Population growth and change

Overview
In this book you will learn about:

- World Focus on Population Growth and Change
- Population concepts
- Factors affecting birth rates and death rates
- World population growth

Population
World population is defined as the total number of human beings living on Earth. The total number of people inhabiting this Earth (calculated 2014) is estimated at 7.167 billion and is expected to reach between 8.3 and 10.9 billion by 2050.

About 10 000 years ago, before technological agricultural advances, the human population numbered only a few million people throughout the world. After agricultural intervention however, the human population began to grow slowly, experiencing an increase in continuous growth after the Great Famine and Black Death in 1350. In those days, the world's population was estimated at around 350 million. After the 1900s, there was a rapid increase in growth population and due to advanced medical research and technological developments, the human population reached three billion in the 1960s.

Global analysts are concerned however, about sustainability of an ever increasing world population growth in terms of environmental pressure, food supply and energy resources.

The highest population growth rates recorded were briefly in the 1950s and then for longer periods during the 1960s and 1970s. The world's total annual birth rate peaked in the 1980s to approximately 138 million, but has remained at a constant level of 134 million since 2011. Total deaths are approximately 56 million per year, but will rise to nearly 80 million a year by 2040.

In order to acquire all this statistical information, each country undertakes a 'census'. A census is a procedure whereby the country's government is able to gather and record information about its population. This includes birth rates, death rates, race groups, average age of the population, average number of people living in a household, number of people inhabiting a province and so forth. This count occurs at regular intervals to ensure accuracy. For more detailed information on these statistics, visit: statssa.gov.za/

In South Africa, the last census was conducted in 2011, where the population statistics were recorded. Prior to that, census recordings were carried out in 2001 and 1996.
Birth rates

The world’s birth rate can be defined as “the ratio of live births in an area from the population of that area, usually expressed per 1000 of the population per year.” This is also called the ‘crude’ birth rate.

Activity 1: Data handling and comprehension

Look at the table below detailing South Africa’s population size and answer the questions that follow.


<table>
<thead>
<tr>
<th>Province</th>
<th>1996</th>
<th>2001</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Cape</td>
<td>3 956 875</td>
<td>4 524 335</td>
<td>5 822 734</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>6 147 244</td>
<td>6 278 651</td>
<td>6 562 053</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>1 011 864</td>
<td>991 919</td>
<td>1 145 861</td>
</tr>
<tr>
<td>Free State</td>
<td>2 633 504</td>
<td>2 706 775</td>
<td>2 745 590</td>
</tr>
<tr>
<td>Kwa Zulu - Natal</td>
<td>8 572 302</td>
<td>9 584 129</td>
<td>10 267 300</td>
</tr>
<tr>
<td>North West</td>
<td>2 727 223</td>
<td>2 984 098</td>
<td>3 509 953</td>
</tr>
<tr>
<td>Gauteng</td>
<td>7 834 125</td>
<td>9 388 854</td>
<td>12 272 263</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>3 123 869</td>
<td>3 365 554</td>
<td>4 039 93</td>
</tr>
<tr>
<td>Limpopo</td>
<td>4 576 566</td>
<td>4 995 462</td>
<td>5 404 868</td>
</tr>
<tr>
<td><strong>Total: South Africa</strong></td>
<td><strong>40 583 573</strong></td>
<td><strong>44 819 778</strong></td>
<td><strong>51 770 560</strong></td>
</tr>
</tbody>
</table>

1. Which province has the largest population in South Africa? (1)
2. Which province has experienced the highest population growth in South Africa from 2001 to 2011? (1)
3. Why do you think Gauteng has the highest population density? (3)
4. Which province has the smallest population in South Africa? (1)
5. What economic activity do you think the people in the smallest province mainly engage in? Give a reason for your answer. (2)
6. What was the percentage growth of South Africa’s total population between 2001 and 2011? (1)
7. What do these numbers indicate about South Africa’s birth and death rates? (1)

Total: 10

Factors that affect birth rates in the world are as follows:

- Some countries have laws governing their population – these are called population policies. The policies can reflect a pro-natalist (for birth and population growth) or anti-natalist (against birth and population growth) stance on population growth.
- Some countries adopt a tax penalty on childless couples, whilst other countries provide a tax rebate to couples with no children or one child.
The typical marriage age of the people of that particular country.

Social and religious beliefs also influence population growth, especially related to contraception and abortion.

The country’s ability to provide family planning services, education and free birth control.

Medical facilities to deal with child birth and abortion.

Whether or not the country is industrialised or pre-industrialised. In a pre-industrialised country, unskilled physical labour was required for producing goods and children were seen as an economic resource in a developing country because of their earning capacity. This means the lower level of technology in a country, the higher the birth rate and vice versa.

In an industrialised country, people put more resources into training and development, so parents tend to have fewer children and then invest more money in their child’s education.

A family may have more children if a country’s infant mortality rate is high, as it is likely that some of the children in a family will die.

Poverty levels.

Urbanisation: People living in urban areas normally have greater access to medical facilities and family planning services.

Illiteracy and unemployment.

Financial stability: In difficult economic times, couples will either delay or decrease child bearing due to financial reasons.

Marriage conflict.

Disease: Illnesses such as TB (tuberculosis), malaria, diarrhoea, HIV and AIDS have a huge effect on a country’s population.

The employment of women in the workplace affects either the choice of whether to have/ not have children and/or the number of children a family will have.

Formalised pension structures: Couples tend to have fewer children because formalised pension payout structures eliminate the need to have many children provide for them in their old age.

Fertility of women during child bearing years.

Age structure of the population.

Activity 2: Data Handling

Look at the graph below and answer the following questions:

1. Which above mentioned factor is affecting birth rates as indicated on this graph? (1)

2. Explain the difference in birth rate statistics between developed (industrialised) and developing (pre-industrialised) regions. (6)

3. Name three other factors that contribute to the big difference in birth rates affecting developed and developing regions of the world. (3)

4. Why do you think the difference in birth rates increases as time progresses? (5)

Total: 15

Activity 3: Research birth rates

For information regarding the top 10 countries with the lowest birth rates visit: http://www.youtube.com/watch?v=SUtW0I1NoLg: Top 10: Countries with the lowest Birth Rate.

Birth rate (births/1,000 population) 2012

|---------|------|------|------|------|------|------|------|------|------|------|------|------|------|

View the video, study the table above and then complete the following activity:

You must research the following:
1. South Africa's birth rate vs. the top 10 countries with the lowest birth rates.
2. The possible reasons for the difference in the birth rates of these countries.

Present your findings on an A2 poster size presentation board, which must include:

- A plotted graph (format of your choice) depicting South Africa's birth rate from 2000 to 2012.
- A plotted graph (format of your choice) showing the ten country's birth rates.
- Your research answers to questions 1-3.

Infant mortality

Infant mortality refers to the death of a child that is less than one year in age. Childhood mortality is the death of a child before it turns five. Most statistical tests group these two rates together.

From a worldwide perspective, we lose approximately ten million infants and children due to infant and childhood mortality each year. Ninety nine percent of these deaths occur in developing countries around the world. The consequence of infant mortality for a country is that it strips society of its social, physical, intellectual and human resources.

Factors that contribute to infant and childhood mortality

1. Dehydration from diarrhoea.
2. Mother's level of education regarding infant care.
3. Environmental conditions prevent access to basic medical care.
4. Lack of access to medical facilities and amenities.
5. Poor sanitation systems and access to clean drinking water.
7. Sudden infant death syndrome (SIDS).
8. Complications during pregnancy and delivery.

"Throughout the developing world, one out of every four children – roughly 146 million children – under the age of five is underweight. Among developing regions, undernourished children is the most severe in South Asia and, to a lesser extent, sub-Saharan Africa. For children whose nutritional status is deficient, common childhood ailments such as diarrhoea and respiratory infections can be fatal. Undernourished children who survive the early years of childhood often have low levels of iodine, iron, protein and energy, which can contribute to chronic sickness, stunting or reduced height for age, and impaired social and cognitive development."

Activity 4: Mindmap

Draw a mind map in your class workbook reflecting all the factors that influence infant and childhood mortality rates throughout the world. Total: 10

Activity 5: Reading and comprehension

Read the article below and then answer the questions that follow in your class workbook:

South Africa’s falling birth rate ‘threatens future workforce’

BY SARAH WILD, AUGUST 08 2012, 08:17

South Africa’s declining fertility rate could threaten the country’s labour supply, the South African Institute for Race Relations warns.

The institute’s fertility survey, to be released next week, shows that by 2040, fertility rates are expected to drop below the “replacement level” where couples have two children to replenish the population.

The fertility rate would drop to 2, and 1 by 2035 as better-educated women entered the workforce.
“Births per woman will drop by 17% between 2010 and 2040, following a 20% slump over the past decade,” the Johannesburg-based institute said yesterday.

Its researcher, Thuthukani Ndebele, said SA’s 65+ age group made up about 5% of the population, but this would increase to about 12%.

A major concern was the expected decline in the number of children aged 0–14: “We expect a 21% drop in (this group), where we are looking at our future,” he said.

“It also means that we will have a shrinking workforce. We might have a problem when it comes to labour supply. You are going to have a situation where the country’s welfare system is overburdened, looking after people older than 65.”

Mr Ndebele said an older population would put greater pressure on the state welfare system.

But Econometrix economist Azar Jammine responded yesterday that the survey’s findings was “wonderful news”.

“Our biggest problem is unemployed youth and in recent years we’ve been unable to educate and upskill the huge number of young people,” Mr Jammine said. “That’s going to slow down, and we’ll assume the profile of a more developed country.”

According to a 2002 report by the United Nations Population Division, below-replacement fertility is expected in 75% of the developed world by 2050.

“One of SA’s attractions is that the country has a proportionally larger workforce, but if that workforce isn’t qualified, they’ll be unemployed,” Mr Jammine said.

“At least if you have a smaller number coming on-stream, the requirement to develop and upskill them will be smaller.

“The biggest form of welfare in SA is child-support grants, a scheme geared towards the number of children you have.”

Every month 9-million child support grants are paid to parents and caregivers.

“That’s one of the reasons Fitch put SA on a negative outlook: the government is giving money to the children of unemployed people. If it continues, it will cripple the government.”

With Sapa: wilds@bdfm.co.za

Questions:
1. What is meant by the term “replacement level”? (2)
2. What reason does the South African Institute for Race Relations give for this possible decline in fertility levels in South Africa? (2)
3. If the 65+ age group increases from 5% to 12% of SA’s population, what effect would this have on our economy? (5)
4. Give three reasons why researchers are concerned about the expected decline in children between 0 – 14 years of age. (3)
5. In your own words, state how Econometrix researcher, Azar Jammie, responded to the survey’s findings and give two reasons for your answer. (4)
6. South Africa’s child support grant system is of concern to research economists. Tabulate the following in your class workbook: (5)

<table>
<thead>
<tr>
<th>How it works</th>
<th>Amount paid out monthly</th>
<th>Consequences for the government</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. In your opinion, who do you think has a more accurate outlook on South Africa’s future: Azar Jammie or Thuthukani Ndebele? Give a reason for your answer. (3)

For more articles on world wide birth rates visit: http://articles.latimes.com/keyword/birth-rates
http://www.dailymail.co.uk/health/article-151319/Birth-rate-drops-lowest-ever.html

Life expectancy

Life expectancy at birth:
- Is a comparison of the average number of years to be lived by a group of people born in the same year.
- Measures the overall quality of life in a country and then summarises the mortality at all ages.
- Currently in the “The World Fact Book” a life expectancy survey was conducted involving 223 countries. South Africa is ranked 222 out of 223 countries surveyed and the average age is estimated at 49.56 in comparison with the top ranking country, Monaco, with a life expectancy age of 89.57.

Life expectancies are influenced by regional variations, economic circumstances and gender.
The death rate

The death or fatality rate is the ratio of total number of deaths to population in a specified community or area over a specified period of time. In simple terms, it is the number of people who die each year compared to every 1000 people in the population. This is also called the 'crude' death rate. The death rate is used to accurately assess the mortality impact on population growth in a particular country or area and is affected by age distribution of the measured population.

\[
\text{Death rate} = \frac{\text{number of deaths}}{\text{total population}} \times 1000
\]

To see how this equation is calculated, visit: [http://www.crude death rate](http://www.crude death rate)

Factors affecting death rate in a country:
- Access to medical facilities and health care
- Nutrition levels/ knowledge of good dietary habits
- Living standard
- Access to clean drinking water
- Hygiene levels
- Levels of infectious diseases
- Income levels: can/cannot afford good healthcare, nutritious food
- High stress levels due to financial worries, terminal illness, loneliness, depression
- Violence and crime
- Abuse of elderly people

Activity 6: Interpretation of data

Study the graph below and answer the questions in your class workbook:

1. What factor has influenced the life expectancy in this graph? (1)
2. What do you notice about life expectancy ages of both males and females since 1950 – 2045? (1)
3. Why do you think females live longer than males? (2)
4. Do you think this trend would be prevalent in a South African graph of life expectancy? Give reasons for your answer. (2)
5. What is the difference of the average life expectancy between males and females in years? (1)

Visit: [http://www/life-expectancy-at-birth-male-years-wb-data.html](http://www/life-expectancy-at-birth-male-years-wb-data.html) and gather data about the South African male life expectancy rate and compare the data to the American graph above to draw conclusions about the life expectancy of both. (5)

Total: 12

Activity 7: Graph plotting

|---------|------|------|------|------|------|------|------|------|------|------|------|------|

Plot the above information onto one graph and then answer the following questions:

1. **World death rate statistics:**
   1.1 Which year did the world experience the lowest death rate? (1)
   1.2 Which year did the world experience the highest death rate? (1)
1.3 Find out what happened in 2000 that caused the world death rate to increase to 9/1000. (3)

2. South African death rate statistics:

2.1 Which year did South Africa experience the lowest death rate? (1)
2.2 Which year did South Africa experience the highest death rate? (1)
2.3 Compare the world’s highest death rate to South Africa’s highest death rate. What do you conclude? (2)
2.4 Use the information about death rates below, the factors that affect death rates in a country and what you know about South Africa’s status as a developing country to explain the reasons why South Africa’s death rates are so much higher than the rest of the world. (5)

3. Comparison:

3.1 Work out the point difference in death rate statistics on both graphs during 2005. (1)
3.2 Find the average total death rate for the world and South Africa from 2000 to 2012. Compare them. What are your findings? (3)
4. Study the table on the following page, which lists the countries with the highest death rate. From the information provided, deduce which continent has the highest death rate in the world? (7)

The ten countries with the highest crude death rate, according to the 2012 CIA World Factbook estimates, are:

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>Death rate (annual deaths/1,000 persons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>South Africa</td>
<td>17.23</td>
</tr>
<tr>
<td>2</td>
<td>Ukraine</td>
<td>15.76</td>
</tr>
<tr>
<td>3</td>
<td>Lesotho</td>
<td>15.18</td>
</tr>
<tr>
<td>4</td>
<td>Chad</td>
<td>15.16</td>
</tr>
<tr>
<td>5</td>
<td>Guinea-Bissau</td>
<td>15.01</td>
</tr>
<tr>
<td>6</td>
<td>Central African Republic</td>
<td>14.71</td>
</tr>
<tr>
<td>7</td>
<td>Afghanistan</td>
<td>14.59</td>
</tr>
<tr>
<td>8</td>
<td>Somalia</td>
<td>14.55</td>
</tr>
<tr>
<td>9</td>
<td>Bulgaria</td>
<td>14.32</td>
</tr>
<tr>
<td>10</td>
<td>Swaziland</td>
<td>14.21</td>
</tr>
</tbody>
</table>

Population growth rates

A population growth rate is the rate at which the population changes in size over a period of time. This rate is determined by subtracting the number of people that leave either by death or emigration from the number of individuals that enter either through birth or immigration. By using this calculation, researchers are able to combine all the statistics that influence population size to determine the change in the overall population over time. The population growth rate can either be positive or negative depending on these factors. Crude birth rates are used to calculate a country’s population growth. All of the people that you encounter every day are part of the population.

When a country has a positive growth rate, it means the population is increasing. Similarly, if a country has a negative growth rate, this indicates that the population is decreasing. The world’s population has grown by 30% or 1.6 billion people between 1990 and 2010.

Activity 8: Summary

Use the information in the article below to record a summary of the factors that influence population growth rates.

Factors that influence population growth rates:

Birth rate and immigration
There are two main factors that contribute to the increase of a population: ‘natality’ or birth rate and immigration – the migration of an individual into a particular place. If someone migrates to a particular area, they will increase the size of the population in that area, but will not influence the world wide population number.

Mortality and emigration
Likewise, there are two main factors that decrease a population size: ‘mortality’ or death
rate and emigration – the migration of an individual from one place to another. Once again, this does not have an affect on the overall human population head count, but will impact the population of a certain area.

For simple explanation factors affecting population size, visit: www.factors affecting population size

**Economic factors**

Although many economies of the world encourage smaller families, the size of families of developing countries is still higher that those in the developed world. When a nation has a healthy economy and the people are prospering, the parents are confident in that they can afford to pay for more children. During the Industrial Revolution where the world's economies were being transformed from rural to mechanised, factories populated areas which required a labour force, resulting in a rapid population increase.

**Poverty**

Population growth also occurs in poor, undeveloped regions of the world. People living in poorer communities tend to be less educated and are ignorant of birth control and family planning methods. In many third world countries, children are seen as a status symbol, thus the more children one has, the higher the status. This is a customary approach and as these poor families continue to reproduce, the population continues to increase significantly.

**Improved mortality rates**

Due to advanced medical and health research, lifestyles and fitness mortality rates have been reduced and longer life expectancy has increased, which means more people are on the Earth at the same time.

In addition, the infant mortality rate has improved every year from 1959 to date and there are more people surviving to adulthood which means that there are more people able to create babies.

**Emancipation of women**

In wealthy, liberal, developed countries, the emancipation (liberation) of women has had a demographic consequence on population growth in that it has delayed child bearing age. These days, women are far more likely to study first, work for a few years and then think about having their first child. This results in fewer children being born per woman as her fertility declines with age. In 2002, the average age for mothers with first borns was 29 years, three years older than in 1971.

**Education**

Education is vital in determining birth and death rates in a country and consequently the level of population growth. Health care programmes in hygiene can improve death rates, whilst education in family planning can reduce birth rates. After World War 1, many governments introduced educational programmes which promoted more births in order to compensate for the huge losses that the war brought. Over the long term, as education levels increase, people will tend to have fewer children so that they can focus their resources on those few children.

**Urbanisation**

Birth rates tend to rise and death rates tend to fall, as the country becomes increasingly urbanized. Birth rates rise as people have greater access to medical care, resulting in a decrease in infant mortality and an increase in the birth rate.

This is a short term change however, because when development occurs over longer periods of time in urban areas, birth rates fall because it is easier to deliver and educate people around family planning.

Death rates also tend to fall in urban areas; it is cheaper and far more economical to provide medical and educational services, as well as ensure reliable food supplies. This means that people are well educated, have access to better food and can be treated swiftly when sick. This is often not the case in rural areas.

**Agricultural changes**

Due to significant agricultural changes over the past 400 years, the world is able to produce more food for its people than ever before. The regular supply of food from advanced farming methods promotes birth rates (as people are sure they can feed their children) and reduces famine deaths.

Apart from the factors mentioned above, there may be other factors which influence the population growth and with time, priority of these factors would also change with the rising demand, scarcity of resources as well as due to natural selection of the fittest.

Now that you have read all the information, complete the activity by tabulating a summary of each of the abovementioned factors in your class workbook.

Total: 20

To view factors that influence population growth go to: http://www.population-growth/