;
children caring for parents in old age in countries where state benefits are low / non-existent [2]

c i reference should be made to Figure 3.8 where the age-sex pyramid for Bangladesh provides useful guidance. Expected annotations are likely to include (any 3 of the following):
male population indicated on the left-hand side of the pyramid with the female population on the right;
bars in five-year age bands;
a wide base indicating a high birth rate;
a steady decrease in population up the pyramid as a result of relatively high mortality (compared with MEDCs);
a low % population 65+ years due to relatively low life expectancy [3]

- ii Discussion is likely to include:
 overall shape of the diagram is very different - looks more like a stack than a pyramid;
 bars representing the young population are much narrower due to a significantly lower birth rate (bars may even be narrower than those of the working population if the decline in the birth rate has been particularly steep in recent years);
 slow decline in population up the pyramid due to relatively low mortality rates;
 considerably higher population of 65+ years due to relatively high life expectancy [3]
- 2 a i an improved water supply is one that is likely to provide safe water [1]
- ii In Northern Europe, the total population, both urban and rural, has access to improved water supplies. In Northern America, there is full coverage in urban areas, but 6% of the rural population are without access to improved water. In Southeast Asia and Western Africa, the respective figures for the urban population are 92% and 81%. In both of these areas the gap between urban and rural areas is much greater than for MEDCs. [2]
- iii The reasons for such differences are mainly economic. MEDCs are more able to afford the considerable investment required for the universal supply of improved water. The physical environment is also a factor with areas of low precipitation posing a particular challenge. Some populations in LEDCs live in remote and relatively inaccessible areas. Nomadic groups in particular have problems accessing improved water supplies. [3]
- b i Contaminated water is the main cause of disease in LEDCs. The lack of clean, safe drinking water is estimated to kill about 4500 children a day around the world. Various forms of diarrhoeal diseases are a particular problem along with other diseases such as cholera and typhoid. Improvements in water supply can eliminate such diseases in a short period of time, improving the general health of a population very significantly and increasing life expectancy considerably. [2]
- ii More people will be fit to work and to do a full day's work, increasing the economic productivity of communities and countries. Children will have less time off school so educational attainment will rise. Mothers will need to take less time off work to look after sick children. Less money needed to spend on medicines. [2]
- c Population increase and rising living standards for many people causing increasing demand in the three main sub-sections of water use - agricultural, industrial, municipal. Although agriculture is the main water user, industrial and domestic demands are growing at a faster rate. Agricultural water use is dominated by irrigation. The demand for water is increasing at the fastest rates in NICs as their economies and living standards improve rapidly. [3]
- 3 a i The ecological footprint is a sustainability indicator which expresses the relationship between population and the natural environment. It sums the use of natural resources by a country's population. [1]
- ii the capacity of an area or ecosystem to generate an ongoing supply of resources and to absorb its wastes [1]
- b (any 2) built-up land; fishing ground; forest, grazing land; cropland; carbon footprint [2]
- c i United States, the UK, Russia, Brazil [2]
- ii All these countries have a high level of resource consumption. Living standards in the United States and the UK are particularly high. Russia and Brazil are classed as emerging economies with high rates of economic growth. Russia's cold climate results in a very high use of energy. [2]
- iii Both countries have very large land areas, particularly Russia which is the largest country in the world. Russia and Brazil have huge areas of forest - notably coniferous forest in Russia and the Amazon rainforest in Brazil. Also large areas of grassland in both countries as well as other important natural environments. [3]
- d i $1.80 - 2.70 = -0.9$. Thus, the ecological deficit is 0.9 gha per person. [3]
- ii The current ecological deficit is already unsustainable and any further increases will place even more pressure on the Earth's finite resources. Greater efforts need to be made to improve sustainability in all elements of the ecological footprint otherwise the world could face a range of serious problems - food and water shortages, rapid climate change, falling living standards, increasing international disputes over resources, and so on [3]
- ### Topic 4
- 1 a i the tectonic plate on which Australia is found has been isolated for a long time; so the species on the island of Australia have developed differently from species elsewhere [2]
- ii (any 3) isolation can lead to speciation; because interbreeding and exchange of genes with other