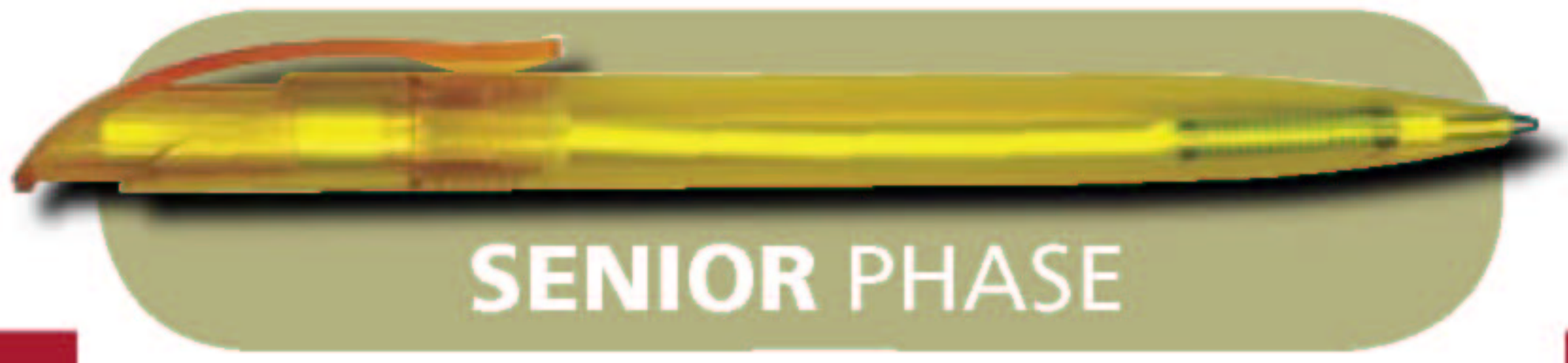
PREHISTORIC PHASE

FOUNDATION PHASE

INTERMEDIATE PHASE



SENIOR PHASE

FET PHASE

TEACHER'S RESOURCE PACK

maropeng™

FET Resource Pack

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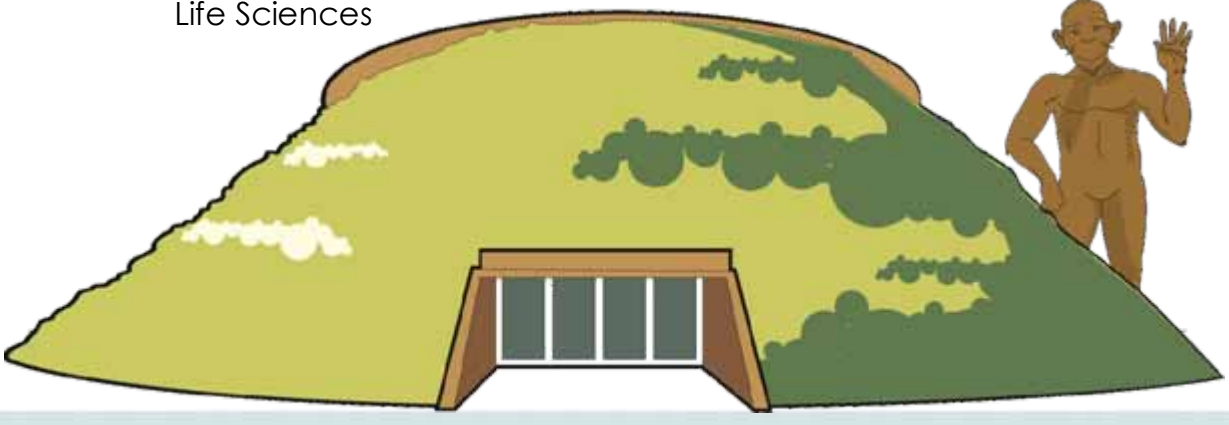
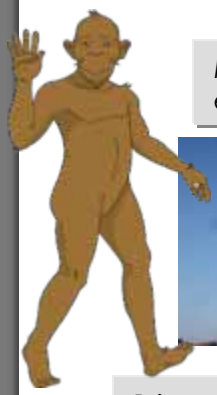
Subjects



Introduction

Teacher Tips!

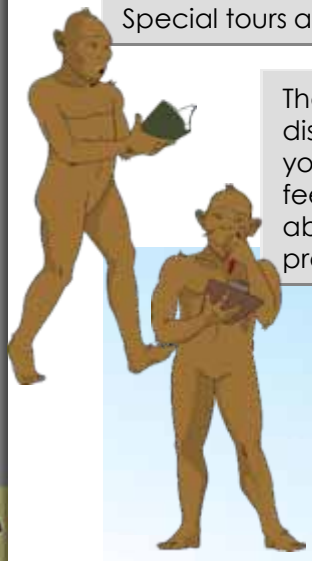


Maropeng offers a great opportunity to discover, explore, imagine, celebrate and experience. We will give you a few activities from different subjects to guide you.

Bring your class to Maropeng for a memorable educational experience.

You'll learn about the history of humankind, how fossils are formed, the importance of sustainability, the unique characteristics that make us human, and so much more. All our displays are highly interactive, encouraging you to learn through doing.

Special tours and overnight stays for large groups are available.

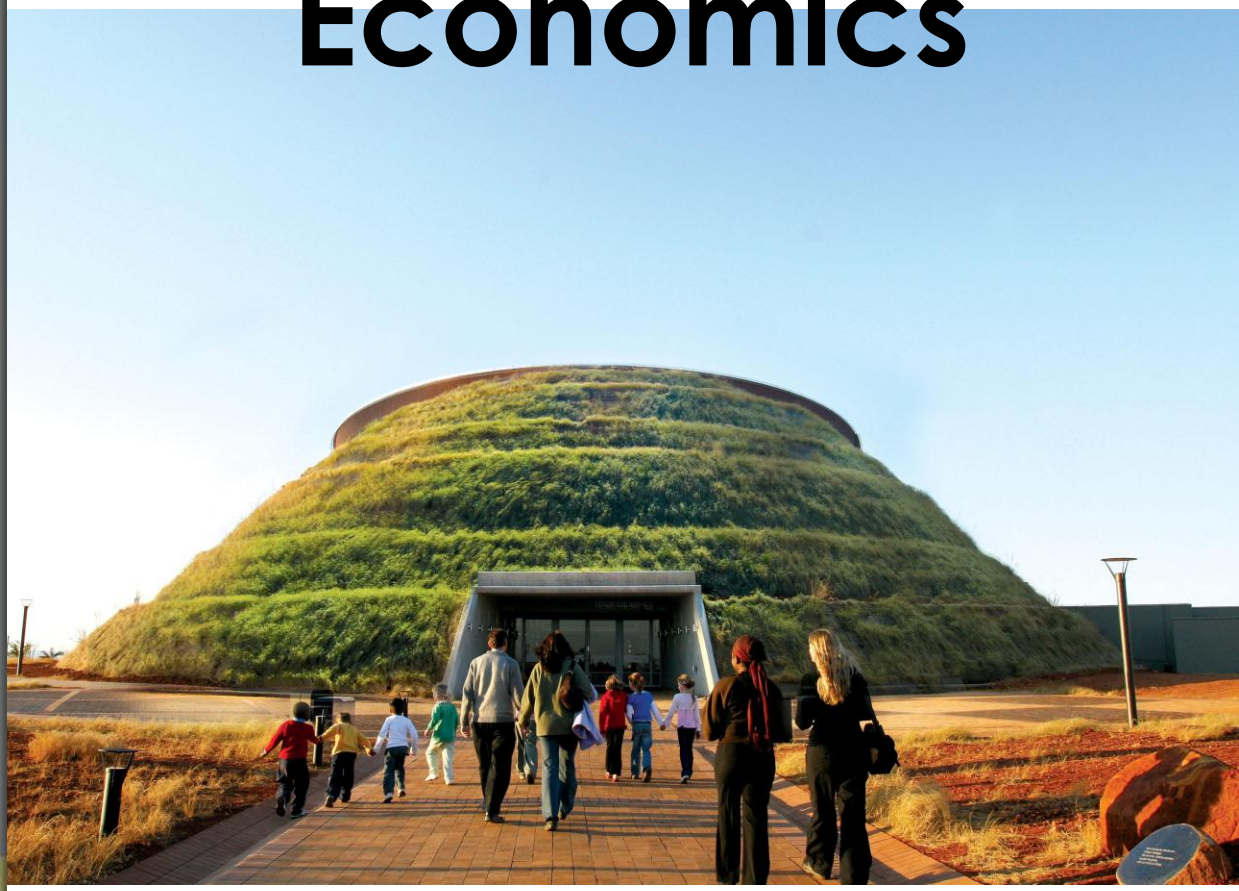


The interactive displays will leave you and your learners feeling exhilarated about the past, present and future.

Move around with your learners at Maropeng and find information on, and explain how, Economics/First Additional Language/Geography/History/Life Orientation/Life Sciences/Mathematical Literacy/Physical Sciences/Tourism can be used to understand the Cradle of Humankind better.

Who am I?

Economics



Developed by:

Natalie Winter

Jack Langa

Morena Lethiba

maropeng

Subject: Economics

Topic: Poverty in the SA Context and Environmental Sustainability

Grade 10 (CAPS)

Topic:

No topic for this section.

Environmental sustainability

Content:

No content for this section.

Grade 11 (CAPS)

Topic:

Economic issues of the day: Poverty

Contents

An analysis and investigation of poverty.
• Poverty:
- absolute and relative poverty
- measuring poverty
- causes of poverty
- the effects of poverty

• The South African Government's measures to alleviate poverty

Grade 12 (CAPS)

Topic and content

- Basic economic problem: Environmental sustainability
- Tourism and Economic redress: (Environmental sustainability)

Contents

- Analysis of environmental sustainability, investigating recent international agreements in this regard, for example, the Rio de Janeiro and Johannesburg summits.
- Measures to ensure sustainability

Debating the economic importance of tourism to South Africa and suggesting policies to promote it. Refer to the importance of indigenous knowledge systems.
• Tourism:
- reasons for its growth
- the effects
- the benefits
- South Africa's profile (indigenous knowledge systems)
- policy suggestions
Basic Economic problem:
Environmental Sustainability
- Measures to ensure sustainability

Background Knowledge

Subject: Economics **Grade: 11**

Teacher's Notes

Poverty in Context

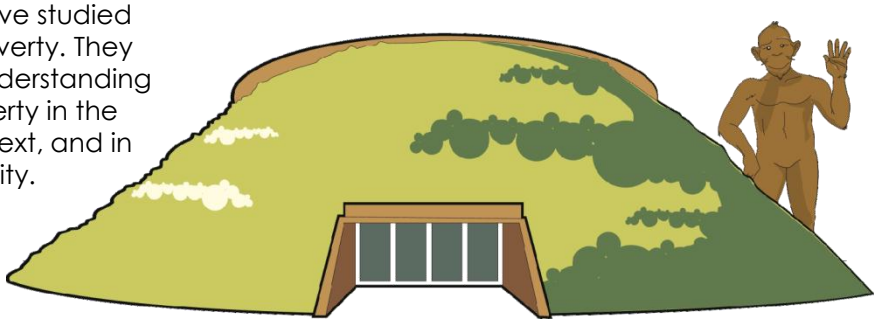
Prior to visiting Maropeng:

Learners should have studied the concept of poverty. They should have an understanding specifically of poverty in the South African context, and in their own community.

The following issues related to poverty should have been covered:

- Absolute and relative poverty;
- Measuring poverty;
- Causes of poverty;
- Effects of poverty; and
- The SA government's measures to alleviate poverty.

At Maropeng:

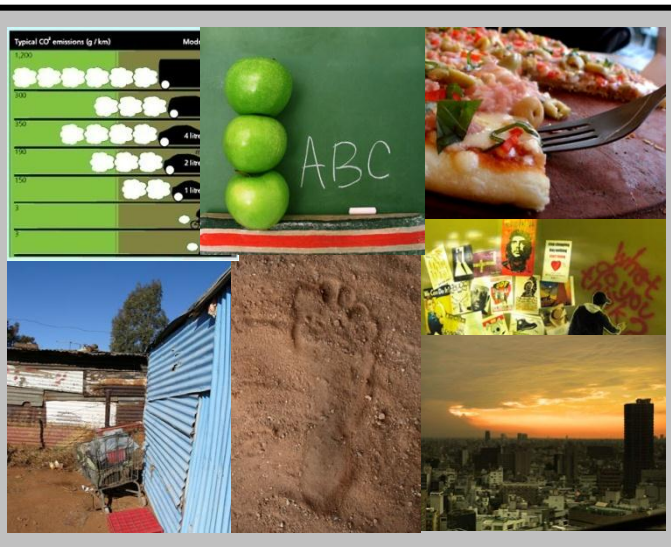


Instructions to the teacher

Explore the Sustainability Wall and the exhibition on diseases with the learners. Focus on the link between poverty and diseases.

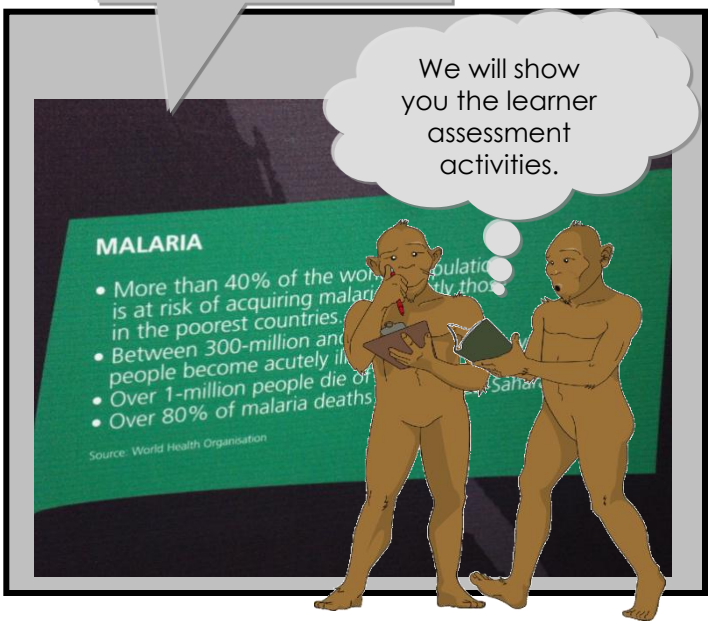
At the end of the exhibition, allow learners five minutes to study the pictures provided on the following page, working individually.

Each learner should then decide on his/her own topic and write a paragraph on any one of the pictures in the context of that topic.



Sustainability Wall

Did you know …? Over 1-million people die of malaria every year.



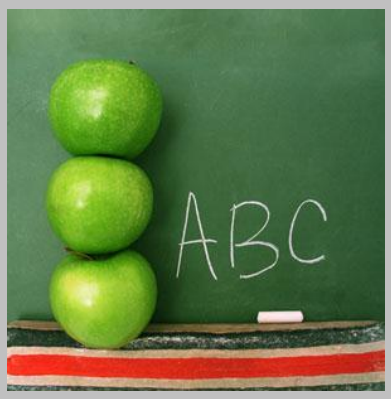
Subject: Economics **Grade: 12**

Sustainability Wall

Explore the Sustainability Wall. Below are some pictures and text to guide you.

- How the global environment has changed over time

- Education and sustainability



- Global appetite

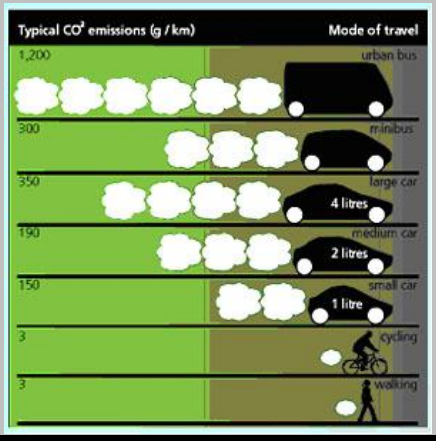
- Poverty and wealth

- Human mobility and urbanisation

- Human impact on the environment

- Your ecological footprint

- Alternative energy sources



FET: Learner Activity and/or Assessment Task

Subject: Economics **Grade: 11**

Activity 1

Poverty in the SA Context

- Suggest an appropriate topic for this picture.
- Write a short paragraph on the picture, within the context of Economics.

Source: Alex Kadis/ http://www.flickr.com/photos/kadis/4054434600/sizes/l/in/photostream/

Background Knowledge

Subject: Economics **Grade: 12**

Can Black Empowerment Address Poverty?

By Geoff Parr, 18 August 2005

Black economic empowerment (BEE) seeks to give increased ownership and control over businesses to historically disadvantaged persons (HDPs) and to increase the procurement spending going to BEE firms. Indeed, section 2(f) of the Competition Act states that one of its purposes is "to promote and maintain competition in order to promote a greater spread of ownership, in particular to increase the ownership stakes of HDPs".

Certainly, increasing ownership stakes of wealthy and even middle-income HDPs is easy enough, but the challenge is to make BEE deals broad based to the extent that they empower the masses. But can BEE really address the problem of poverty that affects so much of South Africa's population?

Poverty, or being very poor, indicates a shortage of both wealth and income, where the wealth of a household might be the accumulated stock of assets acquired by inheritance and by means of spending flows of income. Importantly, wealth can be converted back into income by selling assets, ideally in later years of life, as older family members retire and, in the absence of any wage income, might have to survive by liquidating their stocks of accumulated wealth as well as relying on savings.

Unfortunately for the poverty stricken, each day might be a quest for survival, in which any assets acquired might have to be sold to finance consumption, rather than being accumulated as wealth. For households on or below the poverty line (whatever level of income that might be), consumption is equal to income and savings are therefore zero. In fact, if a household's income is not sufficient to finance consumption in a particular period, then it must resort to dissaving, or selling of any liquid assets.

Economists refer to a concept known as the "marginal propensity to consume". This is the measure of a consumer's tendency to spend a certain portion of additional income received, and it ranges from 0 to 1 (0 percent to 100 percent). Wealthier, or higher-income consumers, have enough income to save a portion each month, so their marginal propensity to consume is less than 100 percent – that is, they do not spend all of their last rand of income on consumption.

But the poor must lead a hand-to-mouth existence and so they will tend to spend all (100 percent) of their income – in other words, their marginal propensity to consume is 1.

When households are given non-cash assets, those with enough income to provide for their day-to-day needs might keep those assets as wealth, whereas the poor must convert them into income to spend on satisfying their immediate needs.

The implication is that an empowerment scheme that gives (or sells at a favourable price) shares to poor people will not necessarily increase the wealth of the recipients. Sadly, the shares will most likely be sold and thereby converted into income to be spent on food, transport, accommodation and clothing.

The proceeds of these shares will yield short-term benefits, and arguably the poorest households would benefit the most, if extra income were presumed to be most beneficial to those with the least of it. But the empowerment exercise will be a one-off shot in the arm, a poverty relief effort rather than empowerment in the sustainable sense that was intended by empowerment legislation (including the Competition Act).

Nor will businesses involved in such transactions be able to claim the BEE credentials for creating a class of poor black shareholders: in all likelihood, those already privileged will have bought the shares from their original recipients.

There are difficulties in ensuring that the benefits of BEE transactions are spread widely and to the poorest. That is surely the reason structures have been devised to hold shares on behalf of the ultimate beneficiaries. For example, some transactions involve partnership arrangements, workers' participation schemes that facilitate empowerment, or the sale of shares to employee groups or union groups. These difficulties apply not only to the private sector, but also to the sale of shares in state enterprises.

Naturally, it seems the government would still prefer to have control and sustainable ownership in these organisations passing to HDPs. But for the government there are other options: giving away shares to the public (on the understanding that those who need the money instead will resell them); or selling them to the highest bidders and then applying the proceeds to its expenditure programmes.

This choice of options should depend on whether the government feels it has made sufficient provision for poverty alleviation, in which case it will have space to pursue other objectives, such as BEE, in the sale or partial sale of state-owned enterprises.

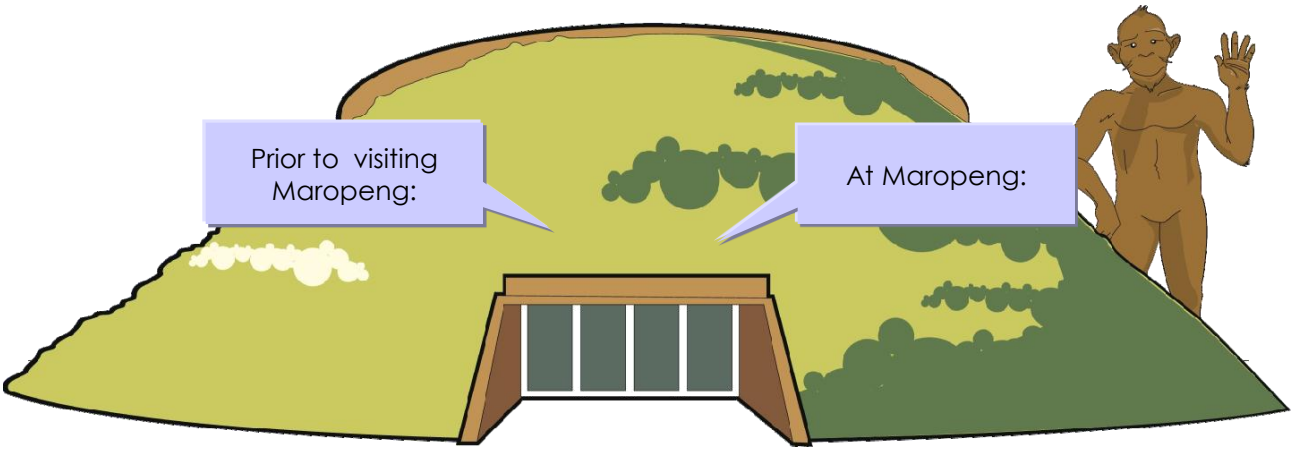
Source: *Business Report*, August 18 2005

Background Knowledge

Subject: Economics **Grade: 12**

Teacher's Notes

Environmental Sustainability



Learners should have studied the concept of poverty. They should have an understanding specifically of poverty in the South African context, and in their own community.

The following issues related to poverty should have been covered:

- Absolute and relative poverty;
- Measuring poverty;
- Causes of poverty;
- Effects of poverty; and
- The SA government's measures to alleviate poverty.

The teacher should also cover these concepts in class prior to the visit to Maropeng:

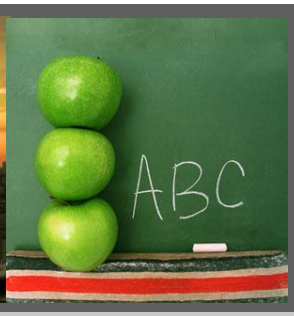
- Globalisation;
- Over-exploitation of resources;
- Levels of literacy in SA;
- Indigenous knowledge systems; and
- Population growth.

Learners need to note any economic concepts or principles that are displayed on the Sustainability Wall. It would be advisable for the learners to have a notepad with them so they can record their observations.

After the observation period, a class discussion is held on what the learners observed. Here are some questions that the teacher can ask at the conclusion of the discussion:

- What can you **personally** do to ensure that the environment does not deteriorate as rapidly as it is at present?
- What can **business** do to ensure that the environment does not deteriorate as rapidly as it is at present?
- What can **government** do to ensure that the environment does not deteriorate as rapidly as it is at present?



Background Knowledge

Subject: Economics **Grade: 12**

Human Impact on the Environment

The global rate of ice melt has more than doubled since 1988 and could raise sea levels 27cm (nearly 11 in) by 2100. – Worldwatch, 2003

Poor farming practice has contributed to top-soil erosion, making some earth unproductive for future generations.

We have used fire to power vehicles and industries, but the resulting emissions now contribute to the global warming that threatens our resources.

We have polluted the air with toxins that destroy plants and animal habitats, and even make us sick.

The world's rich waste fresh clean water while a billion people suffer because they don't have it.

Since 1700, nearly 20 percent of the world's forests and woodlands have disappeared. – National Institute of Public Health and the Environment, Netherlands & Centre for Sustainability and the Global Environment, University of Wisconsin-Madison, USA, 2001

Bird extinctions are running at 50 times the natural rate due to habitat loss and other consequences of human activity. – Worldwatch, 2003

The air we breathe

For decades humans have been pumping tons of greenhouse gases, such as carbon dioxide and methane, and other pollutants, such as sulphur dioxide and lead, into the atmosphere. These pollute the air and cause health problems, such as lung diseases. The increase of greenhouse gases in the atmosphere has caused Earth's climate to change. Average temperatures are gradually rising, threatening biodiversity and, ultimately, the survival of our species.

The power of fire

From the time hominids at Swartkrans harnessed their first flame more than a million years ago, fire has been a central, sometimes sacred, part of our lives. We use it to generate electricity, to power our vehicles, to cook and even to send people into space.

But fire has also had its part to play in weapons and destruction.

A symbol of both good and evil, it can protect us and help to nourish us, but it can also destroy us …

The water of life

We live on a uniquely blue planet. Over 75 percent of the Earth's surface is covered with water. Water is essential to each one of us, making up 60 percent of our bodies.

But despite its abundance, access to water, especially clean, fresh water, is limited. Global consumption is doubling every 20 years while the supply is already overstretched and poorly distributed.

Like many other resources, the world's richest countries have good access to water, while in the world's poorest countries, 1-billion people suffer shortages of clean, fresh water. In 25 years, this could grow to two-thirds of the world's population.

Water use: According to Johannesburg Water, a person in South Africa's biggest city used about 18 litres of water per day in the mid-19th century, 70 litres per day in the 1940s, and 160 litres per day by the end of the 20th century. Added to this, our country's population has skyrocketed over the past 150 years, placing additional strain on the adequate supply of fresh water.

Water usage tells a tale of disparity between rich and poor. People in developed countries use about 500 to 800 litres of water per day on average, compared to 60 to 150 litres per day in developing countries, according to the United Nations Educational Scientific and Cultural Organisation (Unesco). This discrepancy is also prevalent in South Africa, where one toilet flush (which uses 9 to 11 litres) in a wealthy home can be the equivalent of a person's total use of water for washing and cooking for a day in a poor home with limited water access.

FET: Learner Activity and/or Assessment Task

Subject: Economics **Grades: 11-12**

Activity 1

Contemporary Economics:

Environmental Sustainability

Grade 11:

Learners should be aware of, and debate, the following issues:

- The problem of environmental sustainability;
- Protection of the environment;
- Different approaches to sustainability;
- The global impact of environmental issues; and
- The impact of global environmental issues on South Africa .

These questions can be given to learners to brain-storm after the walk down the Sustainability Wall.

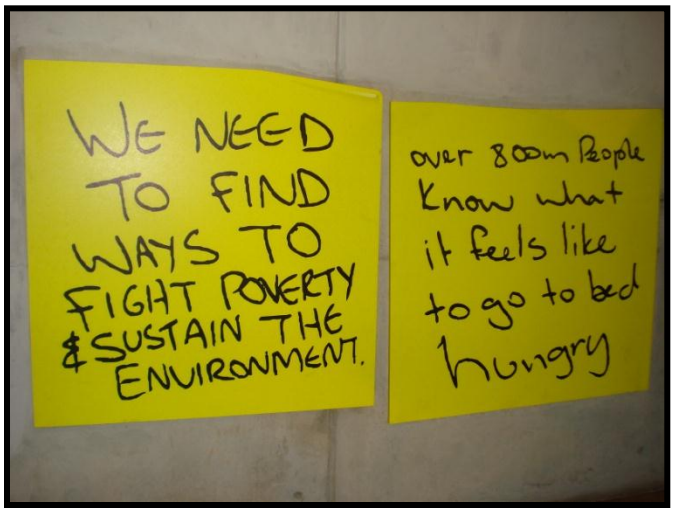
- What can you **personally** do to ensure that the environment does not deteriorate as rapidly as it is at present?
- What can **business** do to ensure that the environment does not deteriorate as rapidly as it is at present?
- What can **government** do to ensure that the environment does not deteriorate as rapidly as it is at present?

Grade 12:

Learners should be able to:

- Analyse the state of the environment;
- Explain measures to ensure sustainability; and
- Understand international environmental agreements.

Refer to Activity 2 for the Grade 12 questions.



Activities

Subject: Economics **Grade: 12**

Activity 2

Contemporary Economics:

Indigenous Knowledge Systems

- What are indigenous knowledge systems?

Once learners understand the concept of indigenous knowledge systems, they should do some research on the topic in their own communities. They should speak to elders in their homes and communities to find out what the indigenous knowledge systems of these communities are.

Learners are then to give a verbal report back on their findings. The rest of the class should be allowed to ask questions. The presenter(s) should respond professionally to the questions, and be prepared to answer all questions from the audience.

Learners from similar backgrounds could report back as a group. The learners will get exposure to different knowledge systems from different communities. Cultural sensitivity and diversity is to be encouraged.

Tourism

- Learners should investigate how much tourists (visitors to an area) can learn about the indigenous knowledge systems (historical or current) of different local communities.

For example, if someone visits Soweto/the Cradle of Humankind/Suikerbosrand/Gold Reef City/Pretoria, what opportunities (exhibitions, tours, people, museums, monuments, etc.) are available to them that will teach them something about the indigenous knowledge systems of the local community/ communities? (Learners should debate whether the opportunities they name really do educate people about indigenous knowledge systems – just having a memorial, for example, does not in itself specifically address issues of indigenous knowledge systems.)

- What economic benefits could a community gain by focusing attention on indigenous knowledge systems in its tourism offerings?

FET: Learner Activity and/or Assessment Task

Subject: Economics **Grade: 11**

Activity 1

Environmental Sustainability

1. What can you **personally** do to ensure that the environment does not deteriorate as rapidly as it is at present?

_____

_____

_____

2. What can **business** do to ensure that the environment does not deteriorate as rapidly as it is at present?

_____

_____

_____

3. What can **government** do to ensure that the environment does not deteriorate as rapidly as it is at present?

_____

_____

_____

FET: Learner Activity and/or Assessment Task

Subject: Economics **Grade: 12**

Activity 1

Environmental Sustainability

1.What can you **personally** do to ensure that the environment does not deteriorate as rapidly as it is at present?

_____

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_____

_____

_____

3. What can **government** do to ensure that the environment does not deteriorate as rapidly as it is at present?

_____

_____

_____

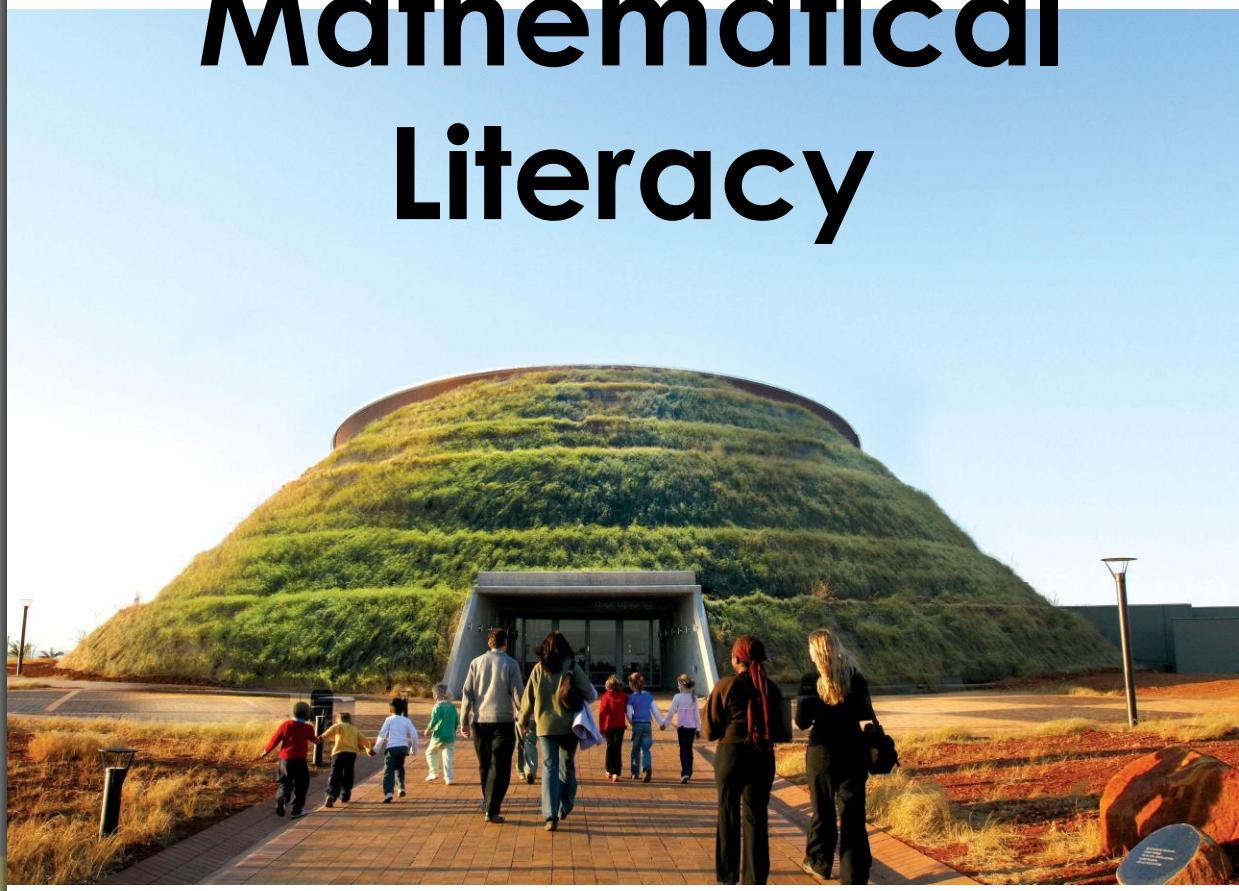
Activity 2

Indigenous Knowledge Systems

1. Research this topic by speaking to elders in your home and community. Find out what the indigenous knowledge systems of your community are.

2. Give a verbal report back on your findings. The rest of the class will be allowed to ask questions. The presenter(s) should respond professionally to the questions, and be prepared to answer all questions from the audience.

Mathematical Literacy



Developed by:

Dr. Erica Spangenberg

Zaheda Sooliman

Magda van der Westhuizen

Who am I?

maropeng

Subject: Mathematical Literacy

Topic: What Data Tells Us

Grade 10 (CAPS)

Basic skills topics:

- Interpreting and communicating answers and calculations.
- Numbers and calculations with numbers.
- Patterns, relationships and representations.

Application topics:
Data handling

Basic skills topics:

Section:

- Classifying and organising data.
- Summarising data.
- Representing data.
- Analysing data.

Grade 11 (CAPS)

Basic skills topics

- Interpreting and communicating answers and calculations.
- Numbers and calculations with numbers.
- Patterns, relationships and representations.

Application topics:
Data handling

Basic skills topics:

Section:

- Classifying and organising data.
- Summarising data.
- Representing data.
- Analysing data.

Grade 12 (CAPS)

Basic skills topics

- Interpreting and communicating answers and calculations.
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Application topics:
Data handling

Basic skills topics:

Section:

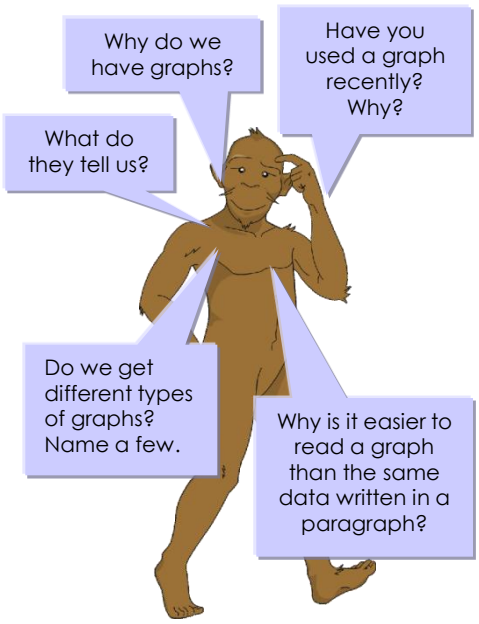
- Classifying and organising data.
- Summarising data.
- Representing data.
- Analysing data.

Background Knowledge

Subject: Mathematical Literacy **Grade: 12**

Teacher's Notes

Data



Timeline

Construct a timeline

Ask learners to create a timeline to scale using the following information.

- 7-million years ago — *Sahelanthropus tchadensis* (Earliest hominid discovered so far)
- 5.8-million years ago — *Ardipithecus ramidus kadabba*
- 3-million years ago — *Australopithecus africanus*
- 4.2-million years ago — *Australopithecus anamensis*
- 2.4-million years ago — Early *Homo*
- 200,000 years ago — *Homo sapiens*
- 1.3-million years ago — *Dryopithecus* (Miocene ape which represents the kind of ancestor that gave rise to African apes)
- 1.8-million years ago — *Homo ergaster*
- 2-million years ago — *Paranthropus robustus; Homo habilis*
- 3.5-million yeas ago — *Australopithecus afarensis*

Graphs everywhere

The teacher is to ask learners to work in groups of two or three and move around the Maropeng exhibition area.

The learners must then choose a graph and there should be no more than one group at a graph. Without mentioning the graph by name, the learners must write down 10 questions that relate to it. When they've finished, they should swop their questions with a different group. Each group must then find the graph to which the questions relate, and then answer the questions.

FET: Learner Activity and/or Assessment Task

Subject: Mathematical Literacy **Grade: 10**

Activity 1

HIV/AIDS

Over 40-million people are living with HIV worldwide, more than half of them in sub-Saharan Africa. In South Africa, over 5-million people are estimated to be HIV-positive.

The National Department of Health conducts an annual HIV prevalence survey among pregnant women attending antenatal clinics at selected sites in all nine provinces.

The government uses this information to understand how the HIV pandemic is developing in the country and to estimate HIV prevalence on a national scale.

HIV prevalence among pregnant women surveyed was 29.5% in 2004, a dramatic increase from 0.7% in 1990.

Source: JournAIDS.
http://www.journaids.org/statistics.ph

Bar graphs

Vertical bar graphs (Note: Bars may be horizontal)

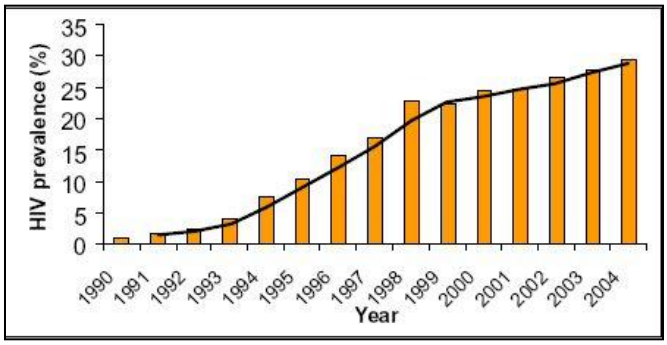
- Bar graphs represent data in vertical blocks or bars;
- The horizontal axis shows the category of data that each column represents; and
- The vertical axis shows a value for each category.

Questions: Study the graph below and answer the questions that follow.

1. What data is represented the horizontal axis?
2. What data is represented on the vertical axis?
3. Use the information in the paragraph to the left to choose a suitable title for the graph:
   a) HIV prevalence among antenatal clinic attendees in SA (1990 – 2004)
   b) HIV prevalence among the total population in SA (1990 – 2004)
   c) HIV prevalence among all females in SA (1990 – 2004)
   d) HIV prevalence among all males in SA (1990 – 2004)
4. What does this graph tell us when we compare the years?
5. What is the overall trend in this graph?
6. Use the information in the last paragraph of the article to supply the table on the left with an appropriate title.
7. What does the table tell us about how HIV is spreading?
8. Compare the information in the table with the graph. Describe the similarities between the two.
9. How was the data for these statistics collected?
10. Are <u>all</u> pregnant women part of the annual survey? Motivate your answer.
11. Is the information in the graph a cause for concern? Why or why not?
12. What do you think can be done to change the trend in the graph?
13. How would you like the graph to look?

	%
1990	0.7
1991	1.7
1992	2.2
1993	4
1994	7.6
1995	10.4
1996	14.2
1997	17
1998	22.8
1999	22.4
2000	24.5
2001	24.8
2002	26.5
2003	27.9
2004	29.5

Source: http://www.hst.org.za/healthstats/13/data



Source: National HIV and Syphilis Antenatal Sero-Prevalence Survey in South Africa, 2004.
http://www.doh.gov.za/docs/reports/2004/hiv-syphilis.pdf

FET: Learner Activity and/or Assessment Task

Subject: Mathematical Literacy **Grade: 11**

Activity 1

Global warming

We are in a general period of natural warming after the "Little Ice Age" of generally cooler weather between the 14th and mid-18th centuries. However, most scientists agree that humans have caused a significant increase in global warming by their own activities.

The greenhouse effect

The land and seas of the Earth receive energy from the sun. To prevent overheating, they in turn release energy into the atmosphere in the form of long-wave radiation. This warms the gases in the atmosphere, including carbon dioxide, water vapour, methane and the ozone, in turn warming the planet's surface and lower atmosphere.

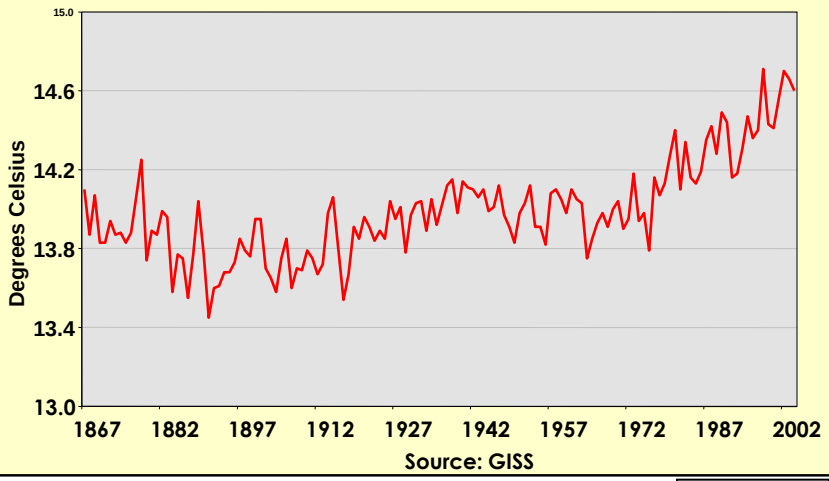
The greenhouse effect naturally keeps the Earth warm. Without it, temperatures would be 30-40°C cooler.

But over the past 50 years, humans have pumped billions of tonnes of carbon dioxide into the atmosphere by burning fossil fuels, which use use to run engines in our cars and factories. With this increase of carbon in our skies, the atmosphere has warmed further than it naturally should.

Countries have now realised that global warming could be catastrophic. As the world warms, polar icecaps begin to melt, raising sea levels and eventually flooding low-lying coastal areas. There may also be changes to world weather patterns, causing uncharacteristic droughts and flooding in regions. Changing climates will also threaten sensitive species with extinction.

Many of the world's leaders have realised that climate change threatens the economic and perhaps political futures of their countries. Most countries are now committed to reducing carbon emissions through policies such as the UN-sanctioned Kyoto Protocol of 1997.

Source: Maropeng



By tabulating the average global temperatures for each year, scientists have been able to record the increase in global temperatures over the last century.

When the data is plotted on a graph, we can immediately tell that temperatures have not increased linearly (in a straight line), but have varied year by year, often decreasing from the previous year before increasing again.

Average Global Temperature at Earth's Surface (Land-Based), 1867-2004

Source: NASA, Goddard Institute of Space Studies, "Global Temperature Anomalies in .01°C, base period 1951-1980" (January-December). *Vital Signs 2005,* Worldwatch Publication

Year	Annual Mean (degrees Celsius)
1875	13.83
1880	13.89
1885	13.77
1890	13.78
1895	13.68
1900	13.95
1905	13.75
1910	13.79
1915	14.06
1920	13.85
1925	13.85
1930	13.97
1935	13.92
1940	14.14
1945	13.99
1950	13.83
1955	13.91
1960	13.98
1965	13.85
1970	14.04
1975	13.98
1980	14.27
1985	14.13
1990	14.49
1995	14.47
2000	14.41

Answer the following questions:

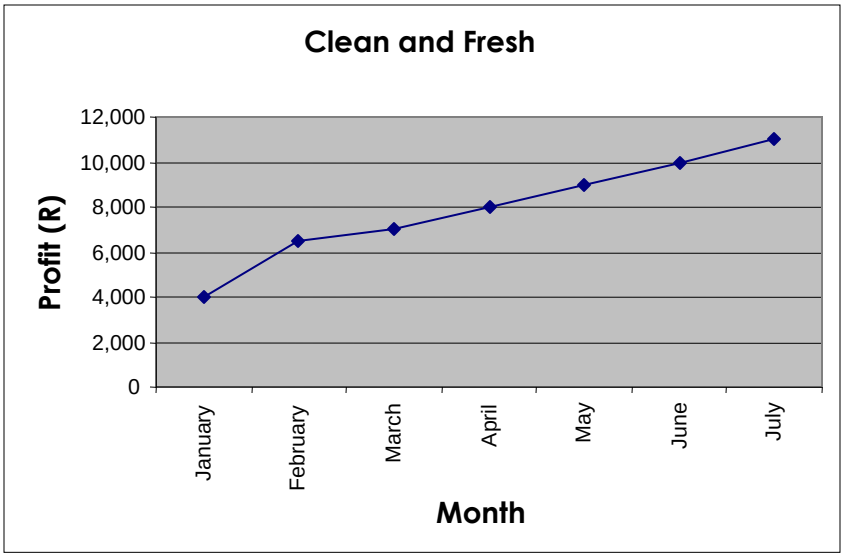
1. What does the graph tell us when we compare the years?
2. Describe the overall trend in this graph.
3. Supply a suitable title for the table on the right.
4. Summarise what the table tells us in one sentence.
5. Compare the information in the table with the graph. Discuss the similarities between the two.
6. How do you think scientists collected the annual data for the graph and table?
7. Is the information in the graph a reason to get worried? Explain.
8. What can be done to change the trend seen in the graph? Suggest at least three practical things that ordinary people can do.
9. How would you like this graph to look?
10. Suggest one thing that <u>you</u> can do to help address global warming?
11. Big industries and governments can also play a role. Which of the following sources of energy would be a better choice to prevent catastrophic global warming?
    a) A coal power station
    b) A nuclear power station
12. Calculate the increase in the mean annual temperature from 1970 to 2000.
13. Give an estimate of the average global temperature for 2030.
14. Discuss two negative consequences of global warming.

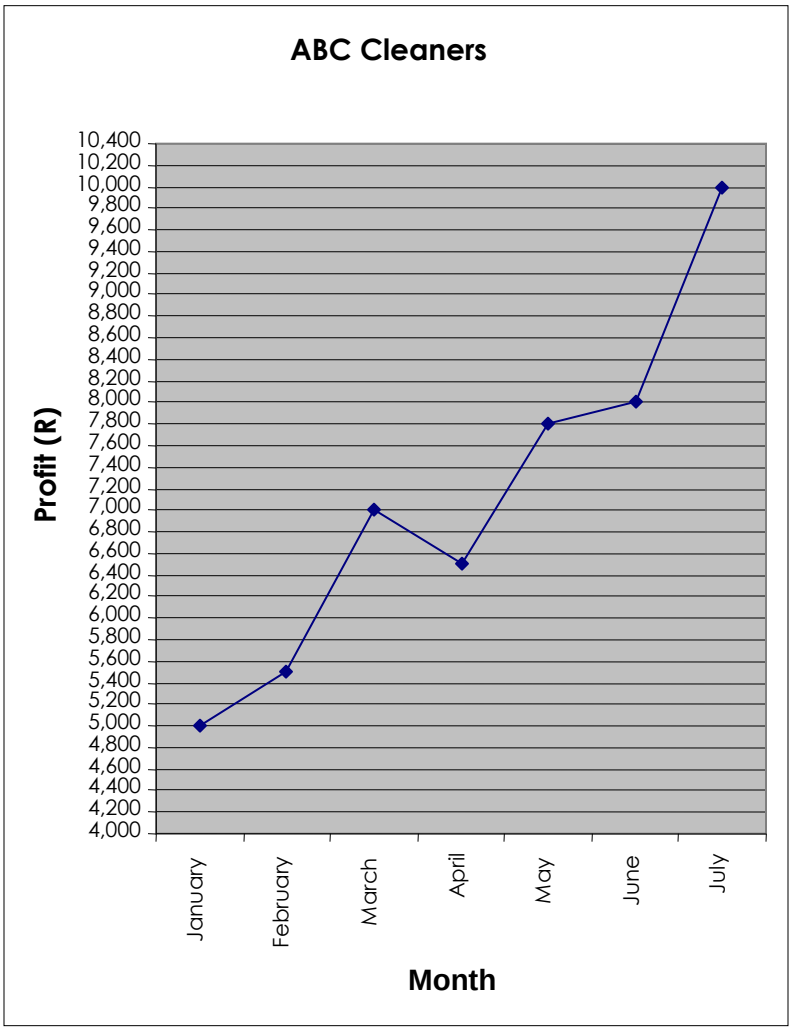
FET: Learner Activity and/or Assessment Task

Subject: Mathematical Literacy **Grade: 11**

Activity 2

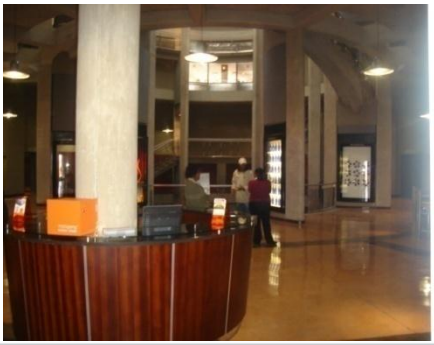
The manager at Maropeng wants to hire a company to clean up their four dormitories. Two companies, namely ABC Cleaners and Clean and Fresh, are considered after management has compared their profit results. Advise the manager which company to hire by answering the following questions.





Use the graphs to answer the following questions:

1. Which company appears to have improved its profit?
2. What is the difference in profit between January and July for ABC Cleaners?
3. What is the percentage growth in profit from January to July for ABC Cleaners?
4. What is the difference in profit between January and July for Clean and Fresh?
5. What is the percentage growth in profit from January to July for Clean and Fresh?
6. What is the profit for July for ABC Cleaners?
7. What is the profit for July for Clean and Fresh?
8. The Maropeng manager feels the appearance of the graphs is misleading. Do you agree with her? Motivate your answer.
9. Which company would you advise the Maropeng manager to hire?



FET: Learner Activity and/or Assessment Task

Subject: Mathematical Literacy **Grade: 12**

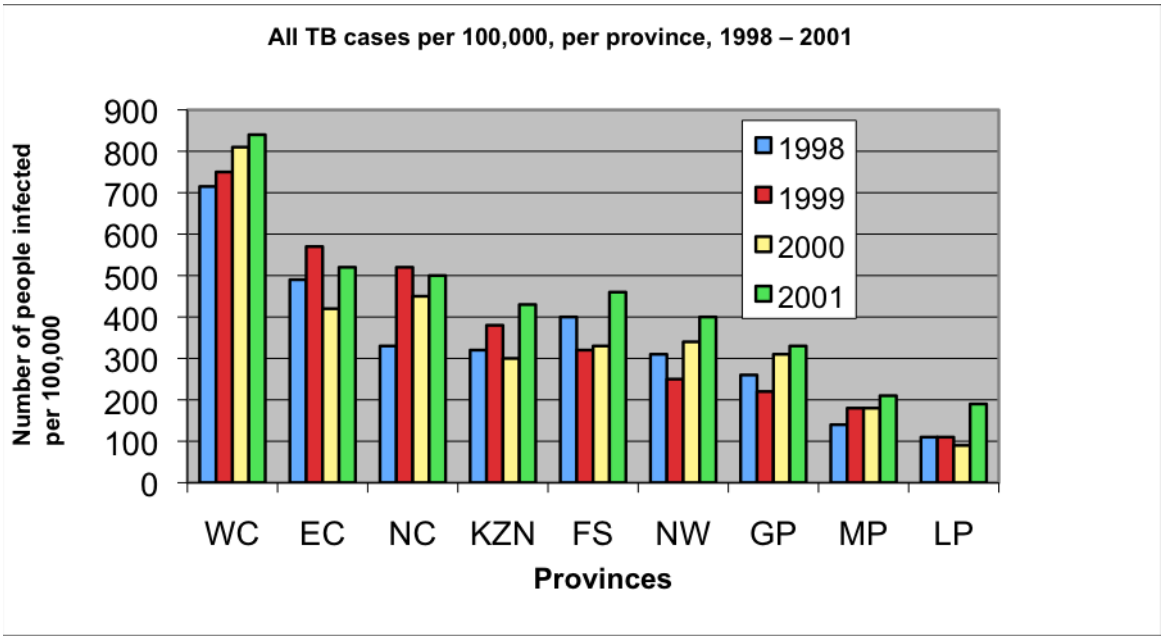
Activity 1

TB Fact Sheet for 2003

Tuberculosis is a curable disease, yet it continues to kill because many people do not take their treatment if they are not properly supervised. TB kills more youths and adults than any other infectious disease in South Africa today, even though these deaths could have been prevented. TB treatment is available and provided free of charge.

Almost 145,000 cases of pulmonary (lung) TB were reported in 2001. Of these, more than 104,000 were infectious, meaning the disease could be spread to others.

From 1998 to 2001, there was a general increase in the reported incidence of tuberculosis as a result of both awareness projects and high levels of HIV infection. In the graph below, the increase per province is shown.



The table below shows the number of cases reported per province for the same period (1998 to 2001).

	EC	FS	GP	KZN	MP	NW	NC	LP	WC	SA
1998	31,763	10,857	19,024	28,637	3,985	10,814	3,877	5,500	28,820	142,277
1999	30,990	8,885	17,450	34,481	5,226	9,043	4,698	5,825	31,566	148,164
2000	28,963	9,414	24,861	28,039	5,339	12,191	3,896	4,735	33,848	151,286
2001	36,520	13,024	27,622	39,586	6,925	14,277	4,435	10,619	35,687	188,695

Source: www.doh.gov.za/tb/factsheets/factsheet2003.pdf

FET: Learner Activity and/or Assessment Task

Subject: Mathematical Literacy **Grade: 12**

Recent South African tuberculosis statistics

The estimated tuberculosis caseload in South Africa for 2004 was 1,084 cases per 100,000 people.

This equates to a total caseload of some 529,320 cases.

Some 66.4% of these cases were related to people who are HIV-positive.

The provinces with the highest caseloads are the Western Cape, Eastern Cape and KwaZulu-Natal, Gauteng and Limpopo.

Source: Weyer & Fourie, Medical Research Council

It is suspected that at least 66% of the South African population is infected with TB, but in most instances the germ remains dormant.

Global tuberculosis statistics:

- 8-million new sufferers every year;
- 2-million deaths every year;
- Three of every four people stricken by tuberculosis are young adults; and
- Tuberculosis accounts for at least one third of AIDS deaths worldwide.

Source: Amsterdam Declaration to Stop TB – March 2000, www.santa.org.za?Tbstatistics.html

Answer the following questions:

The graph shows the number of TB cases per 100,000 people in the province.

The table shows the number of cases reported per province. Use the information to answer the questions.

1.1 Which province shows the highest reported cases per 100,000 of its population?
1.2 How many cases per 100,000 were recorded in 1998 in this province?
1.3 Calculate the approximate percentage of people with TB in this province in 1998.
1.4 Discuss the trend of TB infection in the Western Cape as indicated in the graph over the years.
1.5 Is there any province that shows a decreasing trend over the four years? If any, name the province.

2.1 Which province recorded the highest number of TB cases for 2001?
2.2 What percentage is this of the total number of TB cases in South Africa?

3. Use the table of values to answer the following:
3.1 Write down the number of TB cases in the Northern Cape in 2000.
3.2 Write down the number of TB cases in the Eastern Cape in 2000.
3.3 Express the number of TB cases in the Northern Cape in 2000 to the number of TB cases in the Eastern Cape in 2000 as a ratio.

4. Use the graph to answer the following:
4.1 Look at the bars for the year 2000 for the Northern Cape and the Eastern Cape. Which one of the two provinces had the most cases per 100,000 of the population?
4.2 Does the graph contradict the values given for the two provinces in the table? Motivate your answer.

5. In the section entitled "Recent South African tuberculosis statistics" it is said that "66.4% of these [TB] cases were related to people who are HIV-positive". Why do you think there is such a big link between the two diseases?

6. In the same section, it is said that there is a TB incidence of 1,084 cases per 100,000 people and that this equates to a total case load of 529,320 cases in SA.
6.1 Calculate the increase in TB cases since 2001.

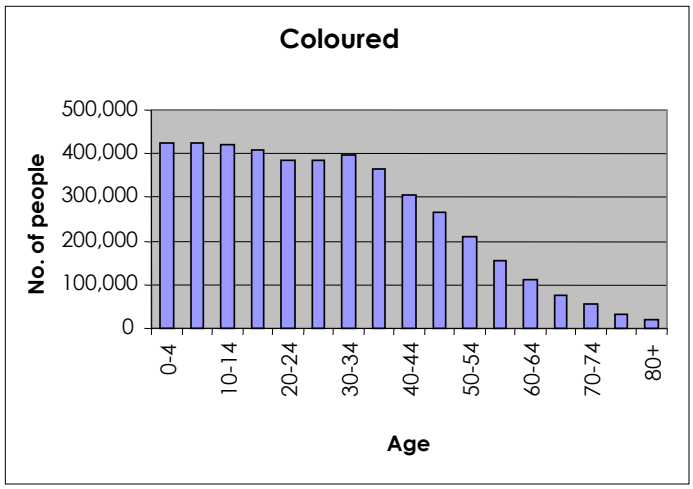
FET: Learner Activity and/or Assessment Task

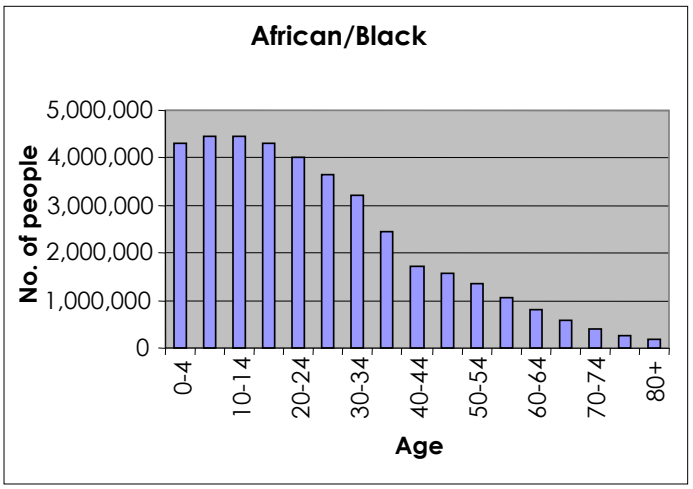
Subject: Mathematical Literacy **Grade: 12**

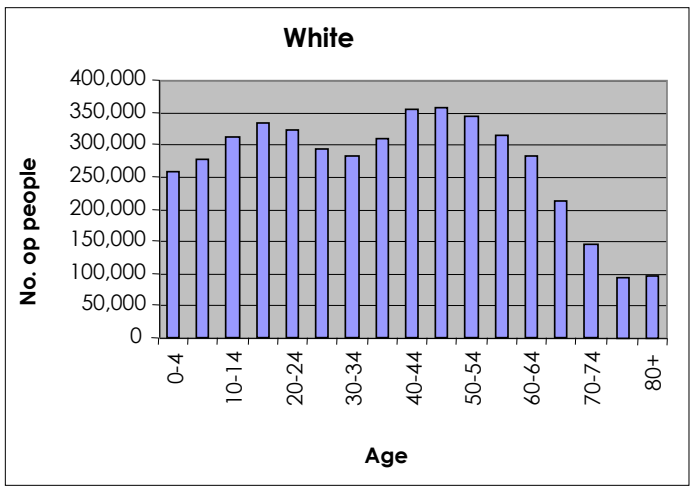
Activity 2

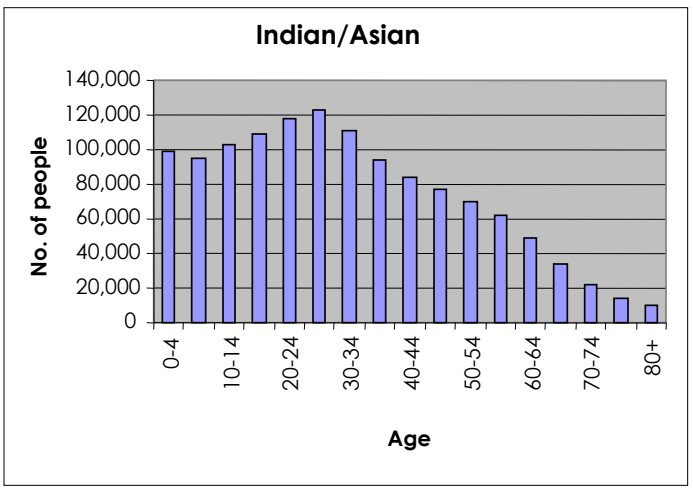
Growth of the South African population

The Cradle of Humankind is known for its richness of fossil finds. However, the management of Maropeng is not only concerned about geological times prior to humans, but also about humanity today. Therefore, an investigation was done on the growth of the SA population in 2008 as indicated in the graphs below.









Answer the following questions (give approximate values):

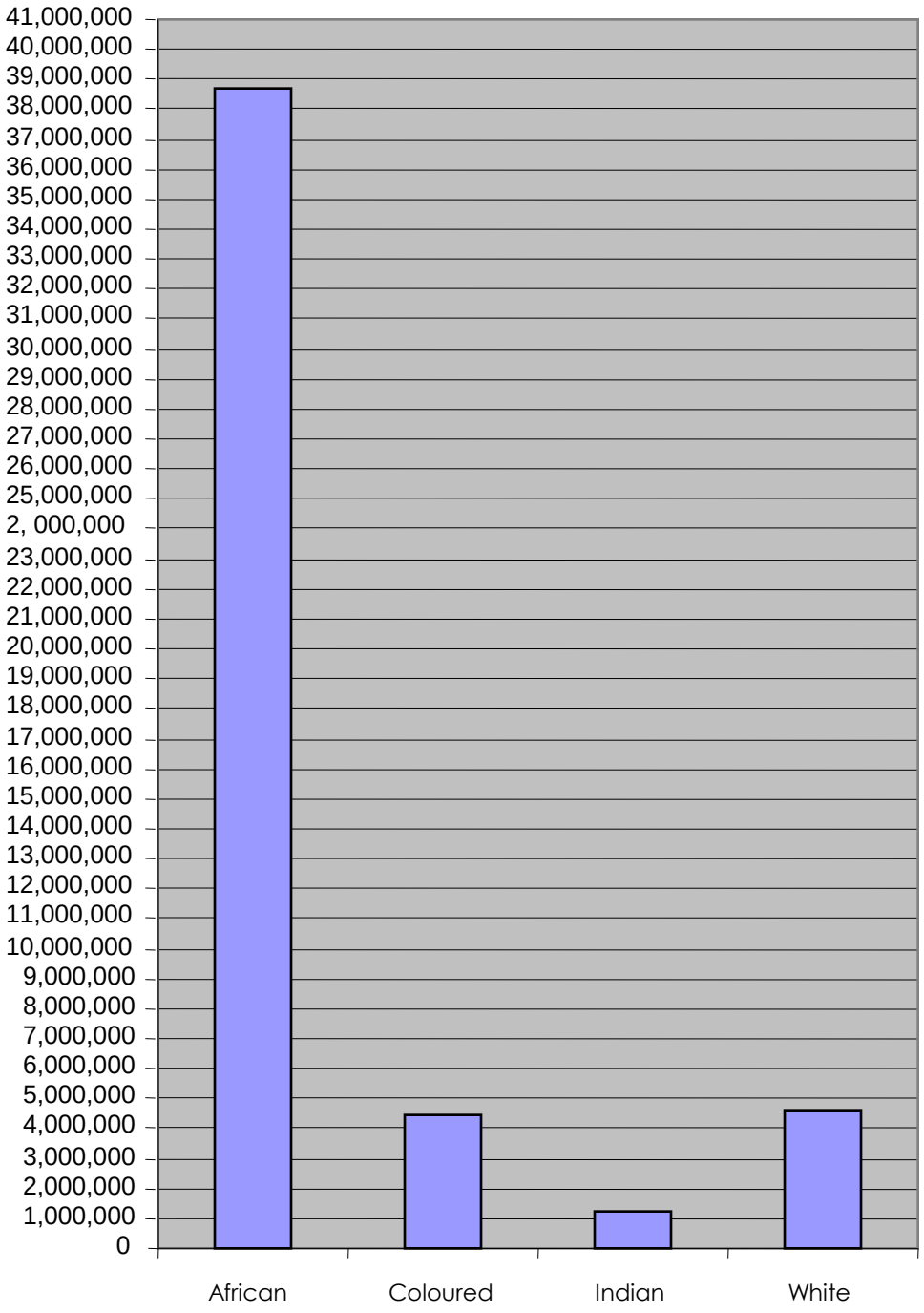
1. What is the ratio of African/black people to Indian/Asian people in the age group 0-4?

2. What is the ratio of people in the age groups 0-4 and 30-34 in each population group?

3. What do you notice about these ratios (between the 0-4 and 30-34 age groups) in the different population groups? What might explain the differences?

4. Why do you think there is a decline in the white population group between the ages 24 and 40?

Total Population According to Stats SA 2008



Answer the following questions and give approximate values rounded to the nearest 1,000,000:

5. Express the relationship between the race groups as a ratio as follows:

African:Coloured:Indian:White

6. Which was the smallest population group according to the 2008 Stats SA statistics?

7. Which was the largest population group according to the 2008 Stats SA statistics?

8. What was the approximate population of South Africa in 2008?

Memorandum

Subject: Mathematical Literacy **Grade: 10**

Activity 1

1. The years for which statistics on HIV data has been collected.

2. The percentage of pregnant women in the selected sample who are HIV-positive.

3. (a) HIV prevalence among antenatal clinic attendees in SA (1990 – 2004)

4. It tells us that there is a constant increase in the prevalence of HIV in the sample group.

5. There is an increasing trend.

6. HIV prevalence among pregnant women in SA (visiting selected antenatal clinics) from 1990 to 2004.

7. It tells us that HIV is spreading at a high rate. People must really change their way of living and their attitude in order to prevent further infection. (Any suitable comment linked to the rapid increase is acceptable.)

8. The graph represents the information in the table. It gives exactly the same information about the increase in the prevalence of HIV among antenatal clinic attendees.

9. They did a survey among pregnant women who attended antenatal clinics at selected sites in all nine provinces.

10. No, not all women were part of the annual survey. Only those who visited the specific selected sites were part of the survey. Therefore the HIV data is based on the sample used in the survey.

11. Yes, one must get worried if HIV is increasing at such a rate. It means that people are not changing their lifestyle to prevent the spread of the virus and that the government is not successful in the treatment and prevention of HIV.

12. Any suitable answer giving specific, practical things that can be done to decrease the percentage of HIV infection. Examples are:

- People must have only one sexual partner.
- Go for HIV tests with your partner before getting involved in unprotected sexual activities.
- Use condoms to protect yourself.

13. I would like the graph to show a decreasing trend or downward trend because…

Memorandum

Subject: Mathematical Literacy **Grade: 11**

Activity 1

1. Although the graph goes up and down from year to year, there is still a general increase over time.

2. It shows an increasing trend.

3. Average annual temperature in °C of the Earth's surface from 1875 to 2000.

4. There are fluctuations (increases and decreases) in the temperature, but over the whole period, the temperature is increasing overall.

5. The graph shows the temperature for the period 1867 to 2004, where the table shows it for the period 1875 to 2000. The table shows the values for every five years and the graph shows it for every year. They are similar in that both reflect the same increasing and decreasing patterns with an overall increasing trend.

6. Because it is global, scientists must have received data about the temperature at the Earth's surface from all countries in the world. From the source NASA, Goddard Institute of Space Studies it may be assumed that information was gathered using satellites.

7. There is reason to get worried. Although there was only an approximate change of 0.6°C over 125 years, this still shows global warming which will cause polar ice to melt, sea levels to rise and the flooding of low-lying coastal areas. Weather patterns may change which may lead to droughts and flooding.

8. Any practical suggestion of what ordinary people can do to reduce carbon dioxide levels in the air. For example:

- People must not use their cars unnecessarily, meaning that less carbon dioxide will be pumped in the air;
- Start lift clubs: less carbon on the road means less fuel burning;
- Use less electricity by switching off lights; and
- Switch off the geyser when not necessary to use or insulate your geyser and pipes.

9. I would like to see a downward trend.

10. I can try to save electricity by … (any suitable answer).

For example:

I can talk to people to inform them about the causes of global warming and convince them to make lifestyle changes like … to help prevent global warming.

11. (b) A nuclear power station

12. Increase = Temp. in 2000 – Temp. in 1970
= 14.41°C – 14.04°C
= 0.37°C

13. Estimate = Temp. in 2000 + increase over previous 30 years
= 14.41°C + 0.37°C
= 14.78°C
(any estimate around this will do)

14. Polar ice may melt causing flooding and shrinking of coastal areas and changes in weather patterns may cause droughts and flooding, in turn influencing crops and food supply in the world.

Activity 2

1. ABC Cleaners appears to have improved its profit over the period by larger amounts, if you just look at the gradient (steepness) of the lines. (But learners may read the graphs carefully and note that Clean and Fresh in fact has made a greater improvement in profit.)
2. R10,000 – R5,000 = R5,000
3. 200%
4. R11,000 – R4,000 = R7,000
5. 275%
6. R10,000
7. R11,000
8. Yes. It appears, according to the graphs, that ABC Cleaners has a higher percentage growth. However, according to calculations, Clean and Fresh has a higher percentage growth. Therefore, the graphs are misleading.
9. Clean and Fresh

Memorandum

Subject: Mathematical Literacy **Grade: 12**

Activity 1

1.1 Western Cape
1.2 705 - 710
1.3 Approximate percentage $= \frac{705}{100\,000} \times \frac{100}{1}$

$= 0.705\%$

1.4 There is an increasing trend.

1.5 There is no province with a decreasing trend.

2.1 KZN

2.2 % of total cases

$= \frac{39586}{188695} \times \frac{100}{1}$

$= \frac{\text{number of TB cases in KZN in 2001}}{\text{number of TB cases in SA in 2001}}$

= 20,98 % (rounded off to 2 decimal places)

3.1 3,896

3.2 28,963

3.3 3,896:28,963

4.1 Northern Cape
4.2 No, it does not contradict the values in the table. The table reflects the actual number of cases where the graph gives the number of cases per 100,000 inhabitants of the province. The Northern Cape is the province with the smallest population in SA. Therefore, the number of reported cases is low compared to Eastern Cape, but when it is reflected per 100,000 it shows a higher rate of infection than the Eastern Cape.

5. Any suitable but realistic explanation. For example:

HIV leads to Aids which means that a person has an immune system that cannot defend him or her properly against infection. Therefore, more people who are HIV-positive may die when they get TB compared to people who have immune systems that can help their bodies fight against the TB germs.

6.1 TB cases in 2001 in SA = 188,695
TB cases in 2004 in SA = 529,320
Increase = 529,320 – 188,695
= 340,625 more cases

Activity 2

1. ≈ 4,000,000:100,000 = 40:1
2. African/black ≈ 4,000,000:3,000,000 ≈ 4:3
Coloured ≈ 420,000:400,000 ≈ 21:20
Indian/Asian ≈ 100,000:116,000 ≈ 25:27
White ≈ 260,000:280,000 ≈ 13:14

3. The African/black and coloured population groups have more people in the younger age group than the older age group, whereas the Indian/Asian and white population groups have more people in the older age group. White and Indian/Asian people had fewer children. (Accept other reasonable explanations.)

4. Possibly a number of people in this age group are living or working overseas. (Accept other reasonable suggestions.)

5. ≈ 39,000,000:4,000,000:1,000,000:5,000,000
≈ 39:4:1:5

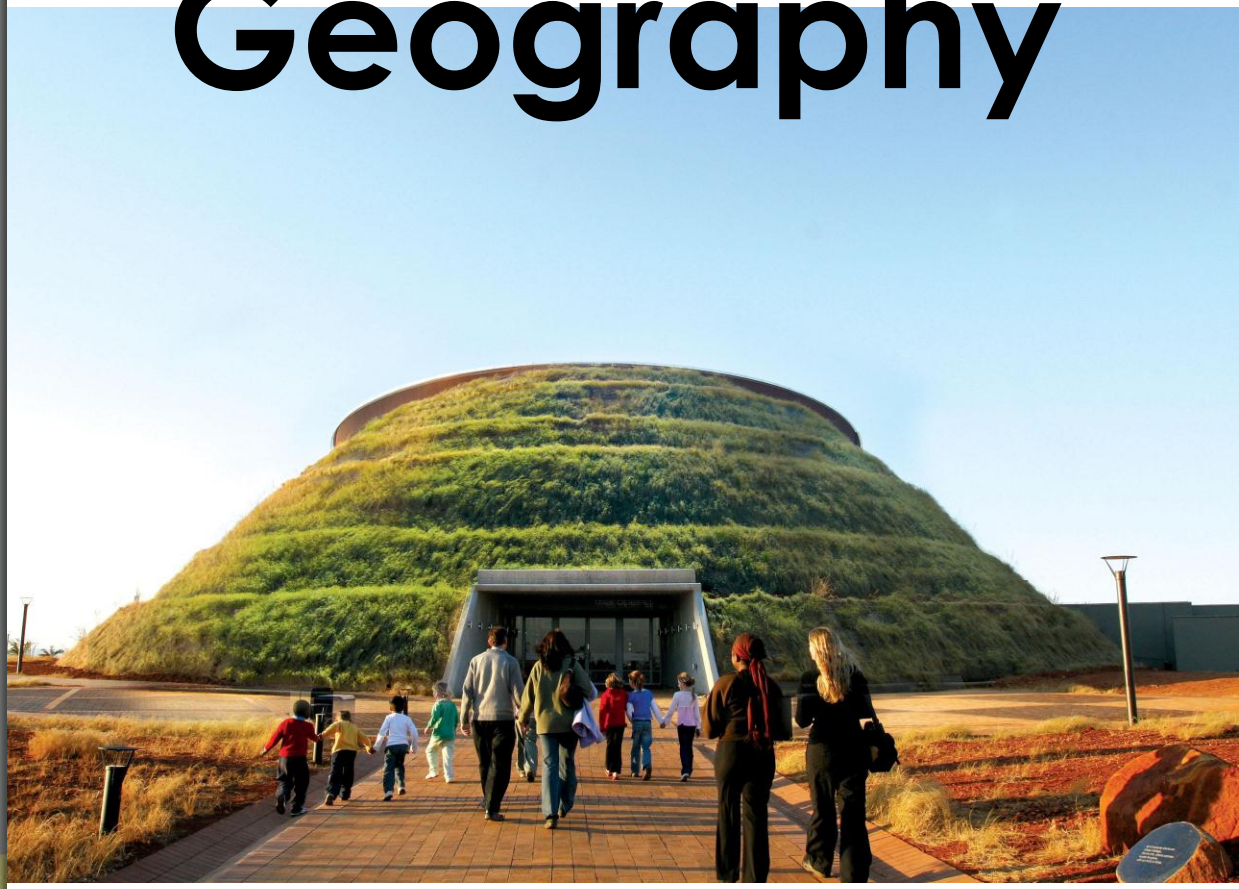
6. Indian

7. African

8. ≈ 49,000,000

Who am I?

Geography



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maropeng

Subject: Geography

Grade 10 (CAPS)	Grade 11 (CAPS)	Grade 10 (CAPS)
Topic:	**Topic:**	**Topic:**
Geomorphology	**Geomorphology**	**Water resources**
Content	**Content:**	**Content:**
Geomorphology **Geographical knowledge: The Structure of the Earth** • the internal structure of the Earth. • Classification of rocks: igneous, sedimentary and metamorphic. **Plate Tectonics** • changes in the position of continents over time; • evidence for the movement of continents over time; • plate tectonics – an explanation for the movement of continents; • the mechanics of plate movements.	**Geographical knowledge** • Topography Associated with Horizontally Layered Rocks • Topography Associated with Inclined/Tilted Rock Strata • Topography Associated with Massive Igneous Rocks.	**Water Management in South Africa** • rivers, lakes and dams in South Africa; • factors influencing the availability of water in South Africa; • challenges of providing free basic water to rural and urban communities in South Africa; • the role of government – initiatives towards securing water: inter-basin transfers and building dams; • role of municipalities: provision and water purification; and • strategies towards sustainable use of water – role of government and individuals. **Note:** No activities for grade 12.

Background Knowledge

Subject: Geography **Grades: 10-12**

Teacher's Notes:

Teachers and learners will never forget their visit to the Cradle of Humankind and its two visitor centres – the main one packed with exciting, interactive exhibits at Maropeng, and a smaller one which is the gateway to the fascinating Sterkfontein Caves and their secrets about our past. At Maropeng and the Cradle of Humankind, learners and teachers are enabled to appreciate the links between their natural, social and spatial environments and to integrate knowledge in a meaningful way. Assessment tasks are linked with programmes of assessment in order to make learning outside the classroom an exciting and relevant experience.

Geography

Prior to visiting Maropeng:

Before visiting Maropeng, learners need to have some understanding of:

The Sustainable use and management of water

- Why there is a need to conserve water.

Formation of caves

- How caves are formed; and
- How underground water influences cave formation.

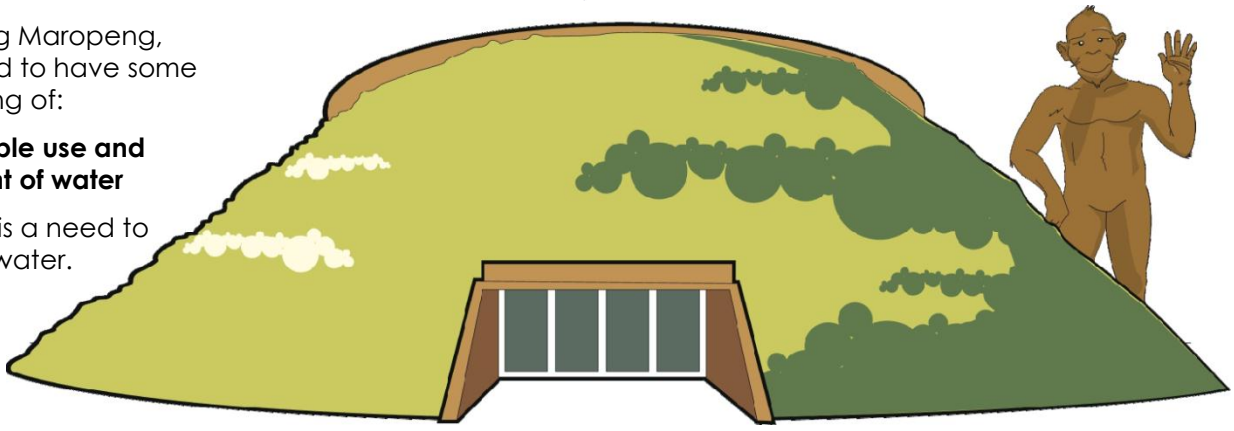
Geomorphology: The formation of caves, types of rocks

- The three types of rocks; and
- Characteristics of each type of rock and the significance of each type of rock.

Geological time

- Why researchers investigate the history of the earth using a time scale; and
- Relate geological events with archaeological events.

At Maropeng:



After visiting Maropeng, learners should be able to:

Sustainable use and management of water

- Explain the need to conserve water;
- Examine the management of water resources in a local context; and
- Appreciate the scarce commodity of water and the need for sustainability.

Formation of caves

- Use caves to explain what minerals and rocks are made up of; and
- Distinguish characteristics of underground water.

Geomorphology: The formation of caves, types of rocks

- Explain why rocks are important.

Geological time

- Be able to explain geomorphology and know and understand the geological time scale.

Background Knowledge

Subject: Geography **Grades: 10-11**

Geomorphology: The Formation of Caves, Types of Rocks

Geomorphology is the study of the changes in the shape and form of the Earth over time. Maropeng provides Geography learners with a rich and rewarding experience, as though in a time travel capsule. Learners are taken on a time travel journey of discovery from a 3-D visual representation of plate tectonics and continental drift to humans' journey through time and our constant engagement with, and fascination with, our ancestral roots. The activities below should be completed in conjunction with a visit to Maropeng in order for Geography learners to obtain a sound understanding of geomorphological processes over time.

Rocks and Rock Types

	Igneous	Sedimentary	Metamorphic
Types	**Intrusive** – magma cools and solidifies in cracks in the crust. The deeper in the crust it cools, the slower the rate of cooling, and the larger the size of the crystals. **Extrusive** – magma pours out onto Earth's surface as lava. Cooling is rapid and crystals are so small that they can only be seen under a microscope.	**Mechanical** – weathered rock particles are deposited in water in strata or in layers where they lithify to form solid rock. **Organic** – decaying plant or animal matter is compressed to form solid rock. **Chemical** – the water component of chemical solutions evaporates, leaving the chemicals behind, which form solid rock.	**Thermal** – rocks are altered as a result of high temperatures. **Dynamic** – rocks are altered due to great pressure. **Regional** – rocks change form as a result of temperature and pressure.
Examples	**Basalt** – very fine-grained, formed on Earth's surface. **Dolerite** – medium-grained, formed beneath Earth's surface. **Granite** – coarse-grained, formed deep in the crust.	**Conglomerate** – composed of large particles. **Sandstone** – composed of smaller particles. **Shale** – composed of very small sand particles. **Coal** – decayed remains of vegetation. **Limestone** – composed of shells of organisms. **Dolomite** – a form of limestone **Gypsum** – composed of mineral salts.	**Marble** – from limestone. **Gneiss** – from granite. **Slate** – from shale. **Quartzite** – from sandstone. **Anthracite** – from coal.
Uses	Building, for example, houses, roads, tombstones. Weathers to form fertile soil. Contains ores and precious metals.	Source of oil and coal. Study of fossils can give information on the geological history of an area. Can be porous and store underground water.	Building, for example, slate for roofs. Marble is used for monuments. Can contain ores.

Background Knowledge

Subject: Geography **Grades: 10-11**

Rock types, Formations, Characteristics Uses and Associated Landforms

Maropeng and the Cradle of Humankind provide insight into our geological and archaeological past.

After understanding geomorphological processes through the journey of Maropeng and the Cradle of Humankind, learners will understand that the basis of all geomorphology is rock and rock types. Learners will experience caves and be able to provide insight into their understanding of Geography over space and time.

Types of Rocks

Igneous rocks
Rocks that form during the solidification of molten material. Granites are among the most common rocks beneath the sea. Basalt is commonly found on the Drakensberg. Igneous rocks are characterised by crystals.

Landforms

Granite domes, tors, ridges, poorts and dolerite sills

Sedimentary rocks

Rocks formed when sand, silt or other material is dropped after being carried by water, weed or ice. These rocks will generally contain fossils.

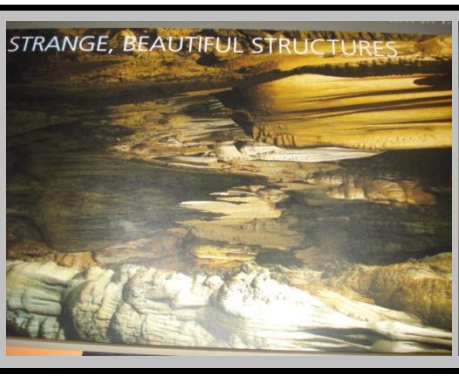
Landforms

Cuestas, hogsbacks and caves composed of limestone.

Metamorphic rocks

Rocks that have been changed by heat, pressure or both.

Generally when magma intrudes on sedimentary layers often, slates are formed. Metamorphic rocks are used in the building industry, e.g. for roof tiles. Gneiss is used to build roads.



Background Knowledge

Subject: Geography **Grade: 10**

The Formation of Caves

Studying caves provides an understanding of our geological heritage. While viewing the caves, learners are provided with an opportunity to see how rocks can be viewed in terms of their types and structure. The following activity can be used for the first term assessment task. Use the rubric to determine the nature and scope of the model to be constructed.

The caves were formed millions of years ago when dolomite limestone was eroded by rainwater.

Dolomite limestone is sedimentary rock formed over millions of years through chemical reactions. With movements within the Earth, dolomite limestone became exposed only on dry land. Limestone is permeable and soluble.

Weak carbonic acid in rainwater, reacting with the chemicals in the rock, dissolved and eroded away the limestone as water filtered into the sediments.

A limestone cave is therefore a natural cavity formed underneath the Earth's surface that can range from a few metres to many kilometres in depth.

Most of the caves are formed in porous limestone. Over millions of years, acidic ground water or underground rivers dissolved away the limestone, leaving cavities that grow over time.

Structures associated with caverns
Structures form inside caves as carbonic acid carrying limestone drips through cave roofs and onto the floors. These structures require millions of years to develop.

Activity 1

Construct a model showing the development of stalactites and stalagmites. Include short descriptions/summaries of the important aspects of your model.

100/5 = 20 marks

See the Memorandum section for rubric.

Cave formation

Visitors to Sterkfontein learn about the formation of caves

Example of a fossil of a sabre-tooth cat encased in breccia, found in the Sterkfontein Caves

FET: Learner Activity and/or Assessment Task

Subject: Geography **Grades: 10-11**

Activity 2

- Of what economic value are rocks?

Discuss the rocks below to see which metamorphic rocks result from which sedimentary rocks.

Column A	Column B
Sandstone	Gneiss
Shale	Marble
Granite	Slate
Limestone	Quartz

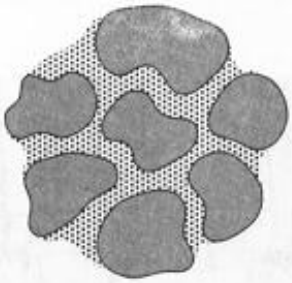
The following is a more detailed understanding of rock types and their uses, which can be viewed at Maropeng.

Rocks are a mixture of different minerals held together tightly together in a solid mass.

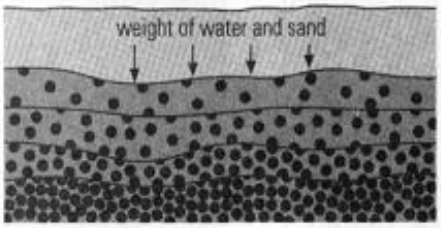
Minerals themselves consist of substances such as silicon, aluminium, magnesium, iron and copper.

When a rock has a large amount of one particular metal we call it an ore, e.g. iron ore.

Conglomerate Pebbles are cemented together by fine-grained sediments.



Sandstone Medium-grained sediments, such as sand, are deposited in layers on the seabed. The weight of the water and the layers of sediments causes the bottom layers to get squashed down or consolidated to become layers of sandstone. Table Mountain is formed of sandstone.



Shale Layers of fine-grained sediments become consolidated to form layers of shale. This is the rock which forms vast areas of the Karoo.

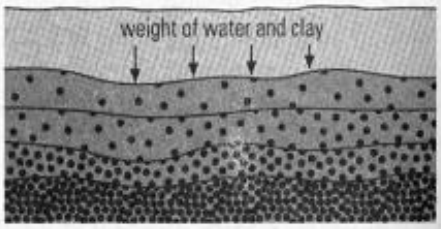
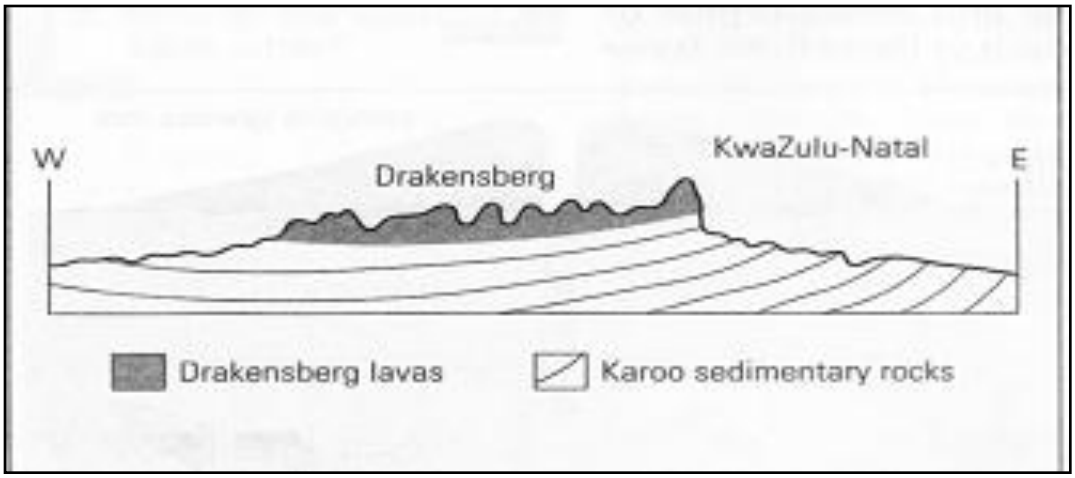


Figure 5.6



Sources: The World in our Hands Grade 10, Goldschagg et al, Juta, 2006. Focus on Geography, Grade 10, J. Earle et al, Maskew Miller Longman, 2004. Understanding Geography Grade 10, Morare et al, Kagiso, 2005. On Route in South Africa, B.P.J Erasmus, Jonathan Ball Publishers, 1995.

FET: Learner Activity and/or Assessment Task

Subject: Geography **Grade: 10**

Activity 3

Research Project

LO 1 AS 1-5; LO 2 AS 1-4; LO 3 AS 1

Here is a suggestion for a research project that could be used as part of your continuous assessment for this module.

Project

The types of rock in my area.

How to carry out a research project

Every project has four stages:

1. The hypothesis
2. The method
3. The presentation of data
4. The conclusion

Stages of the research project

1. The hypothesis

The hypothesis is a statement. You use the results of your project to agree with or disagree with this statement. For example, if you choose Project 1, above, your hypothesis could be:

Some of the rocks in my area are igneous, some sedimentary and others metamorphic.

Limestone cave

2. The method

What equipment will you need?

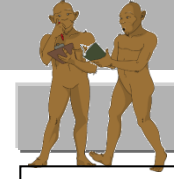
You will need a hammer to get rock samples, plastic bags to put samples in and reference books to help you to identify the rocks you find. You will also need labels, paper and pencils to draw samples and maps and, if possible, a camera to take photographs of your samples and the areas where you found the different rocks.

How will you carry out the project?

You will need to travel around your area to find different rock outcrops and suitable places to get your samples.

Write down the exact location where you found each sample (e.g. "a road cutting, 2 km along the N3 from the centre of town"). Then:

- Identify whether each rock is igneous, sedimentary or metamorphic. Explain how you decided on the identity of each rock.
- Draw each sample of rock and label any typical characteristics.
- Identify how old you think your rock samples are. Use the timeline and geology map or other reference to help you.
- Draw a map showing where the rocks came from.
- Draw a graph comparing how common the different rock types are, if you found more of some rock types than of others.



FET: Learner Activity and/or Assessment Task continued

Subject: Geography **Grade: 10**

3. The presentation of data

The data in your project might be presented in written text, maps, graphs, sketches, diagrams, photographs, questionnaires and interviews.

You can also include newspaper and magazine articles, and brochure pictures.

You can arrange your project in a file, a booklet or as annotated display or poster. Make sure you present all your data in a logical order. If your project is in a booklet or file, you should begin with a contents page.

Include a bibliography at the end of your project. The bibliography lists books, magazines and websites you referred to. With books you must write down the author, the title, the publisher, date of publication and the pages you referred to. You should also acknowledge anyone who has helped you with your research.

4. The conclusion

The conclusion comes at the end of your project. This is where you say whether your hypothesis is true or not.

Do not worry if you prove your hypothesis to be wrong. This is what research is all about! For example, you may find only igneous and metamorphic rocks in your area, so your hypothesis was wrong.

Self-assessment checklist

It is a good idea to keep a check on your progress when doing a project. Always keep in mind when the project has to be finished. You can pace yourself by filling in a form like the one below.

Project self-assessment checklist for Maropeng

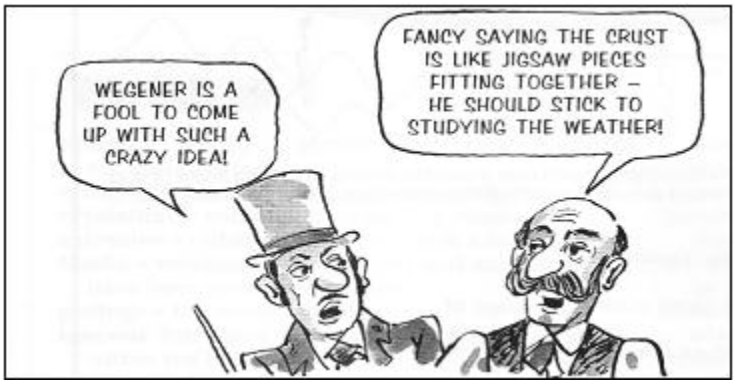
Criteria	Tick	Date
1. Hypothesis completed and checked		
2. Variety of resources collected		
3. Project steps are listed		
4. Interview appointments are made		
5. Questionnaires are designed and copies made		
6. Maps, graphs, illustrations and supporting material are referenced		
7. Designs for final presentation		
8. Final presentation has been checked for paraphrasing and plagiarism		
9. Hypothesis is accepted or rejected (reasons)		
10. Completion of bibliography and acknowledgements		

Background Knowledge

Subject: Geography **Grade: 10**

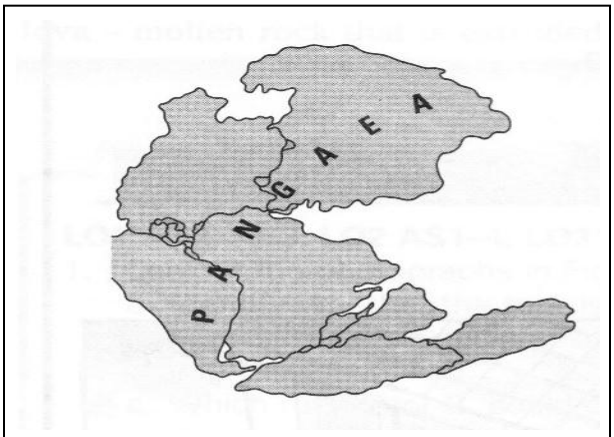
Continental Drift

The theory of evolution – humankind's journey through time – is explained at Maropeng in a variety of interesting and exciting ways: visual, auditory, even sensory. Learners will experience not only a travel through time but an unforgettable lesson in describing the Earth's major components and composition. By the end of their walk through the Visitors Centre, learners should be able to explain the theory of continental drift and why continents move.



Source: Focus on Geography (New Curriculum) Grade 10 (page 130) , Dilley L, Earle J, Keats G, Ravenscroft G, Maskew Miller Longman, South Africa

As long ago as the beginning of the 20th century, it was suggested that the continents of Africa and South America might once have been joined together to form on big continent called **Pangaea.**

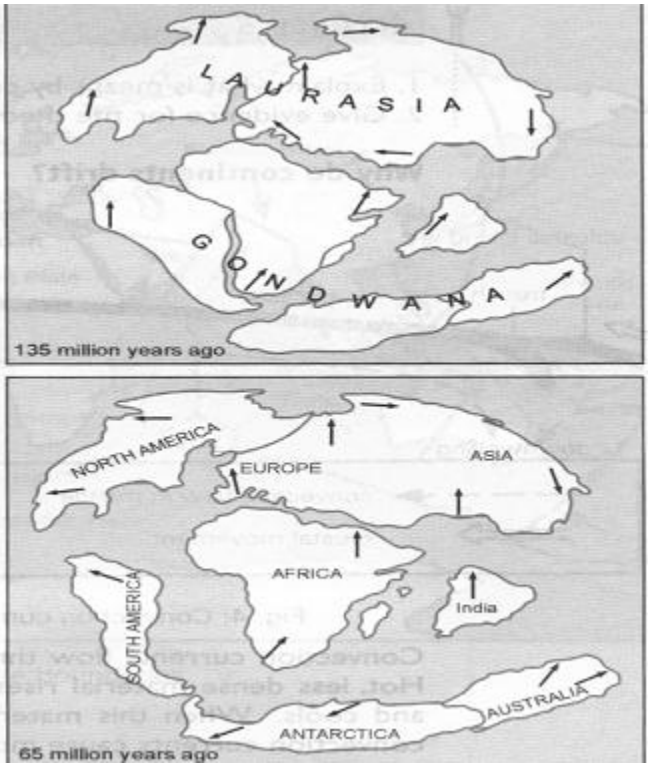


This is what Earth probably looked like 200-million years ago.

Source: Focus on Geography (New Curriculum) Grade 10 (page 130), Dilley L, Earle J, Keats G, Ravenscroft G, Maskew Miller Longman, South Africa

Pangaea then split into two, forming **Laurasia** and **Gondwana.** Gondwana eventually also broke up into South America, Africa, Australia, Antarctica, India and Madagascar. Alfred Wegener (see below) thought that the continents float on the denser mantle below the oceans. He used this theory to explain the present positions of the continents.

Source: Focus on Geography (New Curriculum), Grade 10 (page 130) , Dilley L, Earle J, Keats G, Ravenscroft G, Maskew Miller Longman, South Africa



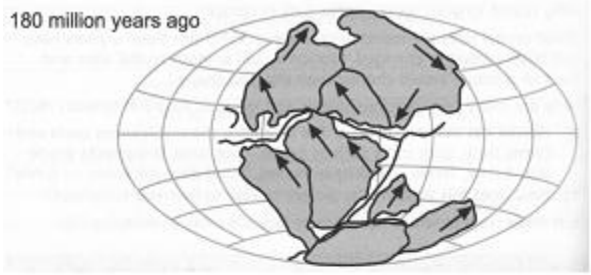
Continental drift

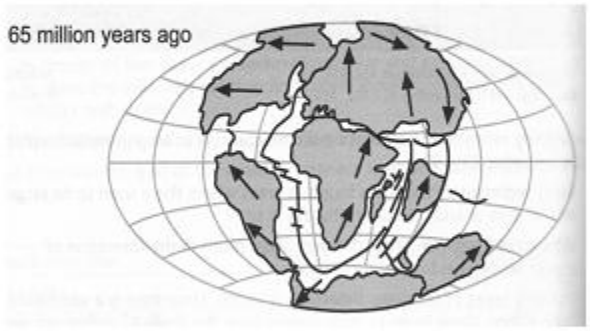
A German astronomer, geologist and meteorologist, Alfred Wegener, was the first person to formulate the modern theory of continental drift. He published a book in 1915 in which he presented evidence for his theory that the Earth's continents were once joined together but have since drifted apart. By the end of the 1960s, evidence from research had provided overwhelming support for this theory.

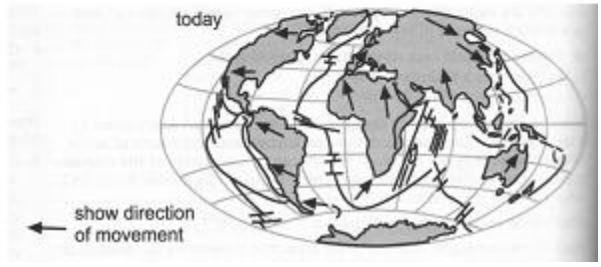
Source: The World in our Hands, Learners Book Grade 10 (page 118-119 adapted), Rusznyak L, Goldschagg P, Sakete P, Juta Gariep, South Africa, 2006.

FET: Learner Activity

Subject: Geography **Grade: 10**







Source: Elements of Physical Geography (Fourth Edition), page 283, Strahler and Strahler, John Wiley and Sons, New York, 1989

Activity

Describe the difference between the maps on the previous page and the maps above.

Activity 4

1. What is continental drift?
2. What are tectonic plates?
3. What are internal forces?

How do the continents move?

Heat inside the Earth is a driving force, causing the continents to move. As heat rises from the mantle, it deforms the crust and breaks it into large sections called tectonic plates. Most tectonic plates carry continents and oceans.

Source: Focus on Geography (New Curriculum), grade 10, page 130, Maskew Miller Longman

Did you know?

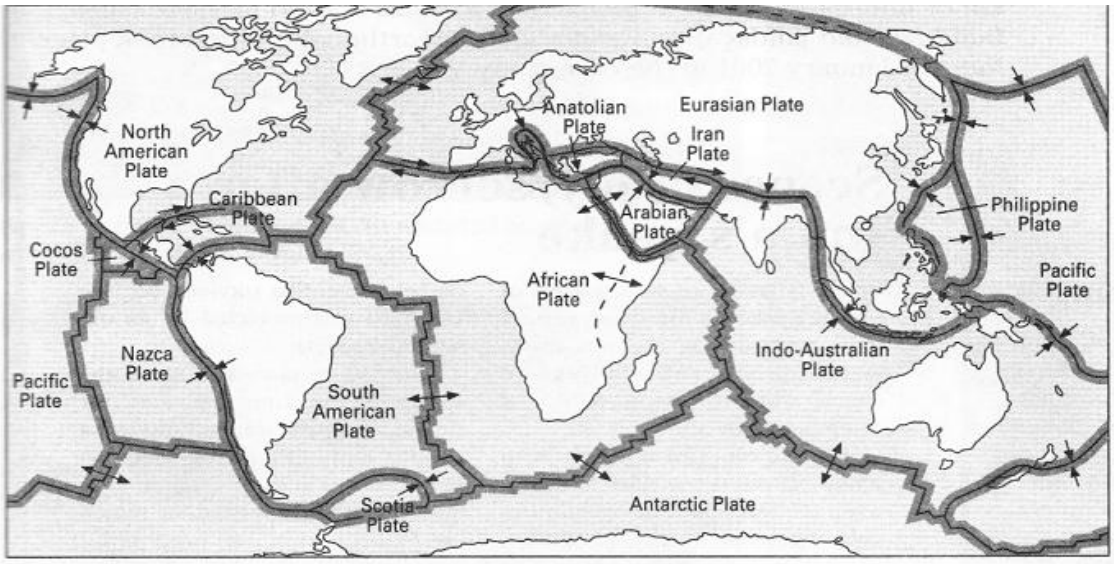
In 1620, Sir Francis Bacon noticed the correspondence between the western coastline of Africa and the eastern coastline of South America. He was the first person to suggest the idea of continental drift.

Source: Focus on Geography (New Curriculum), grade 10, page 130, Maskew Miller Longman

FET: Learner Activity and/or Assessment Task

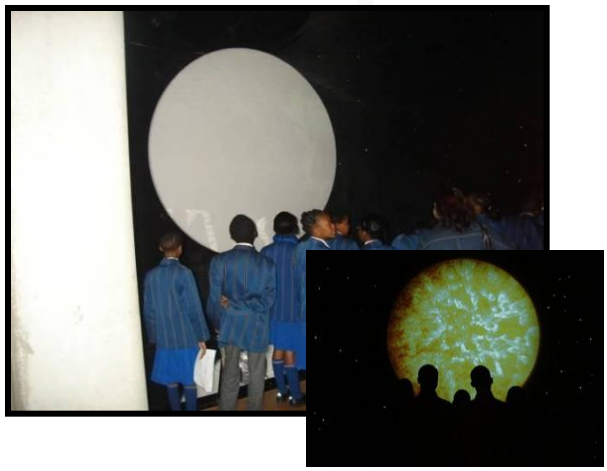
Subject: Geography **Grade: 10**

Activity 5



The Earth's crust is divided into tectonic plates.

Source: Focus on Geography (New Curriculum) Grade 10, page 131, Maskew Miller Longman



Use the map above to find the answers to these questions.

1. Name the plates which contain the following continents:

a. Africa

b. Australia

c. Europe

d. India

e. Japan

2. Find the plate boundary along the west coast of South America.

a. Name the plates on either side of this plate boundary.

b. Are the plates moving apart or towards each other at this plate boundary?

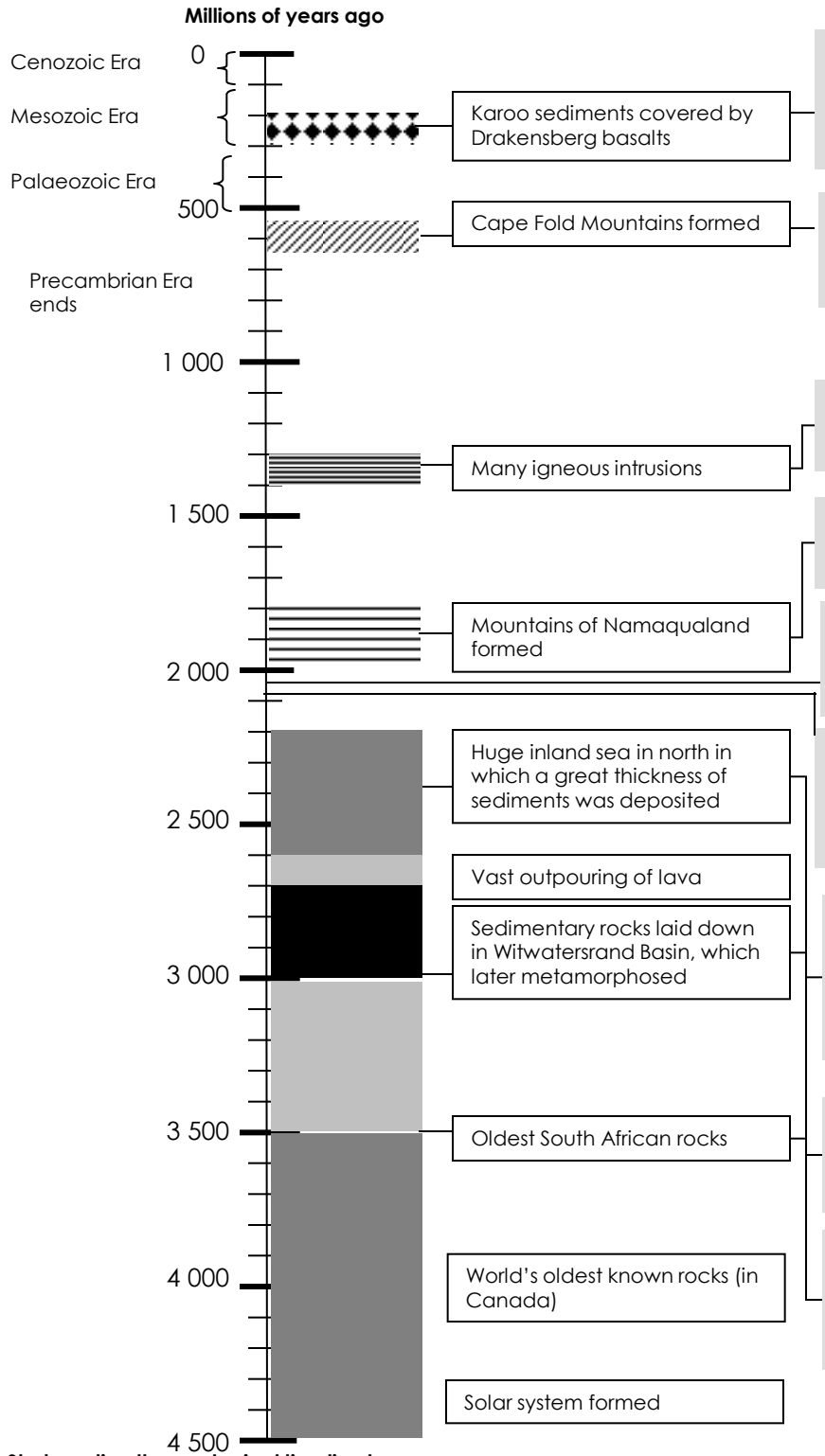
3. In which direction is Australia moving?

Background Knowledge

Subject: Geography **Grade: 11**

Geological Dating

An understanding of the origins and development of landforms and how they have changed over time is the main objective of geomorphology. At Maropeng, major landform changes in structure and shape that have taken place over time are explained. The following activity helps learners to further develop their understanding of geological time.



Rocks covering 60 percent of South Africa include sandstone, shale, coal and lava. The Karoo shales contains fossils of extinct dinosaurs, mammals and plants. The shales were formed during a period in the Mesozoic Era called the Jurassic Period.

Basins along the west and south coasts filled with sediments and intruded granite. Later they crumpled to form the Cape Fold Mountains between 240-million and 220-million years ago.

The kimberlite pipe that is now the Premier Diamond Mine near Pretoria was one of these igneous intrusions.

The Namaqualand mountains formed from sedimentary and volcanic rocks. Today these are the sources of many minerals.

2 020-million years ago a huge meteorite crashed into the Earth's crust causing the Vredefort Dome in Free State – the largest impact structure in the world.

The Bushveld Complex is an area in Limpopo where there are huge igneous intrusions. The magma cooled slowly, causing minerals to concentrate in layers, e.g. platinum group metals, vanadium, chrome, nickel, copper and tin.

For 350-million years sediments were laid down in a huge inland sea. Sediments formed dolomite (a type of limestone) which later dissolved in parts, forming caves such as the famous Sterkfontein Caves. These rocks contain deposits of manganese and iron ore, mined at Sishen and Thabazimbi.

The Witwatersrand Basin consists of sedimentary rocks deposited in a big inland sea. Gold particles were deposited along the edges of the sea. The area was later covered by lava.

The oldest rocks in South Africa are greenstones and granites. These rocks contain concentrations of gold, copper, emeralds, antimony and vanadium. In most parts of South Africa these rocks are covered by more recent rocks.

Source: Developed for GDE by Dr Ian McKay, Wits University, Origins Centre

FET: Learner Activity and/or Assessment Task

Subject: Geography **Grade: 11**

Geological Dating

Activity 1

How long is a million years?

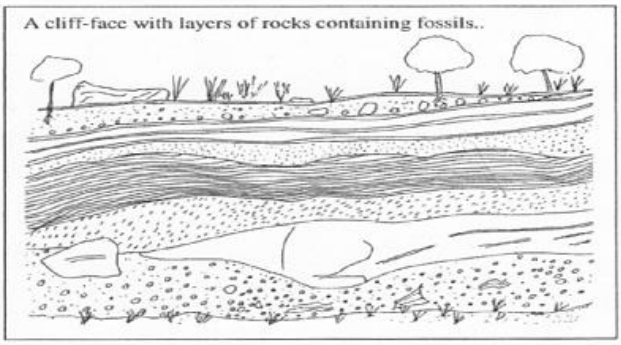
We are told that rocks and fossils are millions of years old. But how long is a million years? Try the following thought experiments to find out more:

1. The average human lifetime is about 70 years. How many human lifetimes are there in a million years? How could life change in a million years?
2. Think of units of length. If 1mm represents a year, what distance represents a million years? Mark out a million millimeters on a roll of toilet paper.
3. Think of a journey. If one step of about 1m represents a year, how far would you have to walk to represent a million years? If you started from your school, what city would you eventually reach?
4. Imagine you were paying a R1-million in R1 coins to a teller at a bank. If you paid R1 per second, how long would it take?

Activity 2

Relative dating

Study the diagram of the cliff below. You will notice that the cliff has different sedimentary layers in it. Each sedimentary layer is from a different age and may contain different fossils. The layers near the bottom of the cliff are older than the layers at the top. We say that the bottom layers are older relative to the layers at the top. But we don't know exactly how old the layers are.



Cross sections of the layers of the cliff in different places.

Section A

Topsoil
Sandstone with dinosaur fossils
Sandstone with mammal ancestors' fossils
Sandstone containing petrified trees, leaves and ferns
Siltstone containing fish fossils

Section B

Topsoil
Sandstone with mammal ancestors' fossils
Siltstone containing fish fossils
Limestone with fossils of trilobites
Sandstone containing fossils of sea lilies
Mudstone containing fossils of bivalves e.g. oysters

Section C

Topsoil
Siltstone containing fish fossils
Limestone with fossils of trilobites
Sandstone containing fossils of sea lilies

Study the cliff sections and answer the following questions.

1. Which are the youngest fossils? What rock type are they in?
2. Were the sediments in which the youngest fossils are found deposited in the sea or on land? Explain your answer.
3. Which are the oldest fossils? What rock type are they in?
4. Were the sediments in which the oldest fossils are found deposited in the sea or on land? Explain your answer.
5. Sections A, B and C are different. Explain how they are different, and how the layers have changed from one cliff face to the next.

Source: Developed for GDE by Dr Ian McKay, Wits University, Origins Centre

Activity 3

Absolute dating

Relative dating cannot tell us exactly how old a rock layer is. Instead, we need to apply absolute dating methods. One of the most common of these is radiometric dating.

Certain elements are not stable. These unstable, radioactive elements may change or **decay** naturally into another element or isotope. For example:

^{14}C (carbon-14) decays to become ^{13}C (carbon-13)

^{238}U (uranium-238) decays to become ^{206}Pb (lead-206)

^{40}K (potassium-40) decays to become ^{40}Ar (argon-40)

The useful thing about these radioactive elements is that we know roughly how long it will take for them to decay. For example:

It take 5, 730 years for half of the ^{14}C atoms in a sample to decay to become ^{13}C atoms.

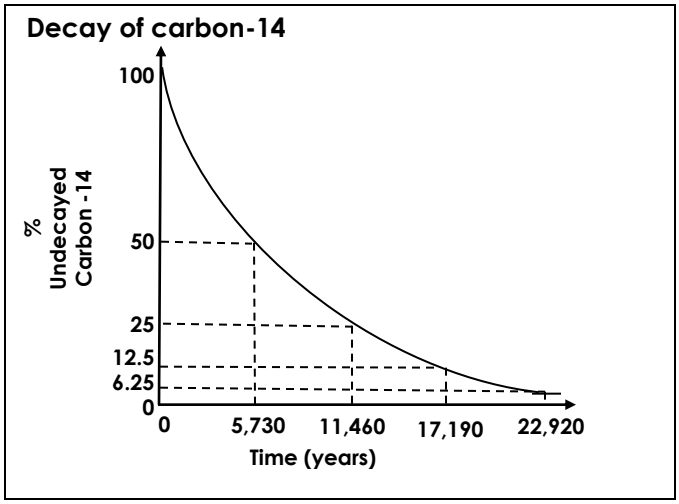
It takes 710-million years for half of the ^{238}U atoms in a sample to decay to become ^{206}Pb atoms.

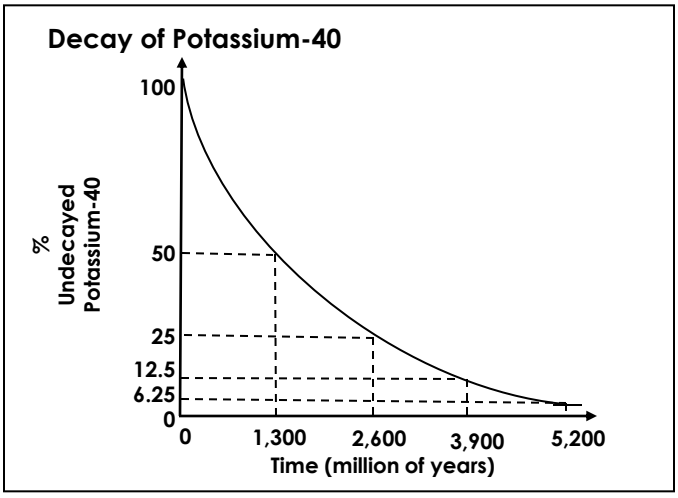
It takes 1, 300-million years for half of the ^{40}K atoms in a sample to decay to become ^{40}Ar atoms.

The time for half of the atoms of a radioactive element in a sample to decay to their product is called the **half-life** of that radioactive element. The half-life principle means if we count the number of atoms of radioactive element and their product in a sample we can calculate how old that rock sample is. For example, if a rock sample is 710-million years old then half of the atoms of ^{238}U will have changed to $^{20}5Pb$.

If you plot the amount of radioactive element over time on a graph, you get decay curves like these:

Decay curves for activity of carbon-14 and potassium-40





Answer the questions using the decay curves above.

1. Suppose scientists took samples from a bone fossil. They found that there was only about 50 percent of the carbon-14 in the sample compared with the amount that was there when the animal was alive. How old is the fossil?
2. Suppose scientists took samples from a bone fossil, and decided there was only about 25 percent of the carbon-14 in the sample compared with the amount that was there when the animal was alive. How old is the fossil?
3. Imagine now that the fossil was found in rocks that contained potassium-40. The scientists were able to determine that there was about 25 percent potassium-40 in the sample compared with the amount that was there when the rock was formed. How old is the fossil?
4. Radiometric dating always has an error of about 1 percent. Now imagine if scientists dated a fossil shell and found that it was 1,0 000 years old using $^{14}C/^{13}C$ dating and there was a 1 percent error in the dating. How old might that fossil really be?

Background Knowledge

Subject: Geography **Grades: 10**

Maropeng helps us to understand better why sustainable practices in our day-to-day living are important in order to secure our future. At Maropeng you will view an exhibit of the sustainable use of water as a resource. Read the following text to see how environmental education is becoming an important tool to support the Maropeng initiative of sustainable living.

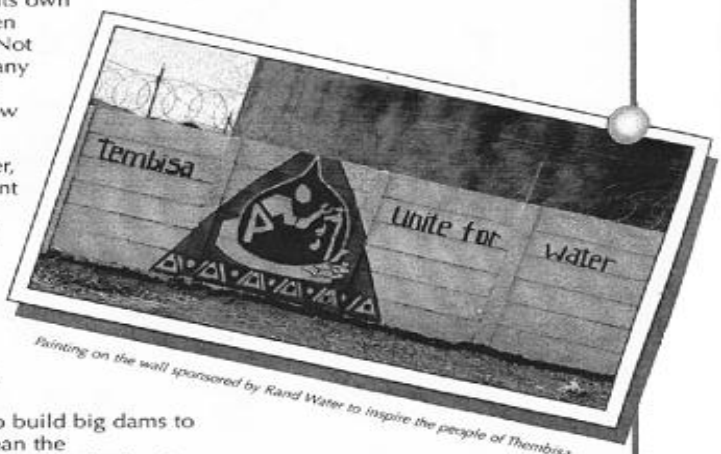
Environmental Education and Saving water

SUMMARY This case study shows that **Environmental Education** can benefit communities.

Case study

The people in Thembisa were fed up with paying high water bills. Everywhere there were leaking pipes which caused mud puddles and dirt. The water bills were very high because toilets and taps were leaking and many pipes were old and had burst. Most of the houses were built long ago by the Council and the plumbing was not maintained properly. When the houses were transferred to the people, plumbing was still bad. Most of the new owners did not have the money to fix their plumbing.

Rand Water found that lots of water was being wasted and that people could not afford to pay for this. So they started a project in Thembisa and in other communities. First a committee was formed to look at this problem. This committee employed people from Thembisa to fix leaks and to put in new toilets that don't waste so much water. Rand Water also trained supervisors, fixers and assessors from the community at its own cost. All the trained workers were given certificates at the end of the training. Not only is the plumbing better now in many houses in Thembisa, but many people have learnt new skills and they are now employed.



Painting on the wall sponsored by Rand Water to inspire the people of Thembisa.

From this project and from Rand Water, the people in Thembisa have also learnt about saving water. This is important because water is very scarce in South Africa. If the community can save water, it can also save money.

Saving water will make it possible to increase services to people who don't have access to clean water. This is because it is very expensive to bring water to people's houses. First, the Department of Water Affairs has to build big dams to store the water. Rand Water has to clean the water and then sell it to the local authorities. The local authority then sells the water to the community.

The people in Thembisa are very excited about this project and they support it. They can now afford to pay their water bills because they know that they are paying for what they are using and not for wasted water. The local council has also saved thousands of rands which would have been used to pay for wasted water.

Source: Spot On Geography Grade 12, A. Blackbeard et al, Heinemann Publishers, Johannesburg, 2008. Understanding Curriculum 2005, J. Tiley and C. Goldstein, Heinmann Publishers, Johannesburg, 1997

FET: Learner Activity and/or Assessment Task

Subject: Geography **Grade: 10**

After reading the article learners should complete the following questions and then **compare** the initiatives taken by a local community to that of Maropeng.

Answer the following questions based on the case study presented on saving water:

1. Why were the water bills so high in Thembisa? (4)

2. Why could the new owners not fix their plumbing? (2)

3. What was the first step that Rand Water took in its project to address the problem? (1)

4. What did people employed from Thembisa do to save water? (1)

5. Complete the following sentence: "If the community can save water, it can also save _____." (1)

6. Why is it very expensive to bring water to people's houses? (5)

7. With a friend, create a mind map that lists six things that people in Maropeng and the surrounding area of Maropeng do or can do to manage their water use wisely. (6)

Source: Spot On Geography Grade 12, A. Blackbeard et al, Heinemann Publishers, 2008

Total: 20 marks

FET: Memorandum

Subject: Geography **Grade: 10**

Continental Drift

Grade 10

1. a. African Plate.
   b. Indo-Australian Plate.
   c. Anatolian Plate.
   d. Indo-Australian Plate.
   e. Eurasian Plate.

2. a. Nazca Plate and South American Plate.
   b. Moving towards each other.

3. Australia (Indo-Australian plate) is moving in a north-easterly direction.

FET: Memorandum

Subject: Geography **Grade: 10**

Rubric for Assessment – Grade 10, Activity 1: Construct a model showing the development of stalactites and stalagmites.

ASPECT	16 -20	12-15	8-11	0 - 7
Geomorphological features built according to specifications	Built according to specifications; relevant insight into topic of depositional features; additional information provided.	Built according to specifications; relevant but limited additional information provided.	Partially built according to specifications; limited use, no additional information provided.	Not built according to specifications; no additional information provided.
Creativity and originality	Bold colours are used, making the model attractive to look at.	Colour is used to a large extent, but it does little to enhance the aesthetic value of the model.	Colours are used to a small extent and lend some aesthetic value to the model.	Some colours were used hap-haphazardly without giving much thought to the attractiveness of the model.
The use of material for building the model	Old, recyclable material was used in the construction of the whole model; original thought and insight.	Model made from old, recyclable material.	Model made from old, recyclable materials; construction lacks creativity.	None of the model was built from old, recyclable material.
The labelling of each model	Model is clearly labeled.	Labels were not easily readable.	The labels were written but placed incorrectly.	There is no labelling in the model.
Short written summaries	Summaries are written for each formation, explaining the characteristics and significance well.	The summaries are written but only partially explain the characteristics and significance of the formations.	The summaries provide a poor explanation of the formations.	The summaries provided do not explain the formations, their characteristics or significance.

FET: Memorandum

Subject: Geography **Grade: 10**

Grade 10, Activity 3: Research Project Rubric

LEVEL	If the learner has demonstrated all or most of the skills listed in a particular level, s/he will be awarded a mark within this category. **The key criteria are presented in bold type and should take precedence** when assessing learners' research and report.
7 **Outstanding** 80% – 100% **Out of 75 marks:** 60 – 75	**Evidence of research (field notes, transcripts, notes, etc.).** **Excellent background research leading to the selection of a clearly focused topic.** **Excellent, searching, open-ended questions clearly focused on the topic.** Evidence of very careful planning. **Evidence of high-quality, comprehensive, accurate notes.** **Electronic media used – evidence of high-quality, accurate and comprehensive transcription.** All research material extremely well archived (e.g. all recording tapes properly labelled). <u>Written report</u> **Report extremely well-structured and very clearly focused on the topic .** Excellent expression. Excellent hypothesis contextualisation. **Excellent synthesis of the material into the written report.** Report neatly and attractively presented. Excellent use of illustrative material (e.g. copies of original documents, photographs, etc.). (Optional)
6 **Meritorious** 70% – 79% **Out of 75 marks:** 52 – 59	**Evidence of research (field notes, transcripts, notes, etc.).** **Very good background research leading to the selection of a clearly-focused topic.** **Very good open-ended questions focused on the topic.** Evidence of good planning. **Evidence of high quality note-making.** **Electronic media used – evidence of high-quality, accurate transcription.** All research material well archived (e.g. all recording tapes properly labelled). <u>Written report</u> **Report well-structured and clearly focused on the topic.** Very good expression. Very good contextualisation of the material. **Very good synthesis of the material into the written report.** Report neatly and attractively presented. Good use of illustrative material (e.g. copies of original documents, photographs, etc.). (Optional)

FET: Memorandum

Subject: Geography **Grade: 10**

5 **Substantial** 60% – 69% **Out of 75 marks:** 45 – 51	**Evidence of research (field notes, transcripts, notes, etc.).** **Good background research leading to the selection of a focused topic.** **Good open-ended questions generally focused on the topic.** **Evidence of notes that are clear and of a good quality.** **Electronic media used – evidence of transcription that is mostly of a high quality.** Research material is mostly well archived (e.g. recording tapes properly labelled). Written report **Report well-structured and generally focused on the topic.** Good expression. Good contextualisation of the material. **Good synthesis of the material into the written report.** Report is generally neat and attractive in its presentation. Some use of illustrative material mostly appropriate to the topic (e.g. copies of original documents, photographs, etc.). (Optional)
4 **Moderate** 50% – 59% **Out of 75 marks:** 37 – 44	**Evidence of research (field notes, transcripts, notes, etc.).** **Evidence of adequate background research leading to the selection of a fairly focused topic.** **Questions more mixed but some good open-ended questions focused on the topic to a reasonable degree.** Planning but some deficits apparent. **Evidence of adequate notes – tend to be rather superficial.** **Electronic media used – evidence of transcription that is mostly of an acceptable quality.** Evidence of archiving of material but some deficits (e.g. recording tapes present but not clearly labelled). Written report **Report shows structure but the focus on the topic is less clear than in the higher categories.** Expression is generally acceptable. Some evidence of contextualisation of the material. **Some evidence of synthesis of the material into the written report but not to a great extent.** Report is generally neat and orderly in its presentation. There may be some use of illustrative material but much of it is not appropriate to the topic (e.g. copies of original documents, photographs etc.). (Optional)

FET: Memorandum

Subject: Geography **Grade: 10**

3 **Adequate** 40% – 49% **Out of 75 marks:** 30 – 36	**Evidence of research (field notes, transcripts, notes, etc.).** **Evidence of a limited amount of background research leading to the selection of a topic focused to a limited degree.** **Questions mostly superficial and closed.** Limited evidence of planning but several deficits apparent. **If notes are supplied, they tend to be brief and disjointed.** **If electronic media is used, evidence of sketchy and/or inaccurate transcription.** Some archiving of material but several deficits (e.g. some evidence missing). <u>Written report</u> **Report shows limited structure and the focus on the topic is intermittent.** Expression is mostly poor. Very little or no evidence of historical contextualisation of the material. **Very little evidence of synthesis of the material into the written report (report is little more than a rehashing of the interviews).** Report scrappy and untidy in its presentation. There may be some use of illustrative material but almost all of it is not appropriate to the topic (e.g. cut-out pictures of film stars etc.). (Optional)
2 **Elementary** 30% – 39% **Out of 75 marks:** 22 – 29	**Evidence of research (field notes, transcripts, notes, etc.).** **Evidence of a very limited amount of background research leading to the selection of a topic focused to a very limited extent.** **Almost all questions superficial, closed and lacking focus.** **If notes are provided, they tend to be very brief and disjointed.** **If electronic media used, very sketchy and inaccurate transcription.** Very limited archiving of material with major deficits (e.g. most evidence missing). <u>Written report</u> **Report shows almost no structure and focus.** Expression is mostly very poor. No evidence of contextualisation of the material. **No synthesis of the interview material into the written report (report is nothing more than a rehashing of the interviews).** Report scrappy and untidy in its presentation. Some use of illustrative material but none of it is appropriate to the topic (e.g. cut-out pictures of film stars, etc.). (Optional)
1 **Not Achieved** 0 – 29% **Out of 75 marks:** 0 – 21	**Totally inadequate research or no evidence of planning and research.** **Totally inadequate report or no report written at all.**

FET: Memorandum

Subject: Geography **Grade: 12**

The Sustainable Use and Management of Water

Grade 12

1. Leaking pipes.
   Toilets and taps damaged.
   Old, burst pipes.
   Old houses not maintained properly. (4)

2. Lack of sufficient funds.
   There were many plumbing problems because of prior insufficient maintenance. (2)

3. Formed a committee. (1)

4. Fix leaks and put in new toilets that don't use so much water. (1)

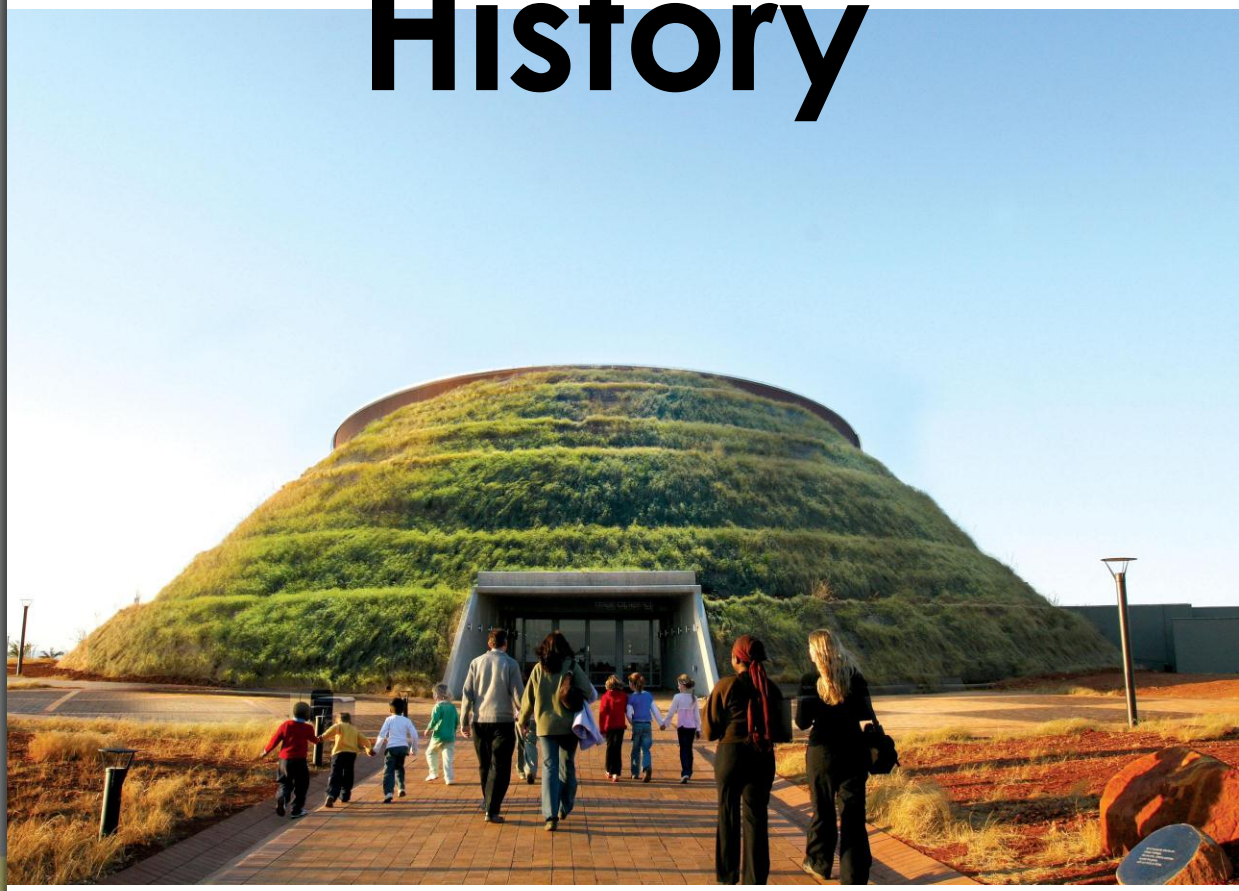
5. Money. (1)

6. Department of Water Affairs has to build dams to store the water.
   Rand Water has to purify (clean) the water.
   Rand Water sells the water to local authorities (this involves administration costs, profit margins and people who have to be paid).
   Local authorities sell to local communities (involving administration costs and people to be paid). (5)

7. Maintenance of water systems – recycle.
   Purification processes.
   Grey water systems – filtering process.
   Restrictions on amount of kilolitres consumed per unit.
   Controlled utility usage. (6)

Who am I?

History



Developed by:

Ninki Maja

Nthabiseng Marilyn Muneri

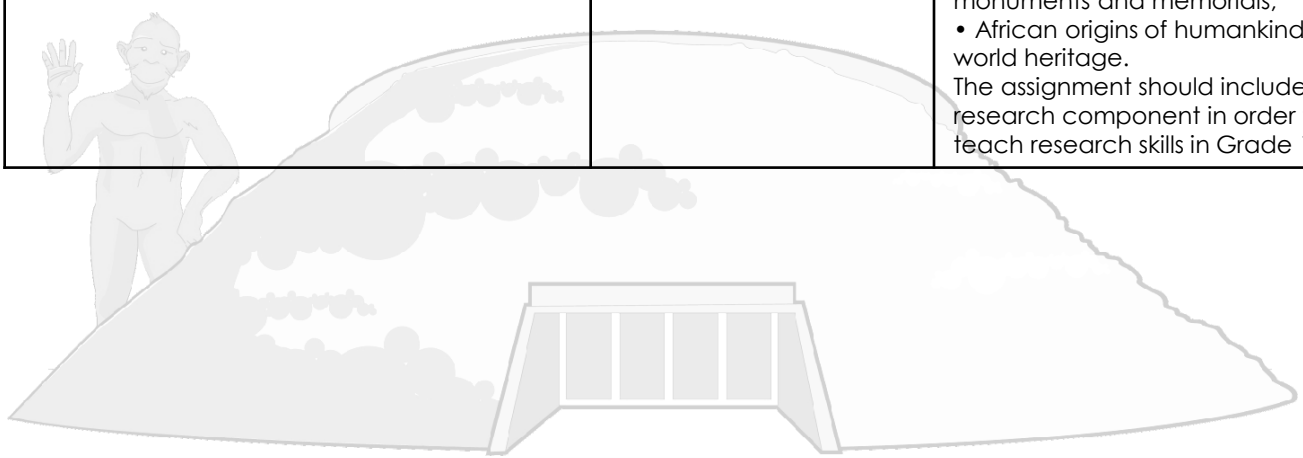
Marlene Truter

maropeng

Subject: History

Topic: Heritage, Social Darwinism and Globalisation

Grade 10 (CAPS)	Grade 11 (CAPS)	Grade 12 (CAPS)
Assignment	**Topic**	**Topic**
Compulsory assignment. Term 2 Task 1 Oral history or heritage investigation with a research component to teach research skills. Skills: Engage critically with issues of heritage and public representations of the past, and conservation. **Heritage assignment:** The focus and resources for the assignment are heritage sites, museums, monuments, oral histories, commemorative events, family and community traditions and rituals, local history, school history and family history. The content detail is not specified in order to provide the choice to study local, regional or national examples of heritage.	Ideas of Race in the late 19th and 20th centuries. What were the consequences when pseudo-scientific ideas of Race became integral to government policies and legislation in the 19th and 20th centuries?	**Heritage assignment (compulsory)** The focus and resources for the assignment are heritage sites, museums, monuments, oral histories, commemorative events, family and community traditions and rituals, local history, school history and family history. The content detail is not specified in order to provide the choice to study local, regional or national examples of heritage. **What is heritage?** The word 'heritage' can be used in different ways. One use of the word emphasises our heritage as human beings and concerns human origins in Africa. Another use of the word relates to the ways in which people remember the past, through heritage sites, museums, through the construction of monuments and memorials and in families and communities (oral history). Some suggest that heritage is everything that is handed down to us from the past. **Possible themes for assignments, which learners should consider, include:** • what is meant by heritage and public representations?; • memory and oral histories as heritage; • the importance of the conservation of heritage sites, monuments and memorials; • African origins of humankind as world heritage. The assignment should include a research component in order to teach research skills in Grade 10.



Background Knowledge

Subject: History **Grades: 10-12**

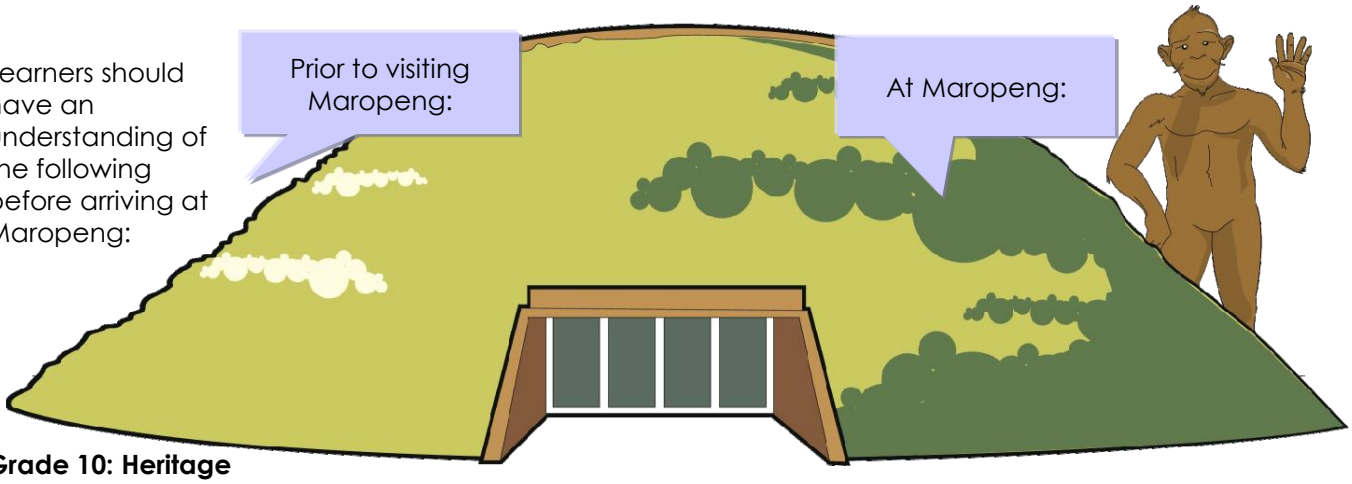
Teacher's Notes

Why Should History Learners Visit Maropeng?

Maropeng gives Grade 10 – 12 History learners the opportunity to investigate the relationship between palaeontology, archaeology and genetics in understanding the origins of humans, and how this has transformed notions of race.

Heritage

Learners should have an understanding of the following before arriving at Maropeng:



Grade 10: Heritage

- Why heritage should be studied and conserved;
- What a World Heritage Site is;
- Heritage concepts; and
- Scientists involved in the research into the development of human origins and evolution.

Grade 11: Social Darwinism

- The meanings of historical terms;
- Charles Darwin's theories;
- The impact of racism on Africa;
- How social racism originated; and
- Why the eugenics movement arose.

Grade 12: Globalisation

- Definitions of globalisation;
- Forms of globalisation; and
- Global economy/inequality.

Why is the Cradle of Humankind an important World Heritage Site?

General questions

1. Explain what is meant by "heritage".
2. Explain what is meant by "public representation".
3. What does "archaeology" mean?
4. What does "palaeoanthropology" mean?
5. What does "indigenous knowledge system" mean?

Source

Subject: History **Grades: 10-12**

Source 1.1

Tumulus at Maropeng

Notes to Help Learners

Answering source-based questions:

- Source-based questions require that learners interpret, analyse, evaluate and synthesise evidence from the source.
- Remember to answer the question according to the given mark scheme.

Extended writing/paragraph writing:

All good writing involves structure:

- An introduction, which should make it clear to the reader what is going to be discussed and the line of argument that is to be followed in the rest of the extended writing. If you read the first sentence of a paragraph or the first paragraph of a longer piece of writing and you cannot work out clearly what the original question was, the introduction has failed in its primary purpose.
- The body, which should contain all the relevant factual material and should be explicitly linked to the line of argument if there is one.
- The conclusion, which should provide a sense of closure. In many cases this will consist of restating the main line of argument.

Source 1.2

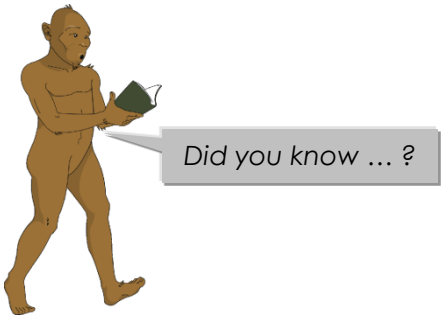
Why is Heritage Important?

Heritage is important to the community as a whole. Heritage places are places worth keeping because they enrich our lives by helping us understand the past; by contributing to the richness of the present environment; and because we expect them to be of value to future generations.

The cultural significance of a place is embodied in its physical material (fabric), its setting, contents and use; in the associated documents; and in its meaning to people through their use and associations with the place.

Source: http://yourdevelopment.org/factsheet/view/id/44.

"Mrs Ples"



"Mrs Ples" is 2.15-million years old and is a distant relative of humankind.

"Mrs Ples"

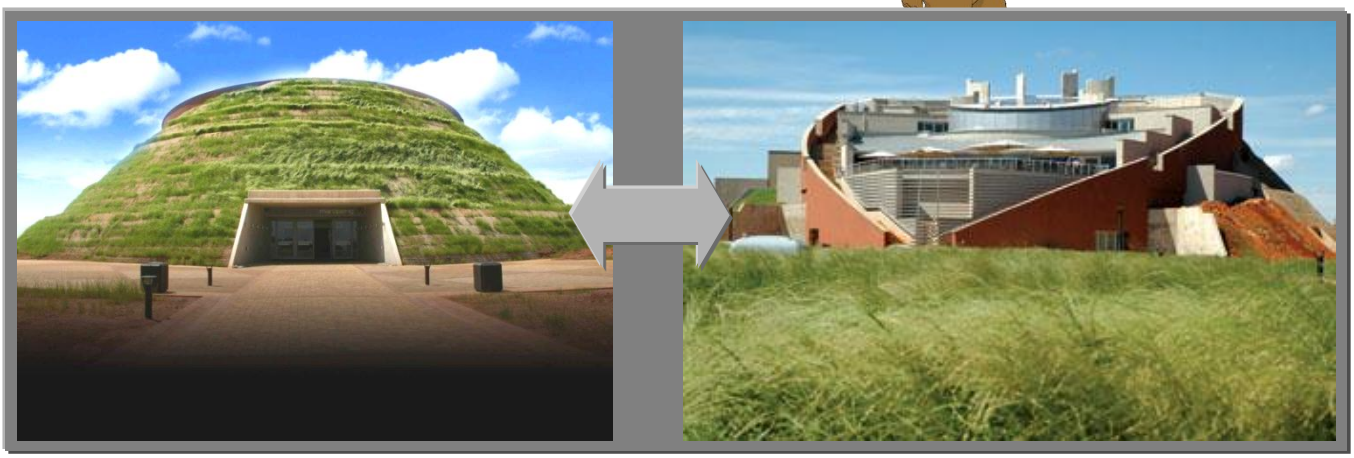
Background Knowledge

Subject: History **Grade: 10**

Content: Heritage

Duration: One cycle

Key question: Why is the Cradle of Humankind an important World Heritage Site?



Learning activities

Explain what is meant by heritage and public representations.

Explain the importance of conservation of heritage sites and public representations.

How the activities could be done

Learners are asked to explain or discuss issues. This could be in structured writing or through discussion and debate.

LOs and ASs: See pages 1 and 2.

LO 1: AS 2, 3; LO 3: AS 4; LO 4: AS 1, 2, 3

Possible links with other subjects: Geography, Tourism, Life Sciences

Assessment activities

- Written work.
- Paragraph.
- Presentation.
- Field work/site visits.

Assessment criteria

- Identify and select sources.
- Extract relevant information from the sources.
- Explain what is meant by indigenous knowledge systems.

Data collection methods assessment

- Learner's written observations.

Evaluators

- Teachers
- Self
- Peers

Feedback/reporting to

- Learners
- Parents
- Others

Sources

Subject: History **Grade: 10**

Source 2.1

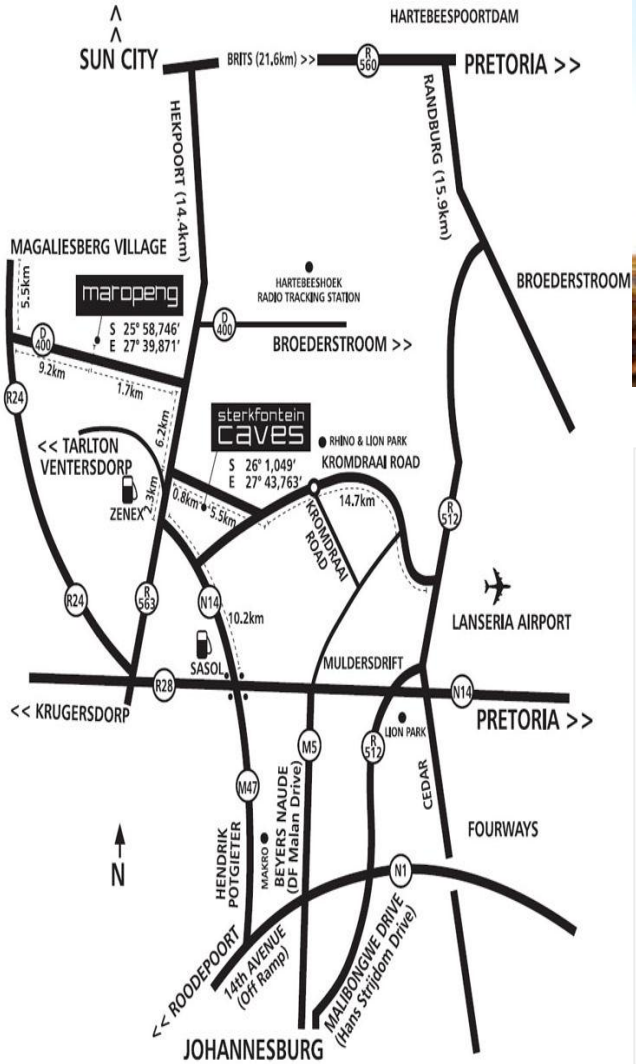
Maropeng

Magaliesburg, Gauteng, South Africa

Maropeng, meaning "returning to the place of our origins", is the official visitor centre for the Cradle of Humankind World Heritage Site. Take the journey of discovery of the evolution of life and the origins of humankind.

Source: http://www.places.co.za/html/maropeng.html

Source 2.2



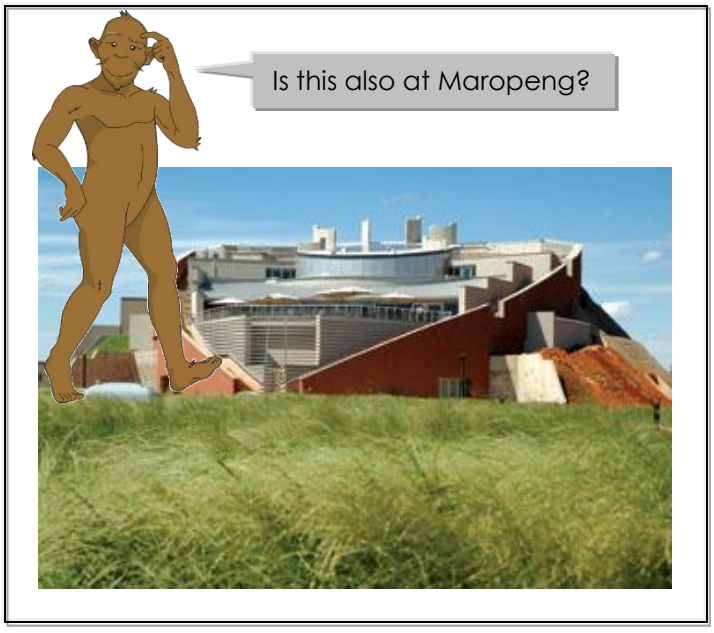
Map to Maropeng

Source 2.3

"Maropeng was chosen as the name for this site to remind people that the ancestors of all human beings, wherever they may live today, originally came from Africa, and probably first emerged here. When visiting the Cradle of Humankind World Heritage Site, people are actually returning to 'the place of origin'."

Source: http://www.polity.org.za/article/jordan-visit-by-chinese-president-hu-jintao-to-maropeng-centre-07022007-2007-02-07

Tumulus



Sources

Subject: History **Grade: 10**

Source 2.4

"The artefacts being excavated are spread across a large area of the Maropeng landscape, which test pits will confirm. They appear to have been washed into this location during a very dry phase, when there was less vegetation to prevent large-scale erosion of the land. Samples will be taken for dating of sediments by the OSL (optically stimulated luminescence) method, which relies on measuring the radiation damage accumulated in sediments over time.

"Such data is useful for reconstructing past environments and for understanding periods of climatic change that had an impact on human occupations, especially in South Africa." – Dr Luca Pollarolo

Source: http://www.paleontologiaumana.it/maropeng.htm

Source 2.5

Use Maropeng as a source. For example, refer to certain areas, posters, etc.

Palaeoanthropology
The study of prehistoric human past through the investigation and research of fossilised remains.

Source: Maropeng exhibition

Did you know …? Humans are the last surviving species in the genus *Homo*.

FET: Learner Activity and/or Assessment Task

Subject: History **Grade: 10**

Key Question

Why is the Cradle of Humankind an important heritage site?

Activity 1

Use sources 1.2 and 2.1 to 2.5 to complete the following activity.

1. Explain the meaning of Maropeng. (1)

2. Explain why the Cradle of Humankind was chosen by Unesco as a World Heritage Site. (2)

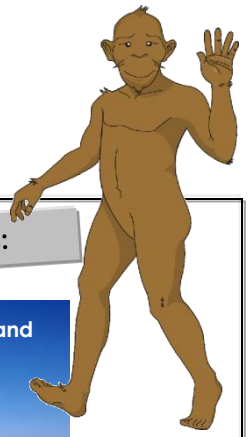
3. In which the province is Maropeng situated? (1)

4. What method is used to make sure samples are authentic? (1)

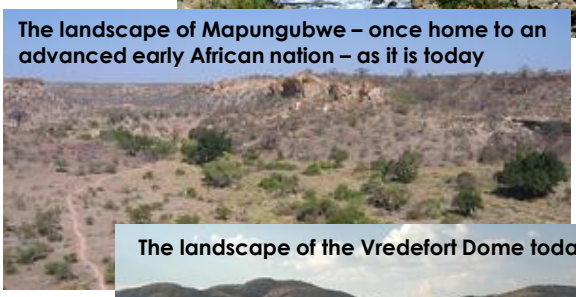
5. List four reasons why it is important to conserve heritage sites. (Refer to source 1.2 in the background information.) (4)

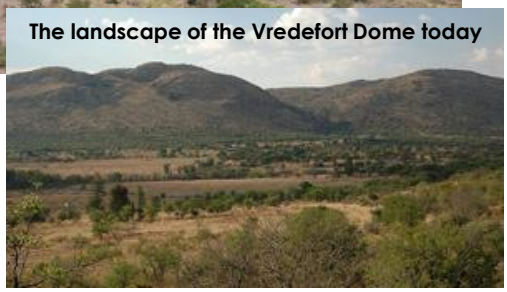
6. Who were the original inhabitants of the area in which Maropeng is situated? (1)

7. Why was archaeological and palaeontological evidence essential to reconstruct the history of the Cradle of Humankind? (4)



Other World Heritage Sites:





Background Knowledge

Subject: History **Grade: 11**

Content: The impact of pseudo-scientific racism and social Darwinism on the 19th and 20th centuries

Duration: One cycle

Key question: What was the impact of pseudo-scientific racism and social Darwinism on the 19th and 20th centuries?

Learning activities

- Analyse the information gathered from a variety of sources.
- Identify issues within the topic under study (e.g. eugenics) and ask critical questions about the issue.

LOs and ASs: See pages 1 and 2.
LO 1: AS 1, 3; LO 3: AS 2, 4

Possible links with other subjects: Geography, Tourism, Life Sciences

Assessment activities

- Written work
- Presentation
- Paragraph
- Field work/site visits

Assessment criteria

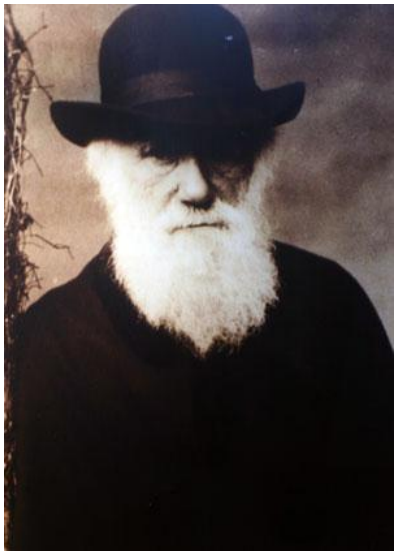
Use evidence to formulate an argument and reach an independent conclusion.

Data collection methods assessment

- Reading
- Questioning
- Learner's written observations

How the activities could be done

Learners are asked to explain or discuss issues in structured writing or through discussion and debate.



Charles Darwin

Evaluators

- Teachers
- Self
- Peers

Feedback/reporting to

- Learners
- Parents
- Others

Sources

Subject: History **Grade: 11**

Source 3.1

Darwin theorised that humans and modern primates shared a common ancestor

Source 3.2

Social Darwinism

Social Darwinism is a social theory that justifies the right of the strong to exploit the weak. It uses evolutionary theories to justify actions. In its crudest form, it is the idea that "might is right" and that only the strong flourish. The idea can be used to justify all kinds of things: racial inequality, class inequality and economic inequality. The theory was particularly applied to races. There were stronger and weaker or higher and lower races. Or there were "mature" races and "child" races. There were many versions of the idea. Concerns over racial purity or racial "contamination" also became issues later in the 19th century.

Source: Viva History Grade 11, Dugmore, C and Horner, EA, Vivlia Publishers & BookSellers, South Africa, 2007

Source 3.3

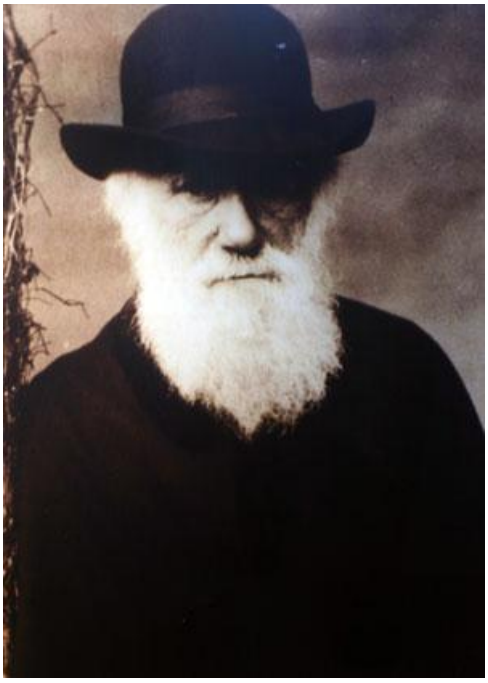
"Social Darwinism is not so much a single theory as it is a family of theories, (there are) several varieties of Social Darwinism. These are metaphysical, economic, and racial social Darwinism." – Spoerl, 2004

Source: Viva History Grade 11, Dugmore, C and Horner, EA, Vivlia Publishers & BookSellers, South Africa, 2007

Source 3.4

Social Darwinism may be understood as a broad philosophy or ideology which describes social evolution in terms of laws of natural selection and stresses the importance of biological inheritance. – Dubow 1995

Source: Viva History Grade 11, Dugmore, C and Horner, EA, Vivlia Publishers & BookSellers, South Africa, 2007



Charles Darwin

Source 3.5

Use Maropeng as a source. For example, refer to certain areas, posters, etc.

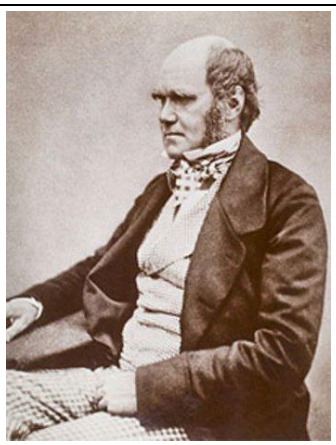
Darwin also argued that all living things are interrelated and have a common ancestry dating back to the earliest forms of life.

FET: Learner Activity and/or Assessment Task

Subject: History **Grade: 11**

Key Question

What was the impact of pseudo-scientific racism and social Darwinism on the 19th and 20th centuries, including the eugenics movement in the late 19th century and its impact on ideas of race and racism in Africa?



Charles Darwin

Activity 1

Complete the following activity. Refer to sources 3.1 to 3.5

1. Explain the concept of eugenics. (2)
2. In your own words, explain how the eugenics movement explained sizes of peoples' brains. (2)
3. Name three varieties of social Darwinism. (3)
4. Can social Darwinism be justified in the modern world? Explain. (2)
5. Analyse sources 3.1 to 3.5 and explain how social Darwinism was used to justify the superiority of some races. (6)

Your teacher will use the rubric below to assess your answers.

Assessment Rubric

Level 3	• The information selected from the sources is relevant. • Information is coherent and is presented in a logical and structure manner. • Discussion is well planned and constructed. • Discussion is based on the evidence from all the sources provided. • Conclusion is well structured, based on the evidence from the sources.	Marks 5 - 6
Level 2	• Some of the evidence from the source is used. • Discussion contains some structure. • Discussion has some evidence of coherency and logical flow. • Evidence extracted relates to some extent to the question. • Can draw a conclusion from the sources given.	Marks 2 - 4
Level 1	• Has not been able to select and use the information from the sources. • Discussion lacks a clear plan and lacks coherency. • Uses information in a very basic or elementary manner to construct an argument. • Lacks a conclusion.	Marks 0 - 1

Background Knowledge

Subject: History **Grade: 12**

Content: Globalisation

Duration: One cycle

Key question: How has globalisation affected developing and developed countries?

Learning activities

Sustain and defend a coherent and balanced argument using provided and independently accessed evidence.

LOs and ASs: See pages 1 and 2.
LO 1: AS 2, 3; LO 2: AS 1, 3; LO 3: AS 1, 2, 3, 4

Possible links with other subjects: Geography, Tourism, Life Sciences

Assessment activities

- Written work
- Presentation
- Paragraph
- Field work/site visits

Assessment criteria

- Analyse historical concepts such as globalisation.
- Compare interpretations and perpectives of events, people's actions and changes in order to draw independent conclusions about the event or actions.

Data collection methods assessment

- Reading
- Questioning
- Learner's written observations

How the activities could be done

Learners are asked to explain or discuss issues in structured writing or through discussion and debate.

How the global environment has changed over time

Evaluators

- Teachers
- Self
- Peers

Feedback/reporting to

- Learners
- Parents
- Others

Sources

Subject: History **Grade: 12**

Source 4.1

Today across the world:
- 1.3-billion people live on less than $1 a day;
- 3-billion people live on $2 a day;
- 1.3-billion people have no access to clean water;
- 4-billion people have on access to sanitation; and
- 2-billion people have no access to electricity.

Source: New Generation History Grade 12

Source 4.2

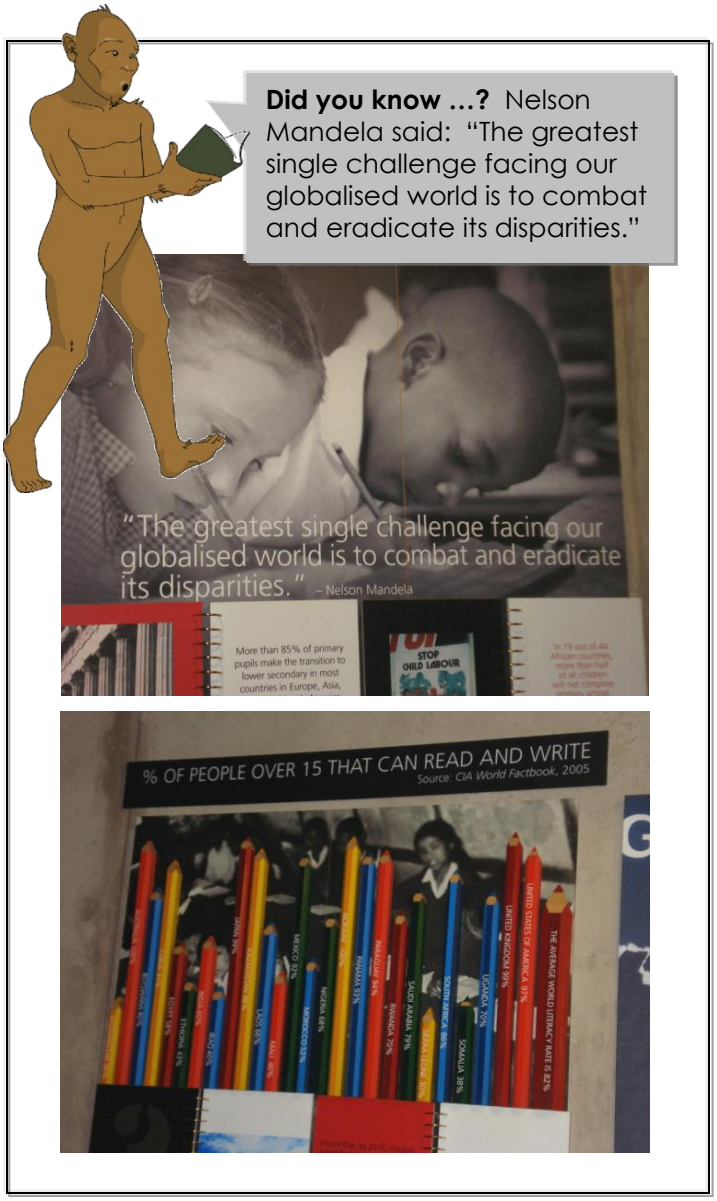
The "Iron Triangle": the IMF, the World Bank and the WTO

Source: Adapted from History for all Grade 12

Source 4.3

Use Maropeng as a source. For example, refer to certain areas, posters, etc.

Study the literacy exhibition in the globalisation section at Maropeng thoroughly.



FET: Learner Activity and/or Assessment Task

Subject: History **Grade: 12**

Key Question

How has globalisation affected developing and developed countries?

Activity 1

Complete the following activity. Refer to 4.1 to 4.3

1. Explain the concept of globalisation. (2)

2. Use the evidence in source 4.1 to explain the effect of the income gap on economic and social development. (2 x 2)

3. Compare the difference in the literacy levels in the following countries:

Developed	Developing
1. Australia	1. South Africa
2. Britain	2. Nigeria
3. Japan	3. Uganda

(6)

4. Use both source 4.2 and your own knowledge to write a paragraph in which you discuss the role played by the World Bank in gobalisation. (6)

Your teacher will use the rubric below to assess your answers.

Assessment Rubric

Level 3	• The information selected from the sources is relevant. • Information is coherent and is presented in a logical and structured manner. • Discussion is well planned and constructed. • Discussion is based on the evidence from all the sources provided. • Conclusion is well structured, based on the evidence from the sources.	Marks 5 - 6
Level 2	• Some of the evidence from the source is used. • Discussion contains some structure. • Discussion has some evidence of coherency and logical flow. • Evidence extracted relates to some extent to the question. • Can draw a conclusion from the sources given.	Marks 2 - 4
Level 1	• Has not been able to select and use the information from the sources. • Discussion lacks a clear plan and lacks coherency. • Uses information in a very basic or elementary manner to construct an argument. • Lacks a conclusion.	Marks 0 - 1

Memorandum

Subject: History

Background information

1. Heritage is something that is or may be inherited. This could be property, but the word more generally refers to a way of life or traditions that have been passed down from previous generations. (1)

2. History represented around us (e.g. monuments, statues, museums, buildings and heritage sites). (1)

3. Archaeology: the study of human history and prehistory through the excavation of sites and the analysis of physical remains. (1)

4. Palaeoanthropology: a branch of anthropology that specialises in the study of fossil hominids (1)

5. Indigenous knowledge system: knowledge embedded in indigenous people's philosophical thinking and social practices that have evolved over thousands of years and that continue to evolve. (1 x 2)

Grade 10

1. Returning to our place of origin. (1 x 2)

2.
- Artefacts found in the Cradle of Humankind trace the origin of humankind.
- It has the largest amount of hominid fossil material found in a single area. (The last count was 118 pieces and still increasing.) (1 x 2)

3. Gauteng. (1)

4. The OSL method. (1)

5.
- They enrich our lives.
- They help us to understand the past.
- They contribute to the richness of the present environment.
- They are of value to future generations. (4)

6. Xam. (1)

7. It helps to understand periods of climate change that had an impact on human occupations, especially in South Africa. (2 x 2)

Grade 11

1. Eugenics is a false science that refers to the act of breeding "improved" offspring. (2)

2. People with smaller brains had less intelligence and were therefore inferior to people with larger brains. (2)

3.
- Metaphysical.
- Economical.
- Racial. (3)

4.
- No, because it had not been tested.
- No, because his research was based on botany. (2)

5. People used Darwin's ideas of biological inheritance (e.g. brain size and pigmentation) and laws of natural selection (survival of only the fittest/ strongest) to justify superiority of some races over other races. (Accept any similar answer which captures the key ideas.) (6)

Memorandum

Subject: History

Grade 12

1. Martin Albrow, author of a number of books and papers on globalisation, describes globalisation generally as follows: "Globalisation refers to all those processes by which the people of the world are included in a single world society, a global society."

Learners should give an answer that captures this idea, but in their own words. Visit this website for other ideas: (2)

http://www.unesco.org/new/en/social-and-human-sciences/themes/social-transformations/international-migration/glossary/globalisation

2. The effects of the income gap on economic development are high unemployment and poverty. The effects of the income gap on social development are low literacy levels and a lack of health facilities. (2 x 2)

3. **Developed**
- Australia: literacy rate 99%
- Britain: literacy rate 99%
- Japan: literacy rate 99%

Developing
- South Africa: literacy rate 82.4%
- Nigeria: literacy rate 69.1%
- Zambia: literacy rate 68%

From these figures we can see that developed countries have a higher literacy rate overall than developing countries. The lower literacy rates of the developing countries may also continue to contribute to their economic development being lower than that of developed countries. (6)

4. The World Bank has played/continues to play the following roles in globalisation:
- Reconstruction after wars, natural disasters and other calamities; and
- Reduction of poverty at grass-roots level.
- The IMF and the World Bank complement each other in that, while the World Bank is involved in direct investment in worthwhile policies, the IMF looks at monetary policies of struggling nations.

(Accept any other relevant information provided by learners.) (6)

Life Orientation

Who am I?

maropeng

Developed by:

Krishni Perimal

Sophia Makwey

Naomi Masilo

Subject: Life Orientation

Grade 10 (CAPS)	Grade 11 (CAPS)	Grade 12 (CAPS)
Topic	**Topic:**	**Topic:**
Development of the self in society.	Social and environmental responsibility	• Development of the self in society • Social and environmental responsibility • Democracy and human rights
Content	**Content**	**Content**
Self-awareness, self-esteem and self-development.	• Environmental issues that cause ill-health: - Dealing with environmental factors that cause ill-health on a personal level: attitudes, safety and first aid skills and coping with disasters. • Participation in a community service that addresses a contemporary environmental issue indicating how this harms certain sectors of society more than others	Life skills required to adapt to change as part of an on going healthy lifestyle Choices • Human factors that cause ill-health Social and environmental responsibility Environments and services which promote safe and healthy living • A personal mission statement for life Democracy and human rights • Responsible citizenship • Ideologies, beliefs and worldviews on construction of recreation and physical activity across cultures and Genders

Background Knowledge

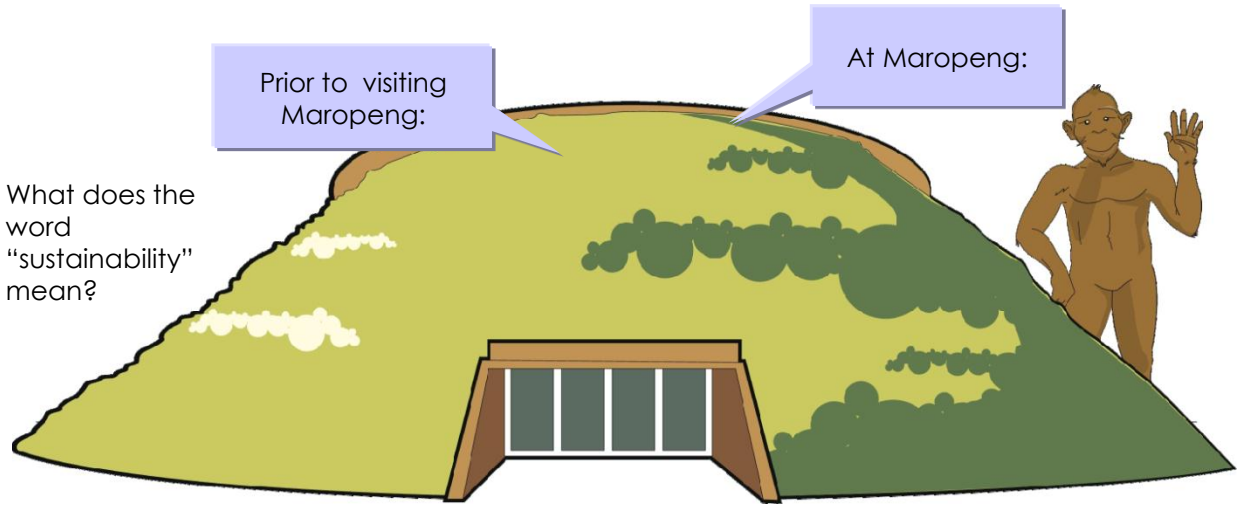
Subject: Life Orientation **Grades: 10-12**

Teacher's Notes

Teachers and learners will never forget their visit to the Cradle of Humankind and its two visitor centres – the main one packed with exciting, interactive exhibits at Maropeng, and a smaller one which is the gateway to the fascinating Sterkfontein Caves and their secrets about our past.

In this section, learners will take the boat ride to enter the exhibition and use the wall display on sustainability to explore sustainability.

Life Orientation



Maropeng tells us the story of how humankind first arose in the African cradle by adapting to the natural elements and later learning how to harness them to support our growing populations.

Today, we have developed such control over our environment, through agriculture and industry, that a new story is emerging, one that involves the future of our planet and ourselves.

Background Knowledge

Subject: Life Orientation **Grade: 10**

Celebrating Heritage

It has become one of South Africa's most revered tourist destinations, but the Cradle of Humankind is more than just a World Heritage Site. This place is well worth a visit.

The Cradle of Humankind was declared a World Heritage Site in 1999 because of the area's exceptional contribution to our understanding of the history and development of humankind, over more than 3-million years.

Much about what we know about our past as a species comes from fossil finds of human ancestors, or hominids, at the Cradle of Humankind.

We humans are relatively recent arrivals on Earth, but our ancestors have been here for millions of years.

Remember from your visit to Maropeng: **"We emerge from the same Cradle".**

Tumulus at Maropeng

Maropeng

Heritage Policy

Sterkfontein Caves Introduces Visitor Management Policy to Preserve its Natural Heritage

In 1999, the fossil hominid sites of Sterkfontein Caves, Swartkrans, Kromdraai and environs in the Cradle of Humankind were declared a World Heritage Site by Unesco, which aims to preserve areas of exceptional value throughout the world. In addition to holding World Heritage Site status, the Sterkfontein Caves is also a declared national heritage site as proclaimed by the South African Heritage Resources Agency (SAHRA). The SAHRA abides by international conservation principles to protect places of cultural significance in South Africa for future generations. The legislation serves to protect conservation-worthy places, including archaeological and palaeontological sites that provide an understanding of the history of the Earth, life on Earth and humankind.

National heritage sites are required to practise sound visitor management to preserve South Africa's natural resources. In accordance with the guidelines set out by the SAHRA, visitor numbers to the Sterkfontein Caves will be limited. It is advisable to book in advance to ensure entry, as ad hoc admission will be phased out over the following months. Sterkfontein Caves reserves the right to refuse entry should the daily visitor limit be exceeded.

To facilitate the growing interest in this internationally acclaimed heritage attraction, Maropeng was purpose-built as the gateway to the Cradle of Humankind, showcasing the wealth of palaeao-anthropological evidence found in this area. The Visitor Centre offers insight into the progress that humankind has made from our early beginnings to where we are today, and concludes with an original fossil display of ancient remains found in the Cradle of Humankind.

Background Knowledge

Subject: Life Orientation **Grade: 10**

Sustainability

The Maropeng Exhibition
The exhibition is a self-guided tour and can take anything from one to three hours, depending on your level of interest and time availability. It is highly interactive and enjoyable, and will engage you and your learners.

Boat ride

Once you have stepped off the exhilarating boat ride through air, water, fire and earth, you'll walk into the first part of the Maropeng exhibition, which introduces some of its major themes, such as evolution, the formation of fossils, extinction, DNA, sustainability and the birth of the Earth and the Cradle of Humankind. In this section, you and your learners will find information on sustainability.

Sustainability

Maropeng tells us the story of how humankind first arose in the African cradle by adapting to the natural elements and later learning how to harness them to support our growing populations.

Today, we have developed such control over our environment, through agriculture and industry, that a new story is emerging, one that involves the future of our planet and ourselves. The food we eat, the appliances we use, the vehicles we travel in, the clothes we wear, and so many other everyday aspects of our lives, depend on us utilising the Earth's natural resources.

The Earth has a limited capacity to produce the raw materials needed to sustain our lifestyles.

But sustainability is not only about humans' impact on the environment, it's also about how we treat one another as a species.

Explore the wall display on sustainability. Below are some pictures and text to guide you.

- How the global environment has changed over time

- Global appetite

- Human mobility and urbanisation

By 2003, Tokyo had a population of 35-million, making it the largest urban area in the world

- Human impact on the environment
- Education and sustainability
- Alternative energy sources
- Poverty and wealth
- Your ecological footprint

FET: Learner Activity and/or Assessment Task

Subject: Life Orientation **Grade: 10**

Activity 1

Group work: Refer to the information you have gathered from the wall display on sustainability at Maropeng and in groups of six, design an **"awareness poster"** on celebrating Heritage Day in our community.

Your poster must cover the significance of heritage within the community.

- Use bold and colourful print.
- Use pictures or drawings.
- Each group will be given a chance to present the poster to the class.

(20)

Your teacher will use the rubric on the next page to assess you.

Activity 2

Home work: Use a mind map to brainstorm the following questions (individual task):

- Find out from your parent: when precisely did you arrive on Earth?
- Describe any special meaning/value to your name (personal and family names).
- What significance does your name have in relation to being "proudly South African"?

(15)

Activity 3

Assignment

1. Explain the purpose of the Cradle of Humankind and what is found within it. (10)
- Explain the significance it has for the human race. (5)
- What impact did it have on the history of humankind (5)
- Do you think that the Cradle of Humankind is preserved correctly? Motivate your answer. (5)
- How will it assist future generations to understand their origins? (5)

(30)

Activity 4

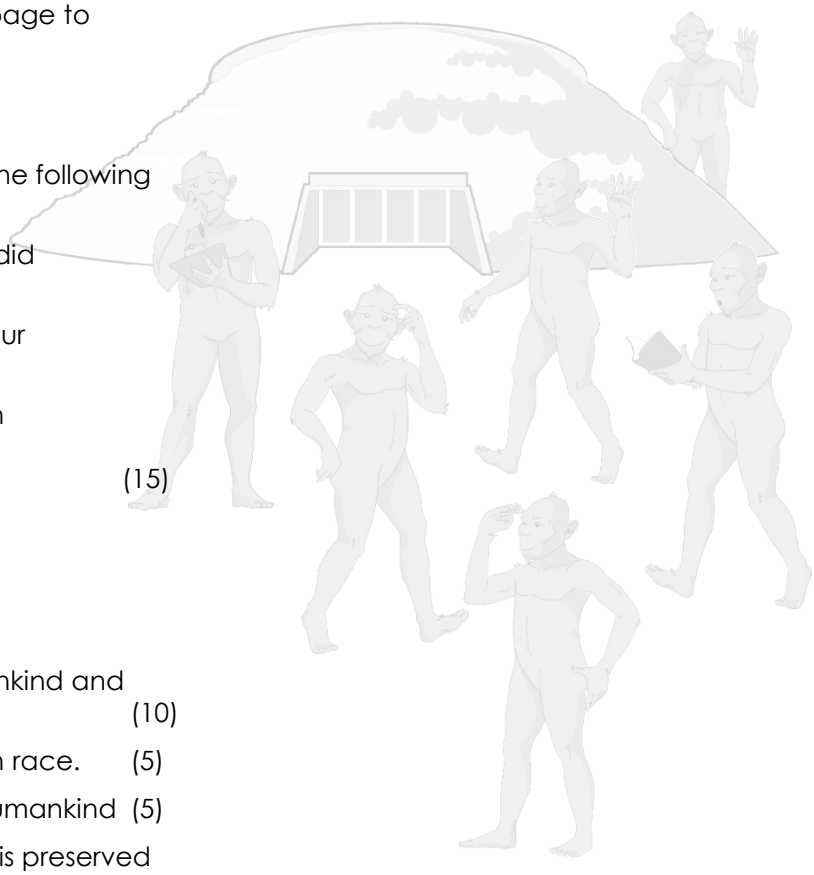
Debate

Learners to be divided into two groups of six, the proposition and the opposition.

TOPIC: The existence of humankind is under threat

The plan should include the following :

- Key speakers;
- Agenda; and
- Programme. (15)



Rubrics

Subject: Life Orientation **Grade: 10**

Activity 1: Awareness Poster Rubric (20)

Understanding of the concept of heritage (5)	
Criteria	**Mark allocation**
Meritorious achievement: Learner shows knowledge of heritage and its relation to historical events.	5
Substantial achievement: Satisfactory knowledge of heritage and its relation to historical events.	3-4
Moderate achievement: Partial knowledge of heritage and little understanding of its relation to historical events.	2
Not achieved: No knowledge of the concept; cannot relate it to historical events.	1
Visual images or message (5)	
Criteria	**Mark allocation**
Meritorious achievement: The choice of visual images effectively supports the poster's message.	5
Substantial achievement: The choice of images satisfactorily supports the poster's message.	3-4
Moderate achievement: The choice of visual images partially supports the poster's message.	2
Not achieved: No evidence of visual images to support the poster's message.	1
Design features of the poster (5)	
Criteria	**Mark allocation**
Meritorious achievement: Outstanding evidence of planning and thought; use of design elements, e.g. shape, colour, etc.	5
Substantial achievement: Satisfactory evidence of planning and thought; use of design elements, e.g. shape, colour, etc.	3-4
Moderate achievement: Partial evidence of planning and thought; little use of design elements, e.g. shape, colour, etc.	2
Not achieved: No evidence of planning and thought; no use of design elements, e.g. shape, colour, etc.	1
Presentation (5)	
Criteria	**Mark allocation**
Meritorious achievement: Outstanding presentation which is holistic, informative and interesting.	5
Substantial achievement: Satisfactory presentation which is holistic, informative and interesting.	3-4
Moderate achievement: Partial presentation.	2
Not achieved: Little information provided.	1

Rubrics

Subject: Life Orientation **Grade: 10**

Activity 3: Assignment Rubric (30)

Purpose and contents of the Cradle of Humankind (10)	
Criteria	**Mark allocation**
Meritorious achievement: Excellent explanation of the purpose and what is found in it is given.	8-10
Substantial achievement: Good explanation of the purpose and what is found in it is given.	5-7
Moderate achievement: Satisfactory explanation given.	2-4
Not achieved: Little or no explanation given.	0-1
Significance of the Cradle of Humankind (5)	
Criteria	**Mark allocation**
Meritorious achievement: Excellent understanding of the significance is shown.	5
Substantial achievement: Good understanding is shown.	3-4
Moderate achievement: Satisfactory understanding is shown.	2
Not achieved: Little or no understanding shown.	1
Impact on the history and how it is preserved (10)	
Criteria	**Mark allocation**
Meritorious achievement: Learner shows excellent insight and understanding of the impact on the history and preservation of the Cradle.	8-10
Substantial achievement: Learner shows good inside and understanding of the impact and preservation of the Cradle.	5-7
Moderate achievement: Learner shows satisfactory insight and understanding of the impact on the history and preservation of the Cradle.	2-4
Not achieved: Impact and preservation facts are haphazard.	0-1
Assistance to future generations (5)	
Criteria	**Mark allocation**
Meritorious achievement: Numerous and sufficient facts are provided.	5
Substantial achievement: Good facts are provided.	3-4
Moderate achievement: Few facts are provided.	2
Not achieved: Facts are barely provided.	1

Background Knowledge

Subject: Life Orientation **Grade: 11**

My Environment is My Life

You have visited **Maropeng** and you have learnt a number of things such as: our origin, knowing who we are, how the Earth was formed, how the inhabitants survived, and much more.

The following issues on sustainability were emphasised:

At first humans barely made an impact on the environment. But this changed as our technological capabilities progressed. Now our activities are causing serious implications for our planet, including unusually rapid extinction of species and global warming.

And we humans have developed very unequally. While the northern hemisphere is generally rich, the southern hemisphere is generally poor. Wealth is unevenly spread. A person who has HIV/AIDS in Africa is more likely to die quickly from the disease because he or she does not, for example, have access to the same drugs as a person in the USA, where it has become a manageable chronic disease. As our population grows, there is ever-more competition for precious resources such as water and land for our sustainability as a species.

While we can propel ourselves into space, millions of people starve to death each year, are illiterate and have no access to basic healthcare and clean water.

What does the sustainability display tell us?

What is it telling us about the environment?

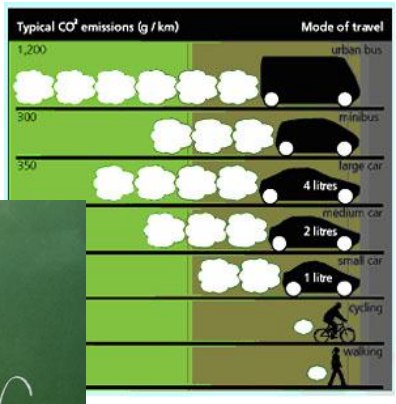
How do social issues link with sustainability?

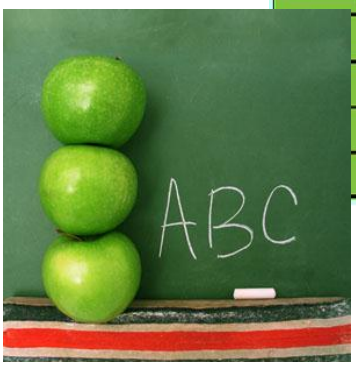
What does sustainability in your community mean?

Explore the wall display on sustainability at Maropeng. Below are some pictures and text to guide you.

- Poverty and wealth
  The world is faced with a dilemma: countries need to develop economically and to do this they need natural resources, but at the same time, they need to preserve the environment so that future generations can thrive.

- Alternative energy sources





- Education and sustainability

- The Gaia Principle
- How the global environment has changed over time
- The "global appetite"
- Human mobility and urbanisation
- Human impact on the environment
- Your ecological footprint

FET: Learner Activity and/or Assessment Task

Subject: Life Orientation **Grade: 11**

Social and Environmental Justice

Activity 1

Group work: In groups of six, referring to the information on **sustainability** from Maropeng, discuss the following:

• Social justice: unequal access to services and resources globally (between the wealthy, industrialised countries and the developing countries); between provinces; between rural and urban areas; and between races.

Each group will be given a chance to present their findings.

Activity 2

Home work: (individual task)

Find out :

• What social issues affect South Africa today?

• In dealing with HIV/AIDS in South Africa, what are we doing wrong and/or right?

• Identify the environmental issues that affect your community.

Activity 3

Research

Promoting sustainable development

The environmental and social issues that we face cannot be solved by the government alone. Being aware of the impact that we have on our environment, we need to take action so that we can make a difference to promote sustainable development.

1. Interview: Draw up five questions to ask older members of your community about the local environment. (Interview at least two elderly people: male and female.) (10)

(Example of a question: "Are there more trees, or fewer trees, than there were before?" Your questions can relate to pollution, the availability of water, and so on.)

2. There should be evidence of interviews – answers given by the people interviewed. (5)

3. Write down your findings. (10)

4. Present your findings to the class. (5)

5. Suggest ways in which you can promote sustainable development. (10)

Activity 4

Project

Design and participate in a community service project.

Group work:

1. Draw up a proposal for a service project which addresses a specific need in your community. Each step needs to be carefully planned.

What are the needs in your community?

Here are some ideas:

• Is there a river or stream that needs to be cleaned up?

• Are there problems with litter?

• Is there an area with alien vegetation which needs to be cleared?

• Are there old people who need assistance in their homes?

• Are there young children or orphans who need help with homework?

• Is there a hospital, clinic or children's home where help is needed to feed, read to or play with the children?

2. Write a report and analyse your experience of participation and the impact you have made on your community.

• Proposal. (20)

• Involvement – evidence of participation, stamp and signature of the place visited, photos, dates should be indicated. (5)

• Report. (10)

Rubrics

Subject: Life Orientation **Grade: 11**

Activity 3: Research Rubric (30)

Evidence of interview (5)	
Criteria	**Mark allocation**
Meritorious achievement: Excellent evidence is shown.	5
Substantial achievement: Good evidence is shown.	3-4
Moderate achievement: Satisfactory evidence is shown.	2
Not achieved: Little or no evidence is shown.	1
Findings (10)	
Criteria	**Mark allocation**
Meritorious achievement: Findings are coherent, and excellently documented.	8-10
Substantial achievement: Findings have all relevant information	5-7
Moderate achievement: Findings are adequate but there are lapses in coherence.	2-4
Not achieved: Findings are haphazard and lack coherence.	0-1
Presentation (5)	
Criteria	**Mark allocation**
Meritorious achievement: Excellent effort has been made with presentation.	5
Substantial achievement: Good effort has been made with presentation.	3-4
Moderate achievement: Some effort has been made with presentation.	2
Not achieved: No effort has been made with presentation.	1
Suggestions to promote sustainable development (10)	
Criteria	**Mark allocation**
Meritorious achievement: Numerous and sufficient suggestions provided.	8-10
Substantial achievement: Good deal of suggestions provided.	5-7
Moderate achievement: A few suggestions provided.	2-4
Not achieved: Suggestions barely provided.	0-1

Rubrics

Subject: Life Orientation **Grade: 11**

Activity 4: Project Rubric (35)

Proposal (20)	
Criteria	**Mark allocation**
Meritorious achievement: Learner shows insight and understanding of issues within the challenges of the community.	16-20
Substantial achievement: Learner is competently able to identify and make proposal to challenging issues.	11-15
Moderate achievement: Learner can make some deductions from challenges and suggest minimal solutions.	5-10
Not achieved: Learner is hardly able to find/identify challenges and make proposals.	0-4
Evidence (5)	
Any of the following: Stamps and signatures from the places visited, dates, photos, reports with signatures.	
Report: the impact made (10)	
Criteria	**Mark allocation**
Meritorious achievement: Report is skillfully done and demonstrates the impact made.	8-10
Substantial achievement: Report is good and demonstrates some impact made.	5-7
Moderate achievement: Reasonable attempt at reporting.	2-4
Not achieved: Weak/poor standard of reporting.	0-1

Background Knowledge

Subject: Life Orientation **Grade: 12**

Choosing a Healthy Lifestyle

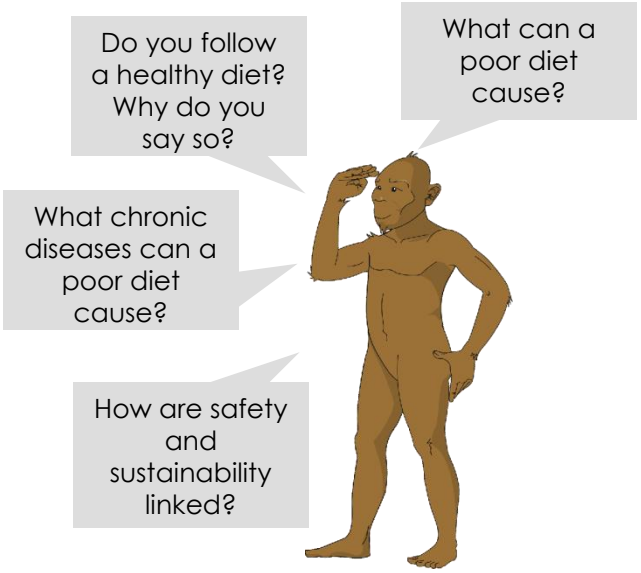
Introduction: During the the visit to Maropeng you should have noticed the following facts on the wall display on sustainability:

- In South Africa people eat on average 17 kg of beef, 24 kg of poultry and 4 kg mutton per year.
- Every day about 78-million servings of Coca-Cola products are consumed in Africa.

Considering that millions of people starve to death each year and have no access to basic health care, it is evident that humans engage in risky behaviour that impacts negatively on health.

In South Africa, more and more people are living a westernised lifestyle. People today have money to spend and more time in which to spend it. While this may bring many benefits, from a health point of view it also carries many risks.

This does not mean that a person has to live an unhealthy lifestyle. As with all things, it is a matter of choices and consequences. Choosing to live a healthy lifestyle is a clear option.



The Global Appetite
Our collective voracious appetite is putting strain on our planet. In this section, we share with you some interesting facts and statistics showing how food and global sustainability issues relate to one another.

Poverty and Food Production

Every year, hundreds of millions of people suffer from hunger and malnutrition, and millions of them die because of it, including more than 6-million children under the age of five. Sub-Saharan Africa has the highest incidence of undernourished people in the world, with statistics creeping up each year.

Global food production has also increasingly become a political issue over the past century. Government subsidies paid to farmers in various countries such as the United States and in the European Union, for example, help to provide them with economic stability, but undermine efforts by farmers in countries where government subsidies are not paid. This includes much of the developing world, in Africa and South America.

"A person may have little means of commanding food if he or she has no job, no other sources of income, no social security. The hunger that will result can coexist with a plentiful supply of food in the economy and the markets."
– Amartya Sen, Noble prize-winning economist

FET: Learner Activity and/or Assessment Task

Subject: Life Orientation **Grade: 12**

Activity 1

Brainstorming: Round table (oral)

Identify the diseases that you know of that can be caused by:

- Poor diet;
- Poverty;
- Cultural and religious practices;
- Environmental factors;
- Poor diet; and
- Unsafe sexual practice;

Activity 2

Home work: (individual task and peer assessment,) Write down the type of diet you follow. Assess whether it is healthy, explain what is healthy about it and what is not; and then suggest ways of improving it. Exchange your task with your partner for peer assessment.

Activity 3

Research

Dealing with chronic disease

Explain each one of the following chronic diseases. You may have to do some research.

Group work:

Allocate one chronic disease to each member of the group. Draw up a table in your workbook with the following headings and fill in the information.

Chronic disease:	Cause (10)	Symptoms (10)	Prognosis (10)
Cancer			
Hypertension			
Diabetes			
High blood cholesterol			
Coronary heart disease			

Activity 4

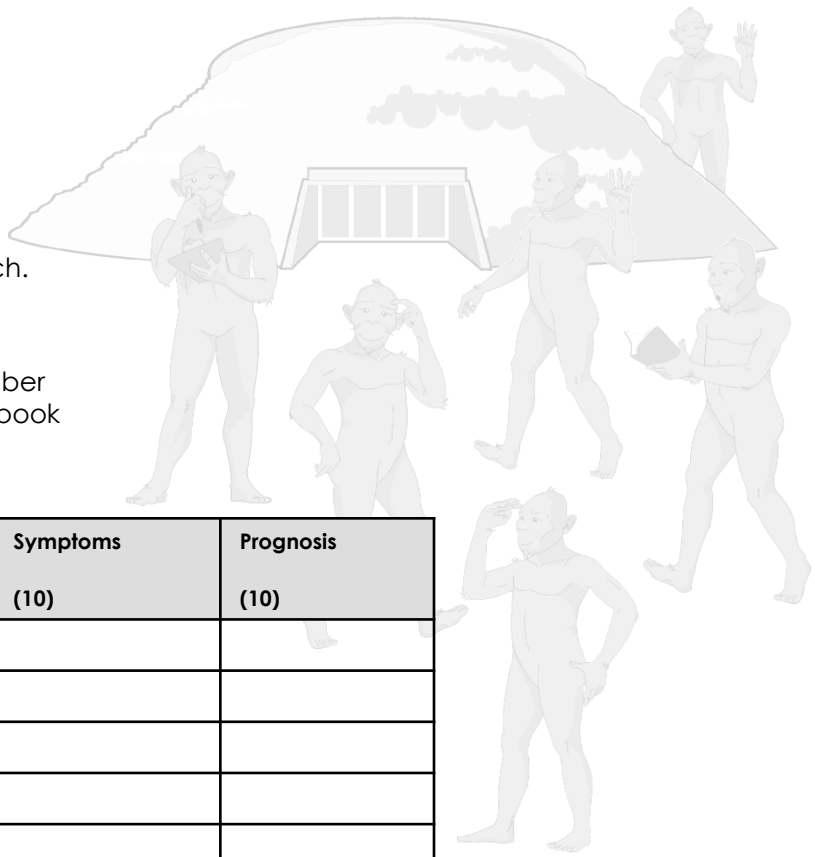
Report

Safe living in communities

Investigate safety in your community and write a report on the following issues:

1. What is a safe community?
2. How can communities be made safe?
3. Who is responsible for safety in your community?
4. There are laws that protect people from crime and violence. Do you think these laws are adequate? State why or why not.
5. How can people deal with crime to create safe communities?

(45)



Rubrics

Subject: Life Orientation **Grade: 12**

Activity 3: Research Rubric (30)

Chronic diseases (10)	
Criteria	**Mark allocation**
Meritorious: Causes are more than enough and show insight.	9-10
Proficient: Great number of causes provided.	7-8
Adequate: Various causes provided.	5-6
Limited: Few causes provided.	3-4
Irrelevant: No causes provided.	0-2
Symptoms (10)	
Criteria	**Mark allocation**
Meritorious: Outstanding research done on signs and symptoms.	9-10
Proficient: Many signs and symptoms researched.	7-8
Adequate: A few signs and symptoms researched.	5-6
Limited: Hardly any signs and symptoms researched.	3-4
Irrelevant: None supplied.	0-2
Prognosis (10)	
Criteria	**Mark allocation**
Meritorious: Outstanding research done; excellent prognosis.	9-10
Proficient: Good prognosis done.	7-8
Adequate: Enough evidence for prognosis provided.	5-6
Limited: Hardly any prognosis provided.	3-4
Irrelevant: None provided.	0-2

Rubrics

Subject: Life Orientation **Grade: 12**

Activity 4: Report Writing Rubric (45)

• Introduction (5) • Definition of safe community (2) • Making safe communities (10)	
Criteria	**Mark allocation**
Meritorious	9-10
Proficient	7-8
Adequate	5-6
Limited	3-4
Irrelevant	0-2
• People responsible for safety in the community (3) • Laws that protect people (10)	
Criteria	**Mark allocation**
Meritorious	9-10
Proficient	7-8
Adequate	5-6
Limited	3-4
Irrelevant	0-2
Ways of dealing with crime (solutions) (10)	
Criteria	**Mark allocation**
Meritorious	9-10
Proficient	7-8
Adequate	5-6
Limited	3-4
Irrelevant	0-2
Conclusion (5)	
Criteria	**Mark allocation**
Meritorious	9-10
Proficient	7-8
Adequate	5-6
Limited	3-4
Irrelevant	0-2

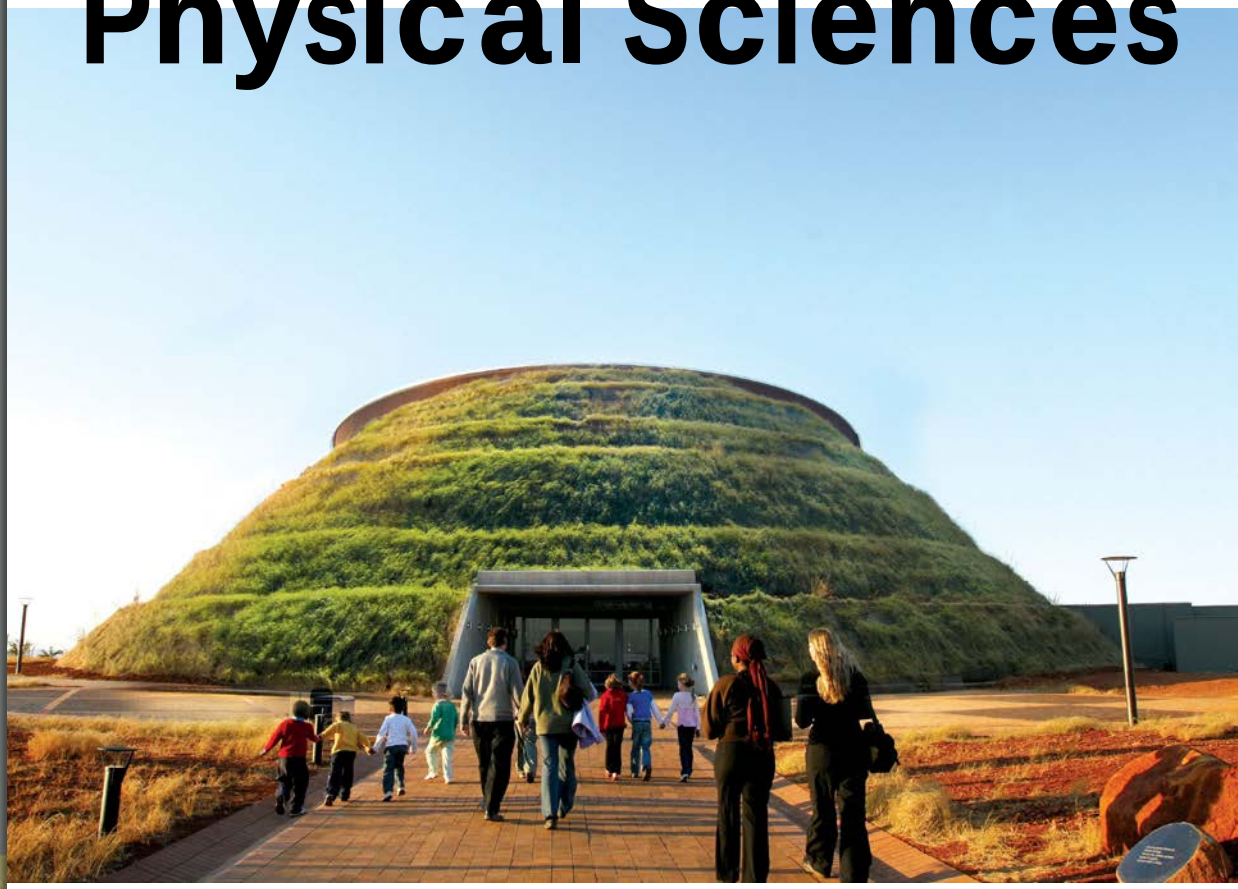
Memorandum

Subject: Life Orientation **Grade: 12**

Activity 3: Chronic Diseases (30)

Chronic disease:	Causes (10)	Symptoms (10)	Prognosis (10)
• Cancer	• Virus • Chemicals • Some are hereditary	• Mostly painless • Depends on the body part affected e.g. cervix – bleeding, bone pains, liver pains when advanced	• Poor • Patient might not recover
• Hypertension	• 90% causes no known • Inherited • Too much salt in food • Narrowed blood vessels	• Occasional headaches and dizziness • Chest pain	• Good patient can be treated • Reduce salt • Exercise
• Diabetes	• Lack of insulin • Abnormal production of insulin • Destruction of the islets	• Abnormal drinking of water • Urinate abnormally • Over-eating • Weight loss	• Good • Patient can be given treatment to control sugar level
• High blood cholesterol	• Genetic • Can be caused by animal fat	• No symptoms • Doctors can see the signs • Yellow skin patches	• Good • Cholesterol-lowering drugs can be taken to keep it normal
• Coronary heart disease	• Too much cholesterol • High blood pressure • Diabetes	• Chest pain that moves to the arm (is prominent) • Upper abdomen pain • Nausea • Headaches • Non-specific	• Fair • 50/50 chances of recovery

Physical Sciences



Developed by:

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Who am I?

maropeng

Subject: Physical Sciences

Topic: Shelters

Grade 10 (CAPS)	Grade 11 (CAPS)	Grade 12 (CAPS)
Topic	**Topic**	**Topic**
Matter and materials **Chemical systems**	**Chemistry (Chemical Systems)** **Exploiting the lithosphere or earth's crust**	**Chemistry (Matter and materials)**
Knowledge:	**Knowledge**	**Knowledge**
Matters and material Chemical system Describe • the energy involved in these chemical changes as much larger than those of the physical change i.e. hydrogen is used as a rocket fuel. • mass and atoms are conserved during these chemical changes but the number of molecules is not. Show this with diagrams of the particles	Chemistry Exploiting the lithosphere or earth's crust Describe the consequences of the current large scale burning of fossil fuels; and why many scientists and climatologists are predicting global warming Give a brief history of humankind across the ages: • Linking their technology and the materials they have used to their tools and their weapons	Chemistry Describe the term polymer; macromolecule, chain, monomer, functional groups • Illustrate the reaction to produce a polymer by an addition reaction using the polymerization of ONLY ethene to produce polythene [nCH2=CH2 → (-CH2-CH2-)n] • What is the industrial use of polythene? (Make squeeze bottles, plastic bags, films, toys and molded objects, electric insulation. Polythene has the recycling number 4) • Illustrate the reaction to produce a polymer by condensation reaction with the reaction to produce a polyester. Use ONLY the reaction to make the polymer polyethylene

Background Knowledge

Subject: Physical Sciences **Grade: 10**

Teacher's Notes

Learners should visit Maropeng to learn more about shelters through the ages. As you move through the journey of discovery from the beginnings of the world you need to start at the place where you will find human beings – the place where they live. Throughout the ages various cultures have developed their own way of living and this is based on the culture they belong to, the beliefs of the tribe and the environment they live in. History helped human beings create their own original cultural stamp here!

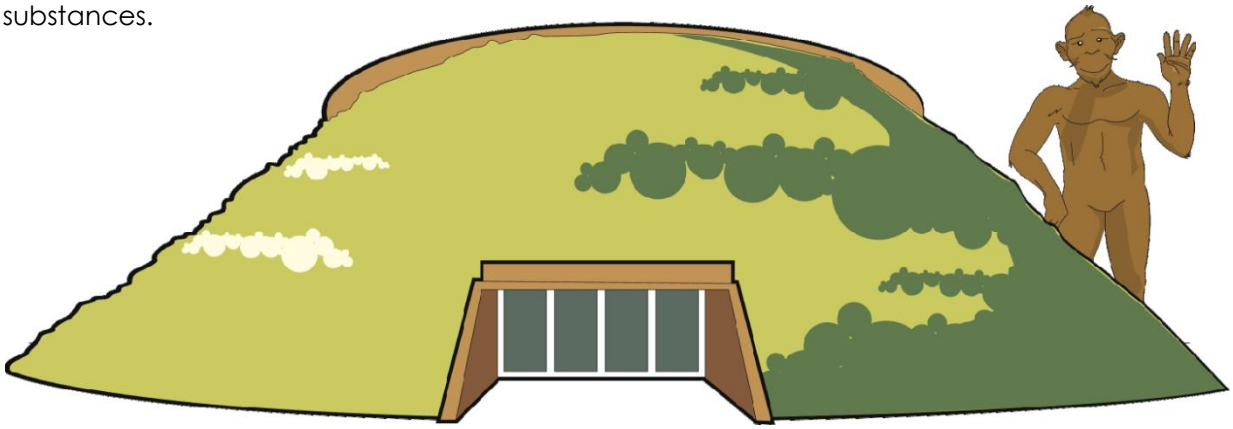
Shelters

Prior to visiting Maropeng:

Learners must know physical and chemical properties of various substances.

Observe the properties of materials used in building shelters.

Where do you live?



We will show you the learner assessment activities.

Background Knowledge

Subject: Physical Sciences **Grade: 10**

Shelters

Throughout the ages people have had the need of a place to stay and shelter against the environment.

Early humans found shelter in rock caves they discovered. About 5,000 years ago, in North Africa, the Egyptians built huge pyramids out of rock to honour their rulers. Some of these structures still stand. Further south, the Zimbabwe Ruins were also built of rocks. In South Africa, at Thulamela, ruins have been discovered of civilizations existing between 1240 and 1630.

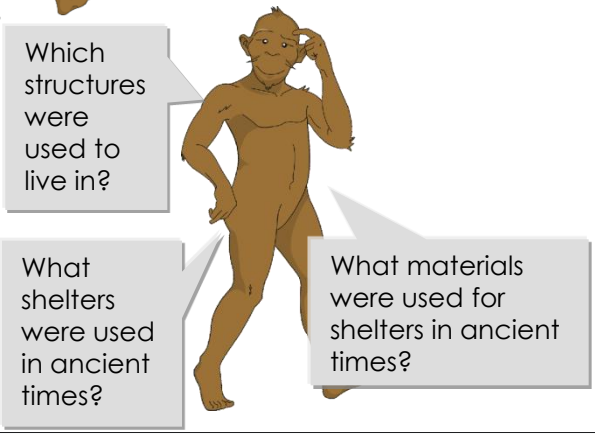
What in the exhibition shows that the human population has used shelters?

Humans have used natural resources and changed them to become fit for a purpose.

The Earth's natural resources are sometimes:

- Unchanged and used by humans, therefore called natural materials; and sometimes
- Changed and used by humans, therefore called artificial materials.

Name some examples of natural materials. Name some examples of artificial materials.



We know that human activity has resulted in changing the environment. The use of building materials caused these changes. We needed certain materials for certain purposes.

Move around the exhibition area and find information on, and explain, how science and technology were used to change materials into other uses.

In the foyer is a large display of the earth. Read the passage on caves. What other materials, except our ancestor's bones, were also found in the caves?

What were the average temperatures and rainfall mentioned?

Going down the ramp and the boat trip you will experience what humans needed to be protected against.

Underground boat ride

Feel the rain, wind, snow, icy conditions, thunder, lightning, mist and lava flow due to volcanic action as you travel in the boat!

Activities

Subject: Physical Sciences **Grade: 10**

Why do humans need shelter?

Make a list of all the conditions in the environment that we shelter from.

One example is rain.

Write down all the properties you want in a material that is used to build the walls of a shelter or house.

Which of the following are not suitable to build a shelter with?

- Materials: plastic, cement, glass.
- Substances: salt, copper, water, oxygen.
- Objects: sugar cane stalks, leaves, grass.

Discuss why you would use/not use these. Explain and give reasons.

The caves our ancestors used were made by the action of water and environmental factors.

What is the chemical name of limestone – the substance a cave is made of?

Background information

Materials that are suitable/not suitable for construction purposes are:

- Cement is suitable, but in the powder form is not suitable as a construction material, because it needs to be mixed with sand and water to form bricks.
- Bricks made from clay that are shaped and baked are suitable. Bricks can then be used to build walls.
- Water is not suitable for walls. However, in the North Pole, where temperatures are below zero, the Inuits build igloos from ice blocks. The snow is used to isolate the houses, or igloos.
- Some shelters are built from skins – Inuits use seal skins which they attach to a frame. The shape of both the ice igloo and skin igloos are like a beehive, with a tunnel entrance. When the snow falls, the igloo becomes covered in thick snow. Snow is a very good insulator and inside the igloo the temperature is much higher than the outside.

How do the Zulus and the Khoisan use grass and reeds to build their houses?

Describe how these huts are constructed and how the frame is used.

How long does a shelter such as this last?

Activities

Subject: Physical Sciences **Grade: 10**

How can we select the best building material for a shelter or house?

Name all the properties of various materials that make them suitable for their purpose.

Construction materials that you need to consider are, for example:

• The roof of the house, roof trusses, piping system, floors, bricks, walls, plaster, windows, doors, drain pipes, lintels, cupboards, electric cables, etc.

• To choose a material fit for purpose we need to think of the following properties: strong material must be used to build the walls of a house – thick glass is strong, but not suitable as a wall since we do not want to see through the walls.

• It becomes hot inside a glass house when the sun shines, so we need material that is able to insulate against environmental temperature changes.

• Sugarcane stalks are not transparent, not very strong, but could be used as a wall – the problem is that rain will seep in between the stalks. Copper is strong, will not leak, but is dangerous since it conducts electricity, conducts heat in summer and is very cold in winter.

• The walls must be strong to support the roof and must not bend or break when a force is applied to it.

Compare how shelters were built in ancient times to the way we build our houses today. Decide what criteria you will use to compare and what you will compare.

Use the exhibition to find answers to the following questions.

Discuss these questions in your groups. Imagine yourself living in a cave when you answer these questions.

• What did our ancestors shelter against, in ancient times, and do we still need protection against the same things?

• What materials were available then and now?

• For how long was the shelter used?

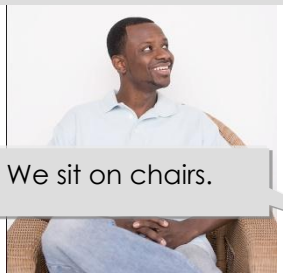
• How long does a house last today?

• How many people used the shelter?

• What is the difference between modern dwellings and the caves used then?

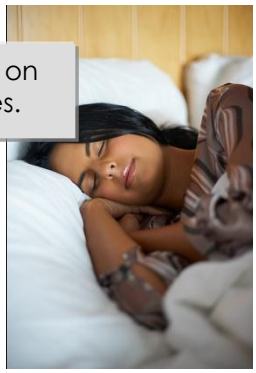
• What were/are shelters used for then and today?

• What do we do today that makes us more comfortable inside our houses?



We sit on chairs.

We sleep on mattresses.



We have comforts such as carpets on the floor.

We heat our houses with electric heaters.

FET: Learner Activity and/or Assessment Task

Subject: Physical Sciences **Grade: 10**

Teacher: Some examples of natural materials used for shelters that learners could mention are wood, sand, rocks, water, air, etc. and examples of artificial materials could be plastic, steel, cement, glass, ceramics, etc.

The display of the Earth in the foyer indicates that the conditions in the environment that we shelter from are rain, sun, wind, cold, danger. Food was found in the caves, owls lived there, etc. The average rainfall is indicated as between 650 mm and 750 mm per annum. Average temperatures were between -12°C and 39°C.

Properties of construction materials: they must be strong, not dissolve, not be see-through, insulate against low and high temperatures, etc.

The chemical substance in a cave, called limestone, is calcium carbonate.

The stalactites and stalagmites formed inside a cave are formed by the dissolving action of carbonic acid on calcium carbonate, which is deposited on the roof or floor of the cave as the water evaporates.

Materials not suitable to use as shelters:

Not suitable: glass – it is see-through and breaks.

Salt – it dissolves and one cannot get enough to form solid crystals.

Water – liquids are not suitable for walls, no protection against anything.

Copper – very expensive and not a good insulator.

Oxygen is a gas, does not provide any shelter.

Leaves – not possible to glue small leaves together. Could use large leaves, could be plaited, etc. to form a solid structure, but still not strong. Leaves eventually become dry and brittle and will break, making the wall collapse.

Limestone is calcium carbonate.

Shelters used in ancient times were caves, mud houses, houses constructed from wood, palm leaves, grass, skin of animals, etc. and the materials used for these shelters were rocks, grass, wood, leaves, sticks, etc.

Activity 1

Research task:

1. Some materials might be more suitable under certain conditions to build a shelter, but others are not suitable as construction material. Explain when and how they could be used.

2. Compare the shelters of various ethnic groups in our country – discuss the construction materials used, frame, shape and purpose of the types of shelter in each culture.

3. How can we select the best building material for a shelter or house?

4. Discuss the properties of materials required by different shelters, where each shelter would be built, etc.

Materials used nowadays for houses: zinc, wood, glass, concrete, metals, carton, clay

Teachers may award their own mark allocation to the various tasks or use the exemplar rubrics, where applicable, as developed by the DoE and supplied to the teachers in the SBA guideline document.

Background Knowledge

Subject: Physical Sciences **Grade: 11**

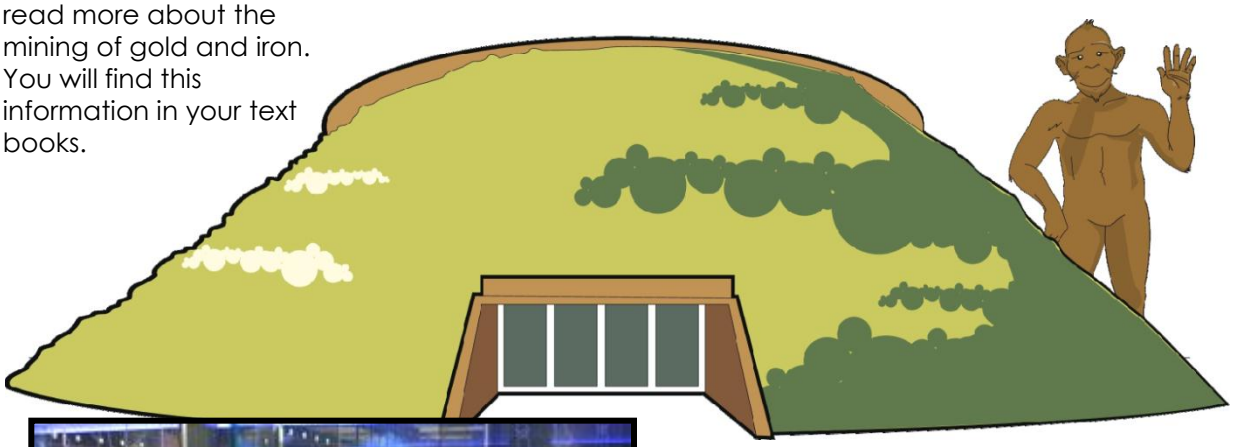
Teacher's Notes:

Learners should visit Maropeng to learn more about shelters. As we have evolved, our shelters also have changed. Life has changed, humans and their environment have changed – there has been a total transformation. Where our ancestors used to life in caves, we nowadays live in hi-tech buildings that do not resemble the past. The link between then and now is that we still need a shelter, although we need shelter for different purposes. What you have learnt, about properties of materials, in Grade 10, will be taken further in this lesson.

Tools – Uses and Origin of the Materials

Prior to visiting Maropeng:

Before you visit Maropeng read more about the mining of gold and iron. You will find this information in your text books.

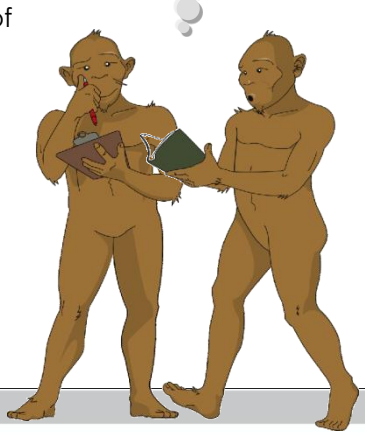


Researchers put the finishing touches on the stone tools display at Sterkfontein Caves

At Maropeng:

- Where do we use tools?
- Why do we use tools?
- Who were the first people to use tools?
- Which species use/s tools?
- Is the development of tools unique to South Africa?

We will show you the learner assessment activities.



Background Knowledge

Subject: Physical Sciences **Grade: 11**

Tools – Uses and Origin of the Materials

There are many different beliefs about the interior of the Earth. Many people in the past believed that the Earth was hollow inside and that we could go down to the core of the Earth. Ancient Greeks thought the inside of the Earth contained the place of punishment, called Hades, and early Christians thought the inside of the Earth was a place called hell. Jewish people believed the inside of the Earth was also a place of eternal fear and punishment and fire, called Sheol.

Where in the exhibition will you find evidence that our ancestors would sit down and discuss their cultural beliefs and ideas about the interior of the Earth?

Once people started to develop tools for various purposes, they also started to dig into the soil. This might have changed their ideas about the fact that the Earth is not hollow, but solid.

How can we prove that the Earth is not hollow inside?

Early people needed objects to do some work for them. These objects are known today as tools. Tools make life easier for us.

Some of these tools were made from materials such as stone, obtained from the earth. Other tools were made from metals that people "mined". They even used bones from animals for various purposes.

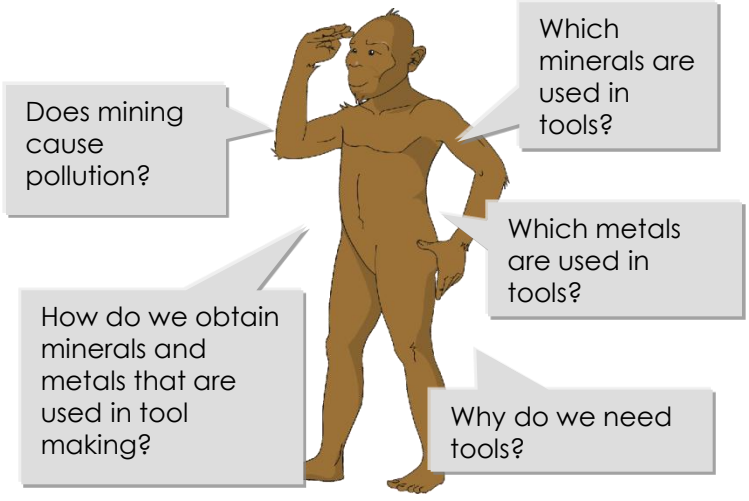
What is your idea about the interior of the Earth?

What are some of your own cultural or religious beliefs about the interior of the Earth?

We know that human activities need tools to make life easier. This resulted in mining activities to obtain minerals from the earth. All these activities cause some pollution and other problems in and around the lithosphere and atmosphere.

Science and technology helped us to develop tools to obtain minerals, metals, and other objects from the Earth. We use tools for eating, drinking, farming, etc. The manufacturing process of tools forms part of the problem of pollution. Science and technology are partly responsible for causing changes in society. Science and technology are also responsible for correcting problems caused. **Sustainable development** here on earth is a way of organising our lives and work so that we don't destroy our most precious planet, Earth.

Move around the exhibition area and find information on the tools our ancestors used. Then use this information to determine and explain how science and technology can be used to devise strategies to improve our *ecological footprint*.



Activities

Subject: Physical Sciences **Grade: 11**

Exploring the Structure of the Interior of the Earth

In the exhibition you'll find a revolving Earth. A narrator talks about the development of the various continents. Listen very carefully to the recording and then answer these questions:

- What is the Earth's diameter?
- What do we call the outer layer of the Earth? How thick is it? Is it the same thickness everywhere?
- What is below the mantle of the Earth?
- We have seen that this molten inner portion can move slowly. What do we call the process in which the plates moved away from their original position? Is this movement of the continents due to conduction or convection currents?
- Do you know what the main constituent metals in the core of the earth are? Name them.

Walk through the exhibition and see what impact tools had on the development of humans through the ages. Identify what tools were used by different people. Write down a description or name of all the tools you can find. Tools used to be made from iron, bone and stone. The tools the Stone Age people used were mainly for cooking, hunting, eating, ceremonial activities such as initiation and marriage, and jewellery-making. For this they needed silver, gold, copper and other metals. The use of tools had an enormous impact on the technological advances of developing cultures.

What do we mean when we speak of resources?

The use of tools created cultures more technologically advanced than cultures that did not use utensils or tools to make their lives easier. This had a tremendous impact on the social behaviour and environment of ancient people. It also had a scientific impact. Knowledge of the properties of materials increased people's ability to improve their environment, and their scientific knowledge gradually became more and more advanced.

What in the exhibition shows us that our ancient ancestors had some technological skills?

Find items in the exhibition to answer the following:

- What tools did our ancestors use?
- What did they use these tools for?
- From what materials did they make these tools?
- How did they make these tools?
- How did they obtain the metals, such as silver, gold and iron? How did they manage to make the jewellery?

A tool is any mechanical means to make a task easier.

In the Tools for Life display it is shown that stones were used as early as 3-million to 2.6-million years ago. They were used as hammers to chip away other stones to make tools with sharp edges. **Manufacturing had begun**.

Tools were manufactured and used then and now: in wars, horse riding equipment, dynamite, clothes and safety, stove plates, batteries, cells, light bulbs, aircraft, boats, paper, cars, trailers, gears, spacesuits, spaceships and matches. The use of fire lit up our ancestors' imagination and provided them, and us, with a means of heat, light and shelter. These three properties gave humans more hours in the day to **think** and to **develop creativity**.

Activities

Subject: Physical Sciences **Grade: 11**

How Large is Your Ecological Footprint?

The size of your ecological footprint depends on the use of the available resources in our country. The more you use and the less you recycle, the larger the footprint.

Mining activities include the obtaining of metals for use in tools. Mining activities use energy, pollute the earth and waste water.

Can we afford to be so wasteful and take more than our share of the resources from the earth?

Adaptation to the environment

Changing climate and geography are some of the reasons that humans had to move to less hostile environments. The air we breathe, water we drink to quench our thirst and the fire we use to warm and protect ourselves are elemental forces that have affected our species. These basic amenities helped to develop humans as tool makers and tool users.

Which tools are used in education? Find the answer in the exhibition.

Teacher:

Learners can answer:

- Pens/pencils/lead;
- Desks/tables/chairs;
- Writing materials;
- Books/paper/ink; and
- Any other appropriate item they saw in the exhibition.

What is your view on mining? Discuss the positive aspects as well as the negative aspects of mining.

Think of all the socio-economic factors involved in mining. These include the infrastructure needed, job creation, and primary and secondary industries that develop from mining.

What science knowledge and technology are involved in mining? Name as many as you can think of.

Do you think the same positive and negative factors played a role when our ancestors obtained metals from the earth which they used to make their tools?

Move to the Global Appetite display. The containers shown here are all made by means of tools. Identify the tools and their functions depicted in this display.

Possible answers:

Plastic containers for storing water and fruit juices; other containers made from metals; sticks that are used as eating utensils; cartons for fast food products; paper bags to carry food in or used as packaging; cooking utensils, wooden spoons, etc.

FET: Learner Activity and/or Assessment Task

Subject: Physical Sciences **Grade: 11**

Before you visit Maropeng read more about the mining of gold and iron.

Activity 1

Write a research report on the mining of gold and iron.

You need to discuss the following in your report:

1. Describe the recovery of gold and iron.

2. Do you think it is worth mining each of these metals? Why do you say so?

3. Identify the major gold and iron mining activities in South Africa. Indicate all the mines on a map.

4. Write down all the major steps in the mining process. This should include methods to separate the ore from rock. Mention any chemical and physical steps that are used.

5. Use any resource to find out how our ancestors recovered metals from rocks.

The uses of tools depends on the properties of the materials the tools are made of.

6. Identify the **physical** and **chemical properties** of the materials the tools are made of.

- For this you will need to identify the various substances used for making tools.
- The strength of the material determines its use.

Teachers may award their own mark allocation to the various tasks or use the exemplar rubrics, where applicable, as developed by the DoE and supplied to the teachers in the SBA guideline document.

Activity 2

1. Make a drawing of a bow and arrow.

2. What properties are important for a bow and arrow that will be used as a hunting tool?

3. Our ancestors did not only use bows and arrows, but also spears. These spears were made of iron. How did they make these spears? What difference is there between these hunting tools and the methods we use to find and kill animals today?

4. Which tools did the cave people use for eating? How did they stir their food?

5. If they used fire to cook their food on, which tools were used to handle the hot food?

6. In South Africa Mapungubwe was the cradle of gold. How do we know that gold was mined there?

7. Do you think the people who lived in the Sterkfontein Caves made jewellery? Discuss the reasons for your answers.

8. During ceremonies masks and other objects were used. These objects were made using tools. Which tools do you think were used to make these masks and other objects?

Teachers may award their own mark allocation to the various tasks or use the exemplar rubrics, where applicable, as developed by the DoE and supplied to the teachers in the SBA guideline document.

FET: Learner Activity and/or Assessment Task

Subject: Physical Sciences **Grade: 11**

Activity 3

To prove the Earth is not hollow, modern technology uses sonar equipment; mining has proved that the Earth is not hollow; volcanic activity shows the presence of lava coming from the interior of the earth.

The diameter of the earth is 12,756 km. The crust forms the outer layer of the lithosphere. Solid rock ranges in thickness of 5 km (beneath the oceans) and 65 km on land. The interior of the earth consists of molten, hot rock. The crust moves on the molten interior and this causes continental drift. Motion of the molten liquid metals caused conduction currents. The core of the earth is made mainly of the elements iron and nickel.

Not everybody is able to make tools. Tool-making is a specialised job.

Find in the exhibition all objects on display that could be classified as tools. Make a drawing of these tools. Discuss how they were used.

Activity 4

People would gather in their shelters around a fire or during certain ceremonies or festivities and they would discuss their ideas on the interior of the Earth. Every culture has its own indigenous knowledge regarding the making and use of tools. Identify a tool from the past in your culture that was used for a very specific purpose. Explain how the tool was made and the purpose of this tool. How did they obtain the iron (or metal)?

Activity 5

This research task, based on mining, could be done prior to the visit to Maropeng or after the visit.

Use any resource to obtain background knowledge regarding the mining of gold/silver/iron in ancient times. Discuss which people were mainly miners. Did they trade the metal with other people? What was the purpose of this trade?

Tools were used for farming; eating; cooking; making soap; slaughtering of animals; food preparation; jewellery-making.

Tools also broadened our ability to communicate. Road-building is based on tool-making and tool use.

Activity 6

Most of our ancestors used stone tools, but the more advanced their knowledge became, the more demands were made on the tool-maker to provide a means to make the task at hand easier.

Materials used for tool-making included iron, stone, bone, gold. The purpose of each tool related to cooking, hunting, eating, ceremonial activities (initiation, marriage, etc.). Stone tool-making made it possible for our ancestors to leave home and spread out of Africa. Tools and the mental ability enabled and equipped us to negotiate almost all environments and help us succeed in our competition against any other animal competitor.

Practical activity:

A short description of tool-making during group discussion could involve a demonstration of tool-making.

In the demonstration, discuss the properties that tools need to be fit for a purpose – strong, pliable, brittle, etc.

Activity 7

1. How did ancient people extract the metal from its ore?

Write a short description of the extraction process. Explain what chemical knowledge was needed and how knowledge of the physical properties of the element enabled people to extract the ore. Describe how people knew how to do this extraction. Find out about any indigenous knowledge regarding the extraction of metals, and folklore regarding the wearing and making of certain jewellery.

(Learners need their textbooks for this activity.)

2. What did they use gold for? And iron?

- Jewellery during ceremonies;
- As an indication of wealth; and
- Diversity of uses of metals in various cultures.

Subject: Physical Sciences **Grade: 11**

Activity 8

Sustainability of our resources

1. How can we recycle metals?

2. Do you think recycling of metals will prevent pollution? Will it help in saving energy and sustaining our environment?

3. Give some ideas of how we can recycle iron, magnesium, etc. (Tip: What are these metals used for nowadays?)

4. Are there other, more suitable, materials that have the same properties, but are cheaper, more suitable and do not cause as much pollution?

5. How long will our metal resources last? Do we need to use them sparingly?

Background Knowledge

Subject: Physical Sciences **Grades: 10-12**

Teacher's Notes

The next lesson is a link between all the grades in the FET phase. Previous knowledge of physical properties of matter is needed.

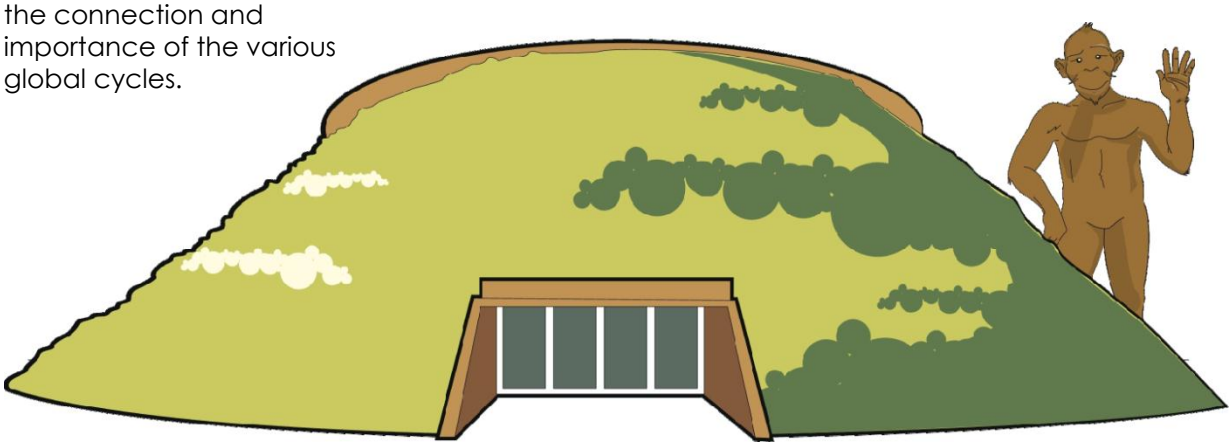
Chemical Systems

Prior to visiting Maropeng:

Before you visit Maropeng, make sure you understand the connection and importance of the various global cycles.

At Maropeng:

- Do you think our ancestors used energy?



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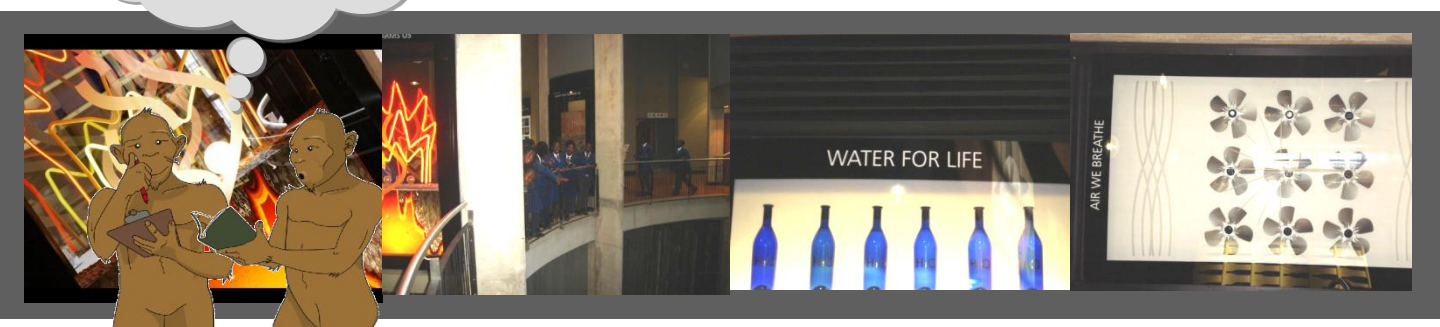
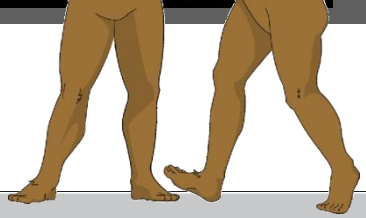




Background Knowledge

Subject: Physical Sciences **Grade: 10**

Solar Power

Solar power is renewable. It is clean and it has no emissions. It also has high capital costs and the electricity it produces is relatively expensive. We are able to extract energy from the sun's rays using photovoltaic cells, thermal turbines or solar water heating.

South Africa has one of the highest levels of sunshine in the world. Eskom plans to build a 100 MW solar thermal plant in the Northern Cape. The University of Stellenbosch has plans for a solar tower consisting of a large chimney with a massive greenhouse at the bottom. When the greenhouse heats the air inside it, the hot air rises through the tower, spinning the turbines as it rises.

Advantages

- The sun is free and will always be available.
- No pollution.
- No waste.

Disadvantages

- Not always sunny.
- The technology would be expensive.

Ocean Power

This energy can potentially be derived from the various characteristics of the sea. The rise and fall of the waves can be converted into hydraulic pressure by mechanical compression devices and this pressure can then drive a turbine generator to produce electricity.

The main reason why this energy is not harnessed at the moment is the fact that no reliable technology exists that can generate electricity from this source.

Advantages

- This energy source is free.
- No waste.
- No pollution.
- Wave generators, once built, are inexpensive to maintain (but they must be strong enough to withstand strong waves).

Hydroelectricity

This involves using the power of falling water to turn turbines. A dam has to be built to trap the water, usually where there is already a lake. The water flows through tunnels in the dam, driving the turbines in the process.

Advantages

- No pollution.
- Once built, it provides cheap energy.

Disadvantages

- Too much pressure on water as a resource that is not only used for electricity.
- SA is fairly dry and cannot get enough water from neighbouring countries as it is expensive.

The Origin of Fossil Fuels

Fossil fuels are so called because they have formed from the remains of dead plants and animals that have been buried for millions of years.

The bodies of plants and animals are mainly made of compounds that consist of carbon, nitrogen and oxygen (an **organic compound**).

Hundreds of millions of years ago, when the Earth was in the process of cooling down, there were many more earthquakes, volcanoes and floods than there are now. This means that when some plants and animals died, instead of rotting away completely as they reacted with oxygen, they were covered with mud or lava from volcanoes and were sealed off from reacting with air in the usual way.

Over millions of years, because of the action of bacteria, and the pressure and heat of the earth on top of them, these dead creatures turned into coal (which formed from land plants and animals) or oil and gas (which formed from sea plants and animals).

FET: Learner Activity and/or Assessment Task

Subject: Physical Sciences **Grade: 11**

Activity 1

1. Discuss how scientists and researchers are using new technologies to try to solve energy and environmental challenges.

2. Point out the positive and negative aspects of these different types of alternative energy resources.

Activity 2

1. Use the Oil display poster in the exhibition to answer the following questions:

This poster shows the following values:

CO_2 emissions (g/km)

Bus	1,200
Minibus	300
Large car	350 (4 litres)
Medium car	190 (2 litres)
Small car	150 (1 litre)
Cycling	3
Walking	3

Draw a bar graph of the above values.

2. Percentage sources of energy supply worldwide

	1973	1999
Oil	45.0	35.0
Coal	24.9	23.5
Natural gas	16.2	20.7
Renewable waste	11.1	11.1
Hydro-electric	1.8	2.3
Nuclear	0.9	6.8
Other	0.1	0.5

a. Draw a graph of the energy supplies in 1973 vs 1999.

b. How much energy does SA use? Find the answer in the exhibition.

Activity 3

Follow-up task for school discussions.

1. Deforestation

Think about the areas of the world that are being deforested.

a. How much land is deforested?

b. Which areas are most severely affected by deforestation?

2. Fossil fuels

a. Where do fossil fuels come from?

b. Why do they release carbon dioxide when they are burnt?

c. Are they "renewable"?

3. Reducing carbon dioxide emissions

a. How can energy be used more efficiently?

b. What is "sustainable forestry" and why is it important?

Teachers may award their own mark allocation to the various tasks or use the exemplar rubrics, where applicable, as developed by the DoE and supplied to the teachers in the SBA guideline document.

Background Knowledge

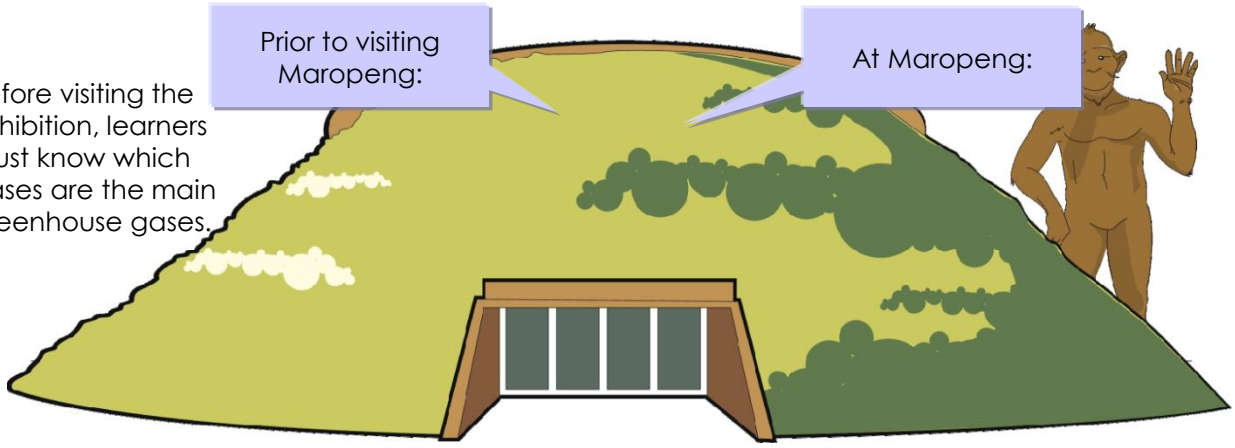
Subject: Physical Sciences **Grade: 11**

Teacher's Notes

Learners should visit Maropeng to learn more about global warming. The human species is a creative species. Our creativity is the ultimate expression of our humanity. This creativity made us a superior species. We developed technologically, but paid a price for this. The more advanced we became, the more we invaded the earth, pushed other species back and polluted our environment. We created so many pollutant gases that we endanger our existence and that of other species due to global warming. History shows us the effect of humans in the past, the effect of increased human population on the present and the future predicament of global warming due to human interference in all walks of life.

Global Warming

Before visiting the exhibition, learners must know which gases are the main greenhouse gases.



- What is global warming?
- Can we do something about global warming?
- Do you think our ancestors contributed to global warming?
- What causes global warming?

Background Knowledge

Subject: Physical Sciences **Grade: 11**

Global Warming

Before visiting the exhibition, learners must know which gases are the main greenhouse gases.

Name them and discuss how each gas contributes to global warming.

In cold countries, people use greenhouses made of glass to keep plants warm.

In small groups discuss what you think the greenhouse effect is.

A greenhouse works as follows:

Sunlight passes through the glass and warms up the plants and other objects inside the greenhouse. In turn, these objects radiate infrared radiation. Infrared rays have a lower frequency than visible light and glass does not transmit it well. So a significant amount of energy stays inside the greenhouse. This makes the temperature inside higher than it would have been otherwise. The same effect can happen through the windscreen of a car.

Activity

Place a thermometer on the dashboard inside a car placed in the sun. Make sure you are able to take readings from the outside, without opening the doors.

Take a reading before you place the thermometer on the dashboard and then every half hour. Note the readings in a table. Draw a graph of the readings. What is the maximum temperature noted? How long did it take the car to heat up to this temperature?

Repeat the same experiment, on the same day and the same time period, but take temperature readings inside a car parked in the shade. This is the control. Write a report on your observations.

The Earth's atmosphere is like a greenhouse. It acts like a blanket and traps the heat. Some of the gases in the atmosphere absorb the heat or infrared radiation and reduce the amount of energy that radiates back into space.

History of the Ice Age

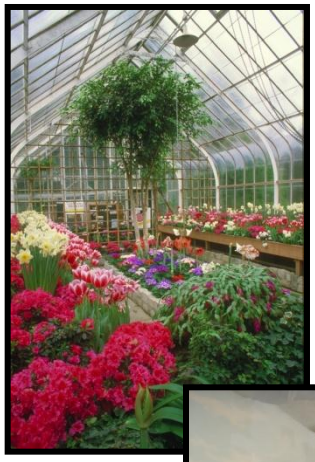
Ice ages result when there are long periods of very cold temperatures, causing expansion of the continental ice sheets, polar ice sheets and mountain glaciers.

Causes of Ice Ages

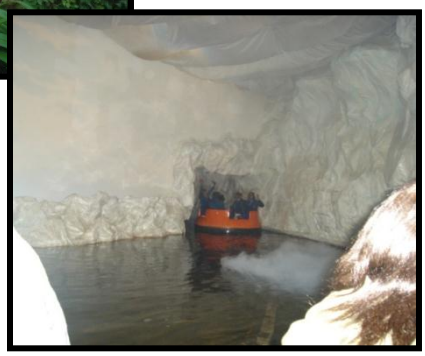
- Atmospheric composition (the concentrations of carbon dioxide and methane);
- Changes in the Earth's orbit around the sun;
- The motion of tectonic plates resulting in changes in the relative location and amount of continental and ocean crust on the Earth's surface;
- Variations in solar output;
- The impact of relatively large meteorites; and
- Eruption of volcanoes.

Do you think greenhouse gas levels may have been affected by some factors which caused the Ice Age? Find out in the exhibition.

(Tip: think of the position of continents and volcanism.)



Greenhouse



Boat ride – ice section

Background Knowledge

Subject: Physical Sciences **Grade: 11**

What is global warming?

Global warming is the gradual increase, that has been noted over a period of years, of average temperatures around the world.

There are many variables that affect the surface temperature of the Earth and this has made it extremely difficult to find out why the changes associated with global warming take place.

Go around the exhibition and find which variables are the cause of global warming.

About 25 percent of the warming happens because of natural changes. However, since the start of the industrial revolution, concentrations of greenhouse gases have increased – mainly as a result of burning fossil fuels.

What contribution do you think the Ice Age people had on global warming? Find some ideas in the exhibition.

Do you think we are still living in the Ice Age? Why or why not?

At what stage did the effect of the greenhouse gases become a major role player in the global warming problem of the earth?

(Think about the meteorite impact that caused huge fires and caused the extinction of the dinosaurs, as well as eruption of volcanoes and the fires that released huge amounts of greenhouse gases.)

What has energy got to do with global warming? Explain.

Do you think population growth can affect the rate of greenhouse gases?

Sustained global warming could have many adverse effects on the climatic systems of the Earth, resulting in severe changes to the Earth's surface. Scientists have estimated that a rise in the global mean temperature of between 1.4°C and 5.8°C may be experienced in 2100.

In your groups discuss these adverse effects and report back on paper.

Although the international agreement signed in 2009 in Sweden encourages governments to watch their carbon dioxide emissions, it is important to heighten people's awareness of what the individual can do to help reduce global carbon dioxide concentrations. For example:

Promote energy efficiency in the home by using less electricity.

Insulate your home.

Walk, cycle or use public transport instead of taking the ca

Lag your hot water tank and pipes.

Plant a tree.

Reduce the temperature on your geyser's thermostat by 10 degrees Celsius.

Only boil as much water in the kettle as you need.

Do all the ironing in one go.

Wash full loads in the washing machine and dry clothes outside where possible.

FET: Learner Activity and/or Assessment Task

Subject: Physical Sciences **Grade: 11**

Teacher: Help learners find at least three contributing factors that the **Ice Age** human had on global warming, e.g. fire for cooking food, warming their shelter, during the hunt fire was used to chase animals down into a gorge, etc.

Teacher: Population counter/statistics according to the UN at time of writing:

6 610 231983

This value increases every second.

Activity 1

1. Think of, and describe, other ways in which the individual may help reduce the emission of greenhouse gases into the atmosphere.

2. List good and bad points about living in a warmer world.

3. If Earth did not have a greenhouse effect, describe what life would be like on the surface. Which planet would the Earth most be like – Venus, Jupiter or Mars?

4. How do cars, buses and trains add to the greenhouse effect?

5. Explain what energy has got to do with global warming.

6. How important are CFCs to the greenhouse effect? Explain.

7. Can forests help slow down global warming?

8. How does agriculture affect the greenhouse effect?

Teachers may award their own mark allocation to the various tasks or use the exemplar rubrics, where applicable, as developed by the DoE and supplied to the teachers in the SBA guideline document.

Memorandum

Subject: Physical Sciences **Grade: 11**

Activity 1

1. **Sample solution**: Recycling, reduce car use, energy efficiency, buying organic products.

2. **Sample solution**:

Good: UK would be sunnier and warmer, a warmer world would need less energy for heating buildings, colder countries would be able to grow a larger range of crops, solar energy would be more prevalent.

Bad: Dry regions would become even drier, sea levels would rise and flood low-lying areas, erratic weather conditions would increase, droughts would increase, heat-related diseases like malaria would become more prevalent, there would be more cases of sunburn and heat stroke.

3. **Sample solution**: Earth would have an average global temperature of -18 degrees Celsius, which would mean the surface would be covered with ice and the majority of the seas would be frozen. (Any description of an ice age era here would be relevant.) Earth would most resemble Mars.

4. **Solution**: The burning of fossil fuels, either through petrol or diesel, adds to the greenhouse effect. Electric trains do not emit greenhouse gases but run on electricity that may have been produced at a coal, gas or oil-powered power station.

5. Almost half of the enhanced greenhouse effect is due to our use of energy. That is because our main source of energy is from the burning of fossil fuels like oil, coal and natural gas.

The burning of any fossil fuel, or wood, produces energy and carbon dioxide, so increasing global warming.

6. CFCs are thousands of times more effective than carbon dioxide at stopping the heat escaping from our atmosphere.

Nearly a quarter of the enhanced greenhouse effect in the 1980s was from use of the family of compounds, called halocarbons, to which CFCs belong. They are used in fridges, freezers, aerosol cans and fire extinguishers.

7. Carbon is stored in the tree as it grows, so young forests can remove a large quantity of carbon and store it for many years.

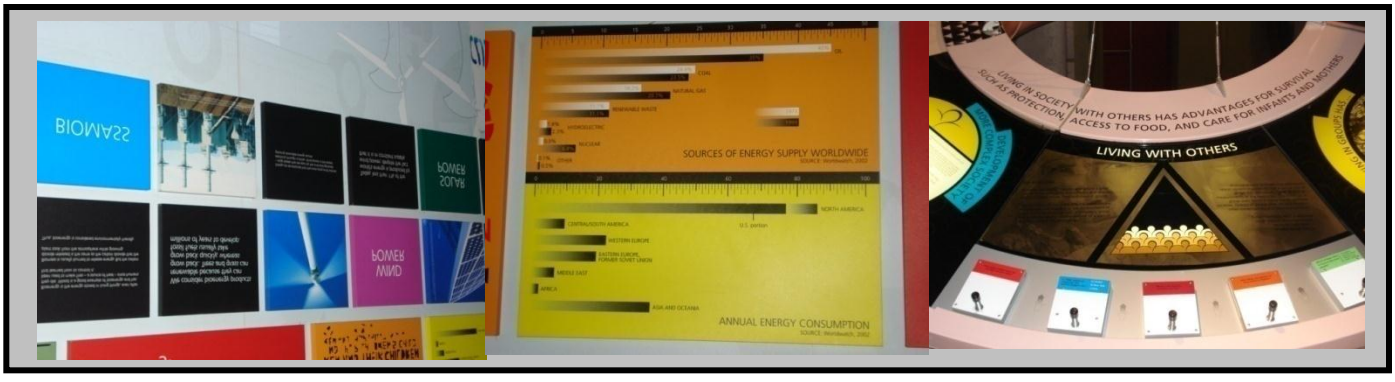
When trees are cut down, two things can happen:

1. The forest cannot absorb as much carbon dioxide from the atmosphere.

2. A lot of the wood (such as roots, twigs and small branches) are often burnt, releasing the stored carbon as carbon dioxide.

8. Cattle and other livestock, and rice-growing, are responsible for the production of a large amount of methane which is an effective greenhouse gas. A reduction in the amount of intensive or "factory" farming would lessen the increase in methane.

Also, farmers use a great quantity of artificial fertilizers which produce a gas called nitrous oxide, another greenhouse gas.



Way Forward

Subject: Physical Sciences **Grade: 11**

The Way Forward – How Can we Slow Down Global Warming?

Governments of the world are very concerned with the threat of global warming, and most are working together to try to slow or halt this threat.

Some steps that can be taken are:

- Limit carbon dioxide emissions by reducing the use of fossil fuels for industry and electricity.
- Alternative sources of energy must be found and harnessed, e.g. water, wind and nuclear power must be utilised.
- Recycling of paper could lead to fewer trees being cut down.
- Educate the population about global warming. Encourage people to recycle and to use transport in an efficient manner.
- Rehabilitation of building sites. Many building sites require large tracts of land to be cleared. Developers should be forced to rehabilitate the area after construction is completed.
- Housing projects should include mandatory planting of trees.

Sustained global warming could have many adverse effects on the climatic systems of the Earth, resulting in severe changes to the Earth's surface.

Scientists have estimated that a rise in global mean temperature of between 1.4°C and 5.8°C may be experienced in 2100.

Background Knowledge

Subject: Physical Sciences **Grades: 11-12**

Teacher's Notes

Learners should visit Maropeng to learn more about plastics and pollution. We have created molecules in the laboratory that cannot in any natural way be destroyed. Do visit the exhibition on the sustainable Earth and verify our present position here on Earth and the Earth prior to our pollutant behaviour. Think about our future here on Earth and decide how we can rewrite the history books for future generations.

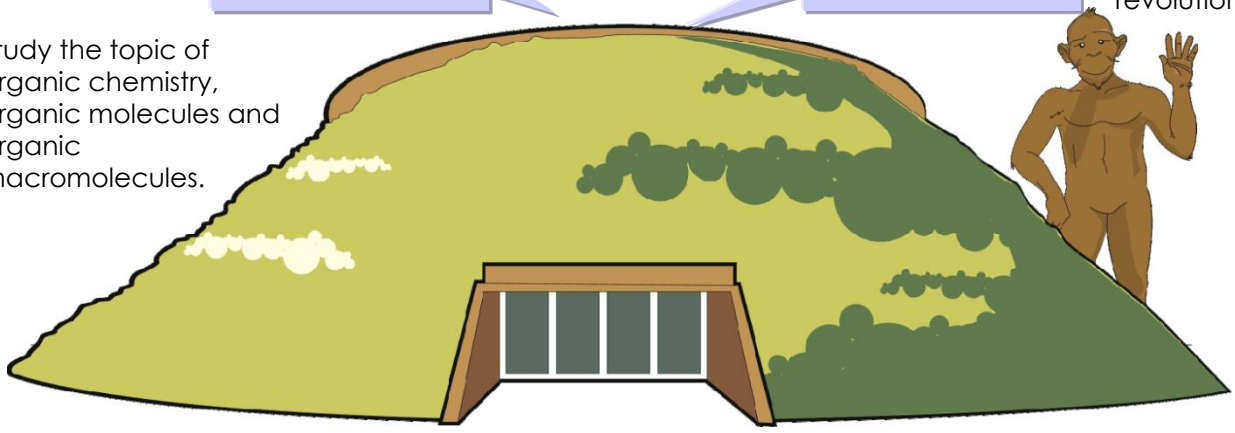
Plastics and Pollution – Do we Create an Unsustainable Earth?

Prior to visiting Maropeng:

Study the topic of organic chemistry, organic molecules and organic macromolecules.

At Maropeng:

• Are we all part of the "plastic revolution". Why?



We will show you the learner assessment activities.

Plastic recycling symbols

Plastic

Background Knowledge

Subject: Physical Sciences **Grade: 11**

Plastics

Our lives have been involved with plastics since a few decades ago. There is hardly an item in the shops that does not contain some plastic. Just think of clothes, bottles, shoes, carpets, blankets, upholstery, etc. Very few items are made of natural substances, such as cotton, leather and linen, nowadays.

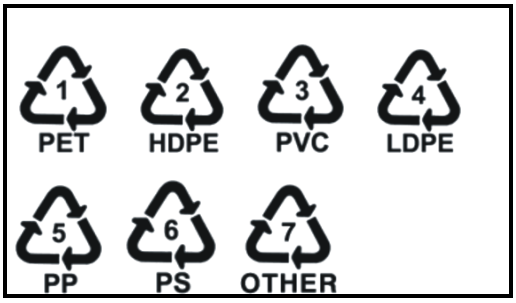
Did you know your T-shirt is made from PET?

Activity

Read the label of the T-shirt, pants, dress or shirt you are wearing. Most of them will indicate it is a polycotton-polyester mixture or cotton and rayon.

What is PET?

PET stands for polyethylene terephthalate, a plastic resin and a form of polyester.



Plastic recycling symbols

Fleece jackets made from PET

Source: www.sateacher.co.za

Walk through the display and identify all items made of plastic or containing a certain percentage of plastic.

You'll find the answers in the Global Appetite display. We see the containers depicted here contain milk and juices, and we see polystyrene used by the fast food industry.

In the display aluminium cans are mentioned. Which would be better to use for a container – plastic or aluminium?

In the display it is mentioned that recycling aluminium will save enough electricity to run a laptop computer for four hours. Do you think recycling plastics will save an equivalent amount of resources?

Every person can make a difference by changing patterns of behaviour – reducing her/his ecological footprint.

By "ecological footprint", we mean the quantity of resources each human being requires to continue living the way we do, and the long-term impact this has on the Earth.

Our ecological footprint is 20 percent bigger than the world can sustain. This means we take more than the Earth can replenish in a given year. We are running an ecological debt and soon the Earth's "natural capital" will run out. We cannot sustain this trend.

How can we reduce our ecological footprint? Do you think it would be better to use human-made substances, which can be replenished, rather than natural resources? Discuss this issue, keeping sustainability, pollution and the manufacturing process in mind.

What impact do humans have on the environment?.

We are impacting on the world by using plastics.

How do we control the environment?

Activity

Subject: Physical Sciences **Grade: 12**

Mind Mapping

Place the following key words together to create ideas to develop a mind map (you may add more words or key phrases):

Plastics

Waste management

Uses of plastic

Manufacturing

Influence of plastic waste

Pollution

Recyclable

Resources

Renewability

Different types of plastics

Disposal methods

Melting

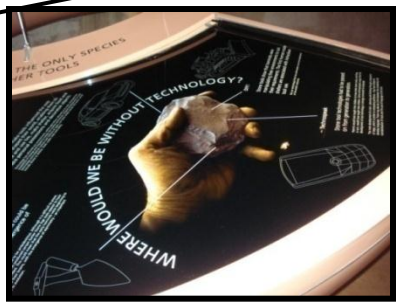
Molecular structure

Cost involved in cleaning environment

Cost involved in manufacturing

Raw materials

Science and technology have contributed to the development of synthetic products. The manufacturing of synthetic products is known as production and is invented by people. Waste that needs to be disposed of and uses energy is produced at every stage. The production process is often detrimental to the natural environment and is **not** a sustainable "cycle".



From the time that people began to realise that energy (from any source) enabled them to produce or manufacture a variety of "new" products that did not occur naturally on Earth, new processes were invented. These processes are often learnt or adapted from nature.

The production process happened through developing indigenous knowledge and/or advances in science and technology.

A production or manufacturing process is not a cycle because waste is produced throughout the process. The environmental "cost" of this waste, including the end product, has not yet fully been taken into account during the production process. This needs to be embedded into the decision-making at all levels of society.

Where do plastics come from?

The making of plastics involve the following steps:

- Coal mining;
- Making polymer gas;
- Producing plastic powdery pellets;
- Heating and moulding; and
- Product formation (e.g. bottles).

Most plastics are derived from the petrochemical industry, which in turn originates from oil, coal and natural gas. In South Africa gas comes from coal. Sasol makes ethyne (ethylene) and propyne (propylene) from the refining of coal at the manufacturing plant in Sasolburg.

Some polymers are produced from the monomers ethyne and propyne to form polypropylene and polyethylene, a powdery substance. In the granulation plant additives and fillers are added to the powder and the compound is changed into granules. The granules are treated at different temperatures to produce different types of plastics.

Background Knowledge

Subject: Physical Sciences **Grade: 12**

Although the popular use of the term polymer suggests "plastic", it actually refers to a large class of **natural** and **synthetic** materials with a variety of properties and purposes.

Natural polymer materials such as shellac and amber have been in use for centuries.

In the insect display you'll find may insects are preserved in amber. What is "amber"?

Biopolymers such as proteins (for example hair, skin and part of the bone structure) and nucleic acids play crucial roles in biological processes. A variety of other natural polymers exist, such as cellulose, which is the main constituent of wood and paper.

Typical **synthetic polymers** are bakelite, neoprene, nylon, PVC (polyvinyl chloride), polystyrene, polyacrylonitrile and PVB (polyvinyl butyral).

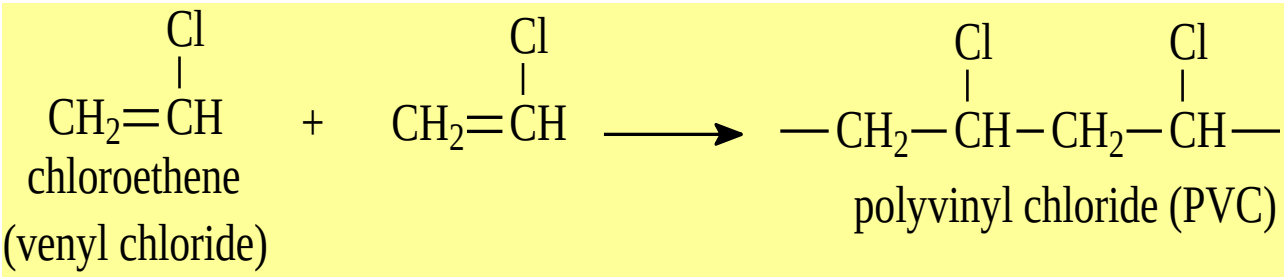
Classification of Polymers

The classification is mainly based on the ability of the polymer to be re-used.

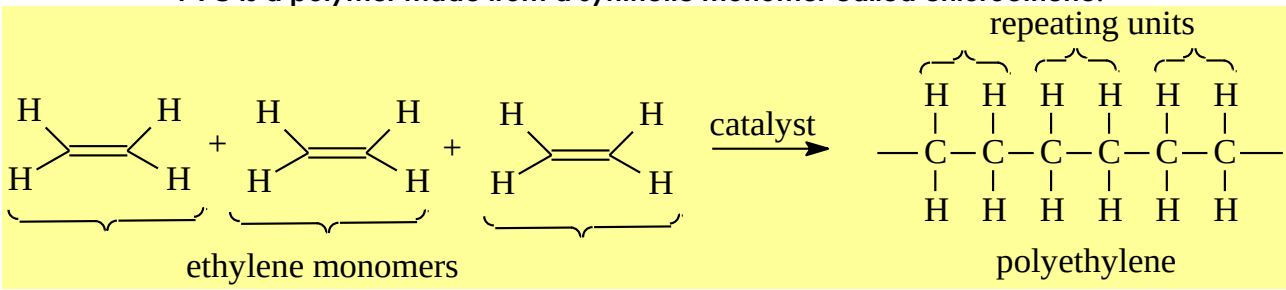
Most polymers are classified as **thermoplastic**. This reflects the fact that they may be shaped or pressed into molds, spun or cast from melts, or dissolved in suitable solvents for later fashioning.

Another group of polymers is characterised by a high degree of cross-linking. They resist deformation and solution once their final morphology is achieved. Such polymers are usually prepared in molds that yield the desired object. Because these polymers, once formed, cannot be reshaped by heating, they are called **thermosets**.

Identify which plastics you use every day are thermosets and which are thermoplastic.



PVC is a polymer made from a synthetic monomer called chloroethene.



Polyethylene is the plastic used in plastic bags.

A polymer is a macromolecule in which all of the molecules have a small characteristic structural feature that repeats itself again and again.

Activity

Subject: Physical Sciences **Grade: 12**

Making Slime

What do you need:

- White craft glue
- 2 disposable cups
- Food colouring (you pick the colour)
- Water
- Borax (find it in a pharmacy or in the baking section of a supermarket)
- Small plate, dish or plastic wrap
- Plastic spoon (for stirring)
- Tablespoon (for measuring)

What to do:

- Mix about a teaspoon of the Borax into a cup of water and stir (it usually doesn't fully dissolve).
- Fill the other plastic cup with about 1 cm of glue.
- Add 20 ml of water to the glue and stir.
- Add a few drops of food colouring and stir again.
- Add two tablespoons of the Borax solution and stir well.
- Lift out the spoon with the goo and place it on the dish.
- Let it sit for about 30 seconds and then pull it off the stick and play with it!

This **polymer** is unique because it has qualities of both a solid and a liquid. It can take the shape of its containers like a liquid does, yet you can hold it in your hand and pick it up like a solid. As you might know, solid molecules are tight together, liquid molecules spread out and break apart (drops). **Polymer** molecules **chain** themselves together (they can stretch and bend like chains) and that makes them special. Rubber bands, plastic soda bottles, soles of running shoes, even gum, are all forms of polymers. The polymer you made should be kept in a sealed plastic bag when you aren't playing with it. Also, be sure to keep it away from young kids or pets who might think it's food. Have fun!

Answer the following questions:

1. How can you make the polymer stretch the furthest?
2. What amounts of Borax and glue mixture make the polymer stretch the most?
3. What method of storage will make the polymer last the longest?
4. What brand of glue makes the stretchiest slime?

The structure of a polymer has one **structural unit**, or **monomer**, that occurs repeatedly – ethylene (ethene), CH_2CH_2. Polymers therefore do not consist of molecules identical in size, but identical in kind. The reaction that makes a polymer out of a monomer is called **polymerisation**.

Polyvinyl chloride (PVC), used to make such things as plastic pipes and tubing, garden hoses and garbage bags, is made from molecules of **vinyl chloride**.

Polyvinyl chloride has been identified as a carcinogen by the American Occupational Safety and Health Administration and is known to cause liver cancer.

Polymers and Physical Properties

Physical properties of polymers are the ones that are most sought after for practical use.

- **Teflon** (a polyolefin) has slipperiness when in contact with almost anything.
- **Nylon** (a polyamide) isn't eaten by moths and has superior tensile strength and the ability to be made into **fibres** and **fabrics**.
- **Dacron** (a polyester) does not mildew, and when made into fibres, it is superior to **cotton**, with greater strength and lower mass, and it doesn't stretch as much.
- The best fibre-forming polymers have shapes that let the molecules align side by side and be twisted into cables. Because the molecules are large, substantial IMF (forces of attraction) occur between them. Hydrogen bonds are also present in some, like the polyamides.

Activity and information on this page adapted from: http://www.sciencebob.com

FET: Learner Activity and/or Assessment Task

Subject: Physical Sciences **Grade: 12**

Activity 1

1. Is the use of plastics sustainable?

a. In small groups, conduct an investigation on the way science and technology have contributed positively and negatively to the development or production of an item of your choice from your everyday life, e.g. a fast food container, a cell phone, a shoe, or a blanket.

b. Communicate your findings in the form of a poster which can be displayed around the school to illustrate ways in which our purchasing and waste practices impact on sustainable development.

c. How can you start this activity?

d. Formulate a research question. Start with words such as how, what, when, who, which, why or where.

For example:

How sustainable is our ecological footprint in maintaining a sustainable Earth when we all use plastics?

d. Can you think why this issue is important? Where will you find information on this topic? Walk around and identify all items made of plastic on the Sustainability Wall.

Humans have hands which can be used to handle tools. Humans are fire-users, tool-users and talkers. These are all characteristics that make us human. All these abilities we use to enable use to live with other humans. We have managed to disrupt the delicate balance in nature over time; this by manufacturing and using plastics. We pollute our environment. We shape the environment to suit us. We increase rather than decrease environmental risks. The disasters we have managed to create include a variety of diseases, climate change, etc. which we have exacerbated by our actions or lack of them. The delicate dynamic relationship which we are in the process of upsetting can be found in the poster on the chemical changes we cause.

Activity 2

1. What does the poster on chemical change mean when it says: "Vote for cleaner air" and "Save our forests!" ?

2. On the same poster a shoe is visible. Do you think using organic hemp uppers, vegetarian leather and recycled soles will help save our environment? Why or why not?

3. Why is it so important to recycle or re-use plastics?

4. Find out how plastic bags are made. Write a short essay on this. Include pictures to make your essay more interesting.

Use the following key points in your research:

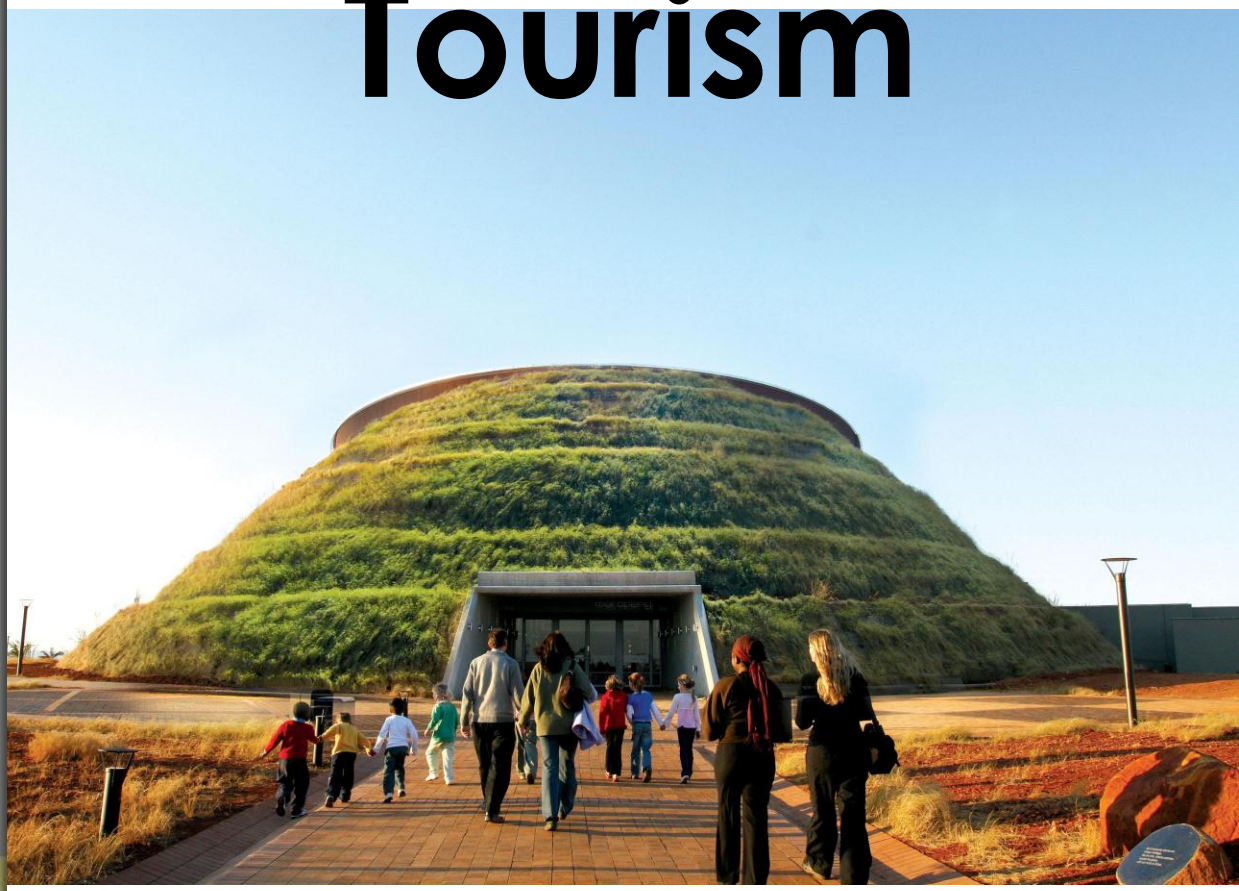
- What are the monomers/polymers used in plastic bags?
- Where do they come from and how are the primary products transported to the factory?
- How is the bag made?
- What waste is generated by the manufacturing process?
- How do we dispose of plastic bags when they become waste?
- What are the positive and negative aspects of the production process (e.g energy consumption, etc.)?
- What attracts people to the plastic bag?
- What other options do you have if you do not want to use a plastic bag?

5. What can we do to save our planet from the plastic waste around us? Give some ideas on how plastic can be collected and what can be done with it.

Teachers may award their own mark allocation to the various tasks or use the exemplar rubrics, where applicable, as developed by the DoE and supplied to the teachers in the SBA guideline document.

Who am I?

Tourism



Developed by:

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Subject: Tourism

Topic: Sustainable and Responsible Tourism

Grade 10 (CAPS)

Topic:

Sustainable and responsible tourism

Culture and heritage tourism

Content:

Sustainable and responsible tourism

- Sustainable tourism concepts: sustainable practices in tourism businesses
- Three pillars of sustainable tourism (planet, people, profit)
- Responsible tourism concepts and behaviour towards the environment
- Good environmental practices
- Global warming and the tourism industry

Culture and heritage tourism

Culture and heritage

- Concepts, elements and importance of heritage
- Heritage sites

Grade 11 (CAPS)

Topic:

Culture and heritage tourism

Map work and tour planning

Tourism attractions

Content:

Culture and heritage tourism

- South African cultural uniqueness
- South African heritage bodies

Map work and tour planning

Tour itinerary

- Concepts: itinerary, logical tour planning, scheduled tours
- Factors to consider when planning an itinerary
- Different types of itineraries
- Writing an itinerary

Tourism attractions

Main tourist attractions in the SADC countries

Grade 12 (CAPS)

Topic:

Tourism attractions

Content:

Factors contributing to the success of a tourist attraction:

- Excellent marketing of tourism products locally and/or internationally, sustainable and responsible management plans, efficiency and ethical behaviour of staff and management, positive experience of visitors, safety and crime prevention, general appearance and upkeep of the attraction, considering the needs of people with disabilities, universal access
- Characteristics of a successful tourist attraction: actual number of visitors exceeds the target number of visitors, repeat visits; income generated exceeds target figures; positive impact on local community and environment

Background Knowledge

Learning Area: Tourism **Grades: 10-12**

Teacher's Notes

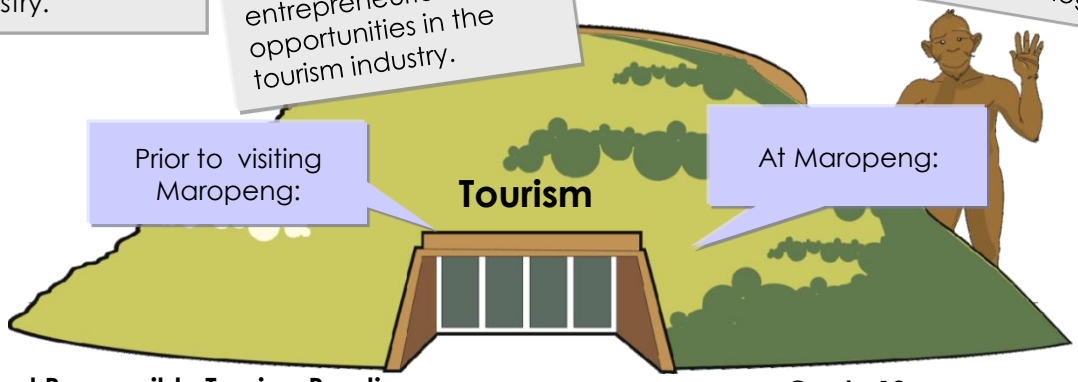
Teachers and learners will never forget their visit to the Cradle of Humankind and its two visitor centres – the main one packed with exciting, interactive exhibits at Maropeng, and a smaller one which is the gateway to the fascinating Sterkfontein Caves and their secrets about our past. Maropeng and the Sterkontein Caves allow the Grade 10 to 12 Tourism learners to cement content knowledge learned in class. Maropeng links to much of the content required in Tourism. For example …

Sectors, sub-sectors and the services and products offered by these sectors; the interdependence between sectors and sub-sectors and the impact on service delivery; the impact of service excellence on economic growth and careers in the tourism industry.

Importance and benefits of sustainable and responsible tourism and the importance of World Heritage Sites; the impact of infra-structure to support tourism; explore entrepreneurial opportunities in the tourism industry.

Evaluation of geographic information; reasons why people choose destinations and how visits contribute to economic growth and job creation.

Effective communication to demonstrate professional conduct; delivering service excellence and functioning as a member of a team; understand and apply technology.



Grade 10

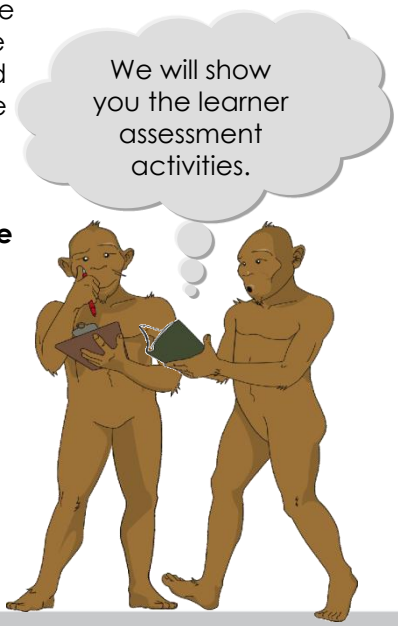
Sustainable and Responsible Tourism Practice and World Heritage Sites

Learners should be familiar with the concepts and content of sustainable and responsible tourism. It is therefore important that all the content and terminology must be covered before the site visit is undertaken, to ensure optimum learning takes place.

Grade 11

Evaluate Available Infrastructure and Make Recommendations for Improvement, and Design a Meander Map

Prior to the visit the learners should have covered the content on the impact of infrastructure to support tourism and plot physical features and their locations to design a meander map.



Grade 12

Careers in the Tourism Industry

It is important that all the content and terminology should be covered before learners can complete these activities. Besides the content knowledge, the lesson will focus on pre- , during- and post-visit activities.

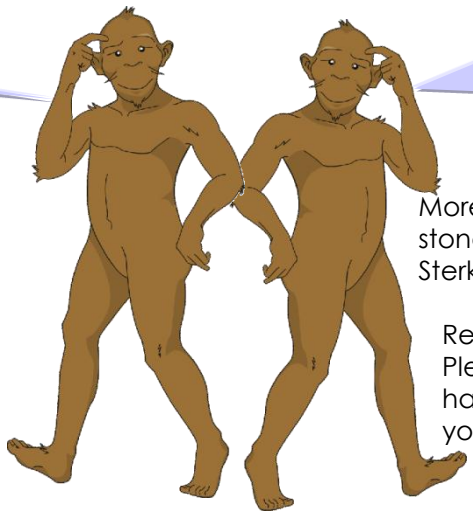
Developing a Basic Marketing Plan

Learners must have mastered the content before attempting this lesson. The lesson covers pre-, during- and post-visit activities.

Background Knowledge

Learning Area: Tourism **Grades: 10-12**

Did you know … ?



Why visit Maropeng and the Sterkfontein caves?

The Cradle of Human kind World Heritage site opened to visitors in 2005.

"Maropeng" is a Setswana word meaning "returning to the place of origin".

More than 500 hominid fossils and 9,000 stone tools have been found at Sterkfontein.

Recent research on the skull of "Mrs Ples" suggests that the skull may not have belonged to a female but to a young male.

The path leading from the parking area to the Tumulus building has casts of the footprints of Thabo Mbeki and Kofi Annan laid in it.

"Little Foot" is still lying in situ in Sterkfontein.

The Cradle of Humankind has 40 different fossil sites, but only 13 have been excavated so far.

The fossil of "Mrs Ples" is 2.5-billion years old and "Little Foot" is around 4.17-million years old.

World Heritage Site

Tourist Attraction

FET: Learner Activity and Assessment Task

Learning Area: Tourism **Grade: 10**

Responsible and Sustainable Tourism

Lesson 1

Duration: 3 x 45 minute periods

Resources required
• Resources on concepts involved in responsible and sustainable tourism; and
• Site visit to Maropeng.

Lesson objectives
To evaluate the importance and benefits of responsible and sustainable tourism.

Teacher Activities:

Pre-visit
• Introduction to Maropeng as an eco-tourism venture.
• Revise important concepts indicated on background knowledge.
• Discuss responsible tourism behaviour to display during the site visit.
• Discuss visit and post-visit requirements based on Activity 2 and highlight aspects on which learners need to take notes during the visit.

During the visit
Conduct site visit.

• Present learners with Activity 1, Part 1 to complete during the site visit.
• Arrange an opportunity for a tour guide to address specific aspects identified in Activity 1, Part 1.

Post-visit
• Provide learners with Activity 1, Part 2 to complete.
• Assess the answers of learners.

Learner Activities:

Pre-visit
• Engage in revision activity.
• Note aspects to be covered during and after the visit.

During the visit
• Complete Part 1 of the assessment tool.
• Listen attentively to the guide and take notes on the following: physical environment, buildings, water, waste, energy and accreditation in preparation for Activity 1, Part 2.

Post-visit
Complete Part 2 of Activity 1.

FET: Learner Activity and/or Assessment Task

Learning Area: Tourism **Grade: 10**

Part 1: Responsible and Sustainable Tourism

Activity 1

Part 1

We need to learn lessons from the past in order to preserve and protect the future.

1. Select and listen to any one of the four auditory presentations on extinct animals found in the exhibition and answer questions 1 – 5.

2. Answer questions 6 and 7.

The Dodo

1. Where did the dodo originate? (1)

2. Explain how it got its name. (2)

3. Briefly describe the three biggest threats to the survival of the dodo. (3)

Flightless birds such as the dodo are different from birds which can fly in three main ways: the bones in their wings are smaller, their keels (breastbones) are absent or very small and they have more feathers than flying birds.

4. Identify the bird in South Africa that forms part of the family of flightless birds. (1)

5. Name the province and town where this indigenous bird naturally occurs. (2)

The Quagga

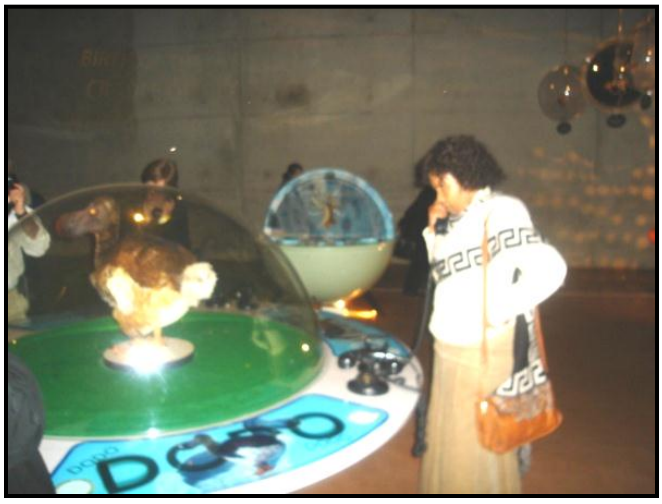
1. Where did the quagga originate? (2)

2. Explain why the quagga became extinct. (3)

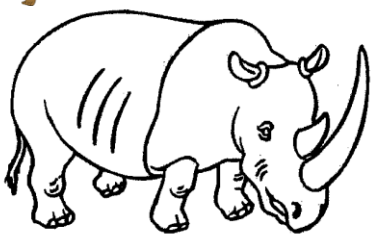
3. In which year did the last quagga die? (1)

4. Explain what the quagga project is attempting to achieve. (2)

5. Name one close surviving relative of the quagga. (1)



The Black Rhino



1. What is the average weight of a black rhino? (1)

2. Name three characteristics of a black rhino. (3)

3. List the biggest threats to black rhinos. (2)

4. Explain why the rhino is a sought-after animal for poachers and hunters alike? (2)

5. In what year did the black rhino become extinct? (1)

The Woolly Mammoth

1. Give a brief description of the woolly mammoth in terms of size and appearance. (2)

2. How did the woolly mammoth evolve to adapt to colder climates? (3)

3. What species was a danger to the woolly mammoth? (1)

4. Why? (1)

5. Apart from your answer to questions 3 and 4, describe the other main reason that the woolly mammoth became extinct. (2)

6. Based on what you've heard in your auditory recording, what can you do to prevent other animals from becoming endangered and extinct in the future? (3)

7. Use all the letters that appear in both of the words below and add the letters "**a**" and "**e** "to form a new word that describes both original words. You may only use a letter once. (1)

SUSTAINABILITY

RESPONSIBILITY

Part 2

1. Can the Maropeng site be regarded as a responsible and sustainable eco-tourism venture? Motivate your answer based on the management of:

- Physical environment; (5)
- Buildings; (7)
- Water; (5)
- Waste ; (3)
- Energy; and (4)
- Accreditation. (2)

2. Maropeng receives many visitors on a daily basis. Set up a 10-point guideline that visitors can follow to ensure responsible behaviour. (10)

Background Knowledge

Learning Area: Tourism **Grade: 10**

Responsible and Sustainable Tourism

Tourism and the environment are co-dependant. There can only be tourism if the environment is conserved and suitable. In return the environment must be used responsibly for the purpose of tourism. In that way everyone co-operates and benefits, the resources are managed responsibly and future generations will enjoy the environment.

Environment

Refers to the natural area: all elements within, all influences and all situations that shape the life and the habitat of organisms and collective populations.

Eco-tourism

Eco-tourism is travel to natural areas where no harm is done to the environment. The local community and the tourists are involved and benefit from tourism, conservation and cultural appreciation.

Sustainable and responsible tourism

The environment is used purposefully for the needs of the current generation, in such a way that future generations will also benefit from conservation.

Why do you think Maropeng is a tourist attraction?

The Cradle of Humankind World Heritage Site

The universe was formed about 14-billion years ago. The Earth is about 4.6-billion years old.

Life first emerged about 3.8-billion years ago. Our journey begins in South Africa, where fossils of some of the earliest known life forms on Earth have been found.

South Africa has yielded fossils of some of the earliest known dinosaurs, at least 200-million years old.

Fossils of our distant mammal-like ancestors, which lived more than 200-million years ago, have been found in South Africa.

Africa is the birthplace of humankind. This is where our collective umbilical cord lies buried.

Hominids – the ancestors of modern humans – first emerged about 7-million years ago, in Africa.

Many significant fossil finds have been made in the Cradle of Humankind World Heritage Site, including the famous fossils "Mrs Ples" and "Little Foot".

The first stone tools were made and used in Africa, at least 2.6-million years ago.

Our ancestors were able to use and control fire at least 1-million years ago in the Cradle of Humankind.

Homo sapiens, the species to which we all belong, evolved in Africa approximately 200,000 years ago.

Africa ignited humankind's imagination. Some of the oldest rock art in the world has been discovered in Southern Africa.

All of humanity shares an African heritage. We are one, diverse species across the globe, with our roots in Africa.

FET: Learner Activity and Assessment Task

Learning Area: Tourism **Grade: 10**

Responsible and Sustainable Tourism

Lesson 2

Duration: 3 x 45 minute periods

Resources required
• Resources/notes on fossils at the site of Maropeng and Cradle of Humankind and World Heritages Sites in South Africa; and
• Site visit to Maropeng.

Lesson objectives
Demonstrate an understanding of the concepts "heritage" and "World Heritage Site" and discuss criteria for the declaration of a World Heritage Site.

Teacher Activities:

Pre-visit
• Introduction to Sterkfontein as a World Heritage Site.
• Indicate the important fossils found at the Cradle of Humankind.
• Discuss visit and post-visit requirements based on Activity 2, and highlight aspects on which learners need to take notes during the visit.

During the visit
• Conduct site visit.
• Present learners with Activity 2, Part 1 to complete during the site visit.

Post-visit
• Provide learners with Activity 2, Part 2 to complete.
• Assess the answers of learners.

Learner Activities:

Pre-visit
• Study resources linked to the Sterkfontein World Heritage Sites and hominid fossils.
• Note aspects to be covered during and after the visit.

During the visit
• Complete the Activity 2, Part 1.
• Take notes on the following: hominid fossils, cultures, human-made and natural sites, World Heritages Sites, criteria for declaration of the site and the impact of mass tourism to Sterkfontein World Heritage Site.

Post-visit
Complete Part 2 of Activity 2.

FET: Learner Activity and/or Assessment Task

Learning Area: Tourism **Grade: 10**

Activity 2: Sterkfontein World Heritage Site

Heritage

Heritage is our legacy from the past. We live in the present and then we pass it on to our future generations to learn from. Heritage includes anything that has been inherited, like culture and nature.

Heritage Site

A place or thing that is of value to a community. It should be looked after so that it does not lose its value. It should be conserved in order not to lose its heritage status.

World Heritage Site

The World Heritage Committee of the United Nations Educational, Scientific and Cultural Organisation (Unesco) has recognised the area to be of significance.

Heritage Tourist

A tourist who is better educated than general tourists, is more mature, has a higher average annual income and travels in pairs or in large groups. Their expenditure is higher and they want to gain knowledge.

Heritage

Refers to preserving the past and showcasing the identity of the community. It is a source of education, generating economic development and providing a range of enjoyable experiences.

Part 1

1. Identify the two hominid fossils of Maropeng and the Cradle of Humankind which add global value to these sites. (2)

2. Briefly describe the fossils above. (12)

3. Identify at least five cultures that are evident at the site of Maropeng and the Cradle of Humankind. (5)

4. Distinguish between human-made and natural attractions at the site of Maropeng. Name two examples of each. (4)

5. Complete the table below in chronological order: (8)

Name of South African World Heritage Site	Date declared

Part 2

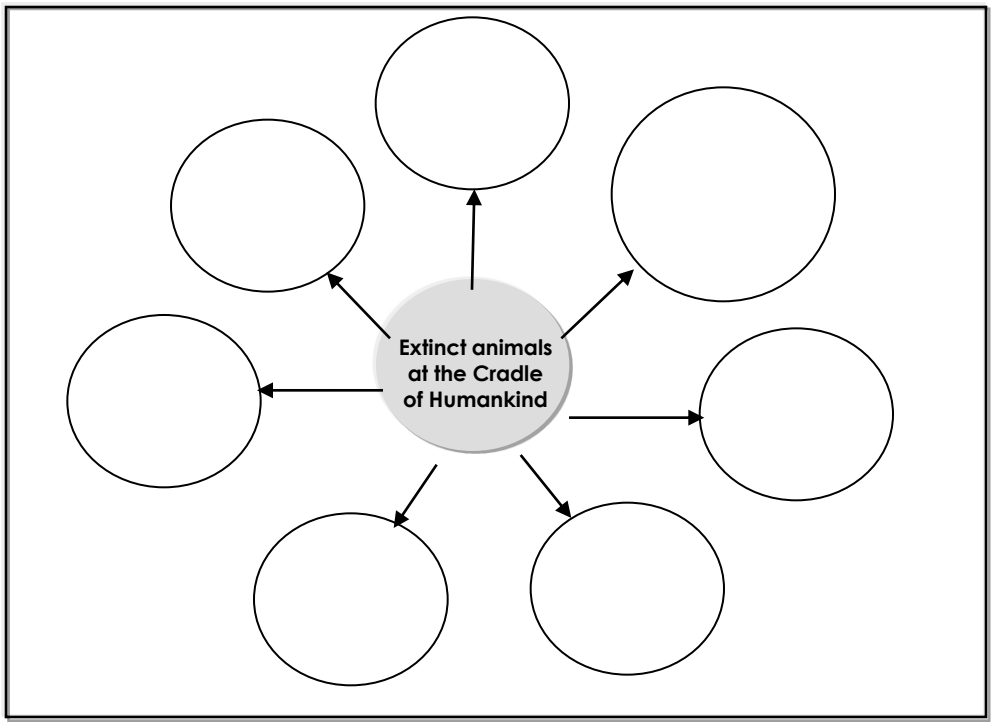
1. Show the locations of all the World Heritage Sites on a provincial map of South Africa. (8)

2. Identify and name the criteria for the declaration of this World Heritage Site. (1)

3. Briefly explain the importance and value of conserving this heritage site for future generations. (10)

4. Explain the potential negative impact of mass tourism to this World Heritage Site. (6)

5. Complete the flow chart below, naming the extinct species found at Maropeng: (6)



Fun class activity

Use the clue provided to solve the conundrum, your word must use all nine letters from the conundrum only once.

Nine-letter word clue: This is the single biggest threat to sustainable and responsible existence.

D	A	K
U	N	M
N	H	I

Background Knowledge

Learning Area: Tourism **Grade: 11**

Culture and heritage tourism

What is infrastructure?

In order to attract tourists to visit a specific area, infrastructure is necessary. Tourists need food, transport, water supply, electricity, sewerage, telecommunications, roads, railway lines, etc.

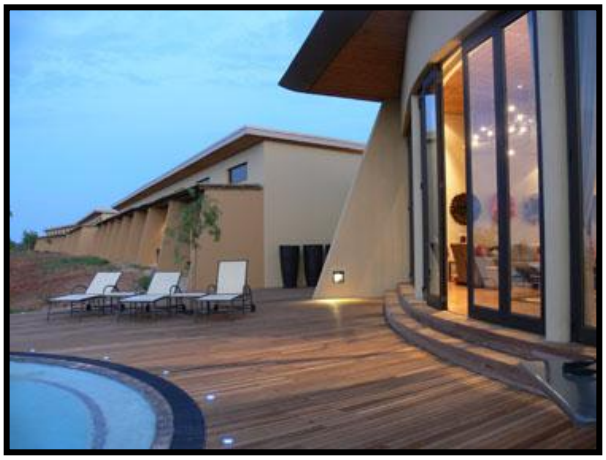
Infrastructure also includes other utilities necessary to serve tourists, e.g. accommodation, restaurants, banks/ATM facilities.

If the infrastructure is good, more money can be spent by tourists. Infrastructure is essential to ensure successful tourism.

Read the brochure on the Maropeng heritage site or visit the site to identify which infrastructure you think could or should be improved.

Sources:

- Kgomotso.Phoofolo@gauteng.gov.za
- theramble@mweb.co.za
- www.theramble.co.za
- www.magaliesbergmap.co.za
- Call 071 051 9661
- The Crocodile Ramble brochure & West Rand Guide Summer 2008 Edition
- Visit to Maropeng



Maropeng hotel

Maropeng Hotel Restaurant

The Cradle of Humankind World Heritage Site, the Destination of the Decade!

The Cradle of Humankind could aptly be dubbed the Destination of the Decade, for in December 2009 this remarkable World Heritage Site turned 10. It is undoubtedly a destination to discover, explore and celebrate. On December 2 1999 the World Heritage Committee granted World Heritage status to these sites and the Cradle of Humankind World Heritage Site was born. The management authority has also been mandated to encourage tourism development through the upgrading of roads and the creation of world class tourism facilities. On September 24 2005 the Deputy President, Phumzile Mlambo-Ngcuka, opened the new Sterkfontein facilities. Maropeng, the product of a public-private partnership, was opened by President Thabo Mbeki on December 7 2005. The interpretation centre complex of Maropeng and Sterkfontein is an excellent place to start your journey of discovery into the past, but there is much more, with over 400 diverse tourism offerings. There is a range of hotels, lodges, guest houses, and bed and breakfast accommodation available to suit every pocket. You can visit restaurants and pubs, a cultural village, private game reserves, craft shops, art galleries and nurseries. The more adventurous can enjoy hot air ballooning, horse riding, river rafting and a host of other thrilling activities.

We have been waiting for you over a million years! What are you waiting for?

FET: Learner Activity and Assessment Task

Learning Area: Tourism **Grade: 11**

Responsible and Sustainable Tourism

Lesson 1
Duration: 3 x 45 minute periods
Resources required
• Brochure on Maropeng Visitor Centre; and
• Site visit to Maropeng Visitor Centre.

Lesson objectives
To evaluate available infrastructure and make recommendations for improvement.

Teacher Activities:

Pre-visit
Informal introductory class discussion on Maropeng and the Sterkfontein Caves, focusing on:
• A brief Introduction – history;
• What to expect/look out for – highlights; and
• Explanation on key aspects to note down for post-visit activity.

During the visit
• Conduct site visit to Maropeng and Sterkfontein Caves.
• Provide opportunity for learners to note the infrastructure and supra-structure available at Maropeng.

Post-visit
• In-depth discussion of Activity 1.
• Give Activity 1 to learners for completion.
• Assessment of Activity 1.

Learner Activities:

Pre-visit
• Participate in class discussion.
• Read the brochures on Maropeng and Sterkfontein Caves.
• Note down key aspects in preparation for assessment activity.

During the visit
Note down all the key aspects in terms of available infrastructure and supra-structure.

Post-visit
Complete Activity 1 using the notes that you compiled during your visit to Maropeng visitors centre.

Activity 1

1. Maropeng is situated on the site of the World Heritage Site. Explain why the Visitor Centre is situated far from the Sterkfontein Caves. (3)

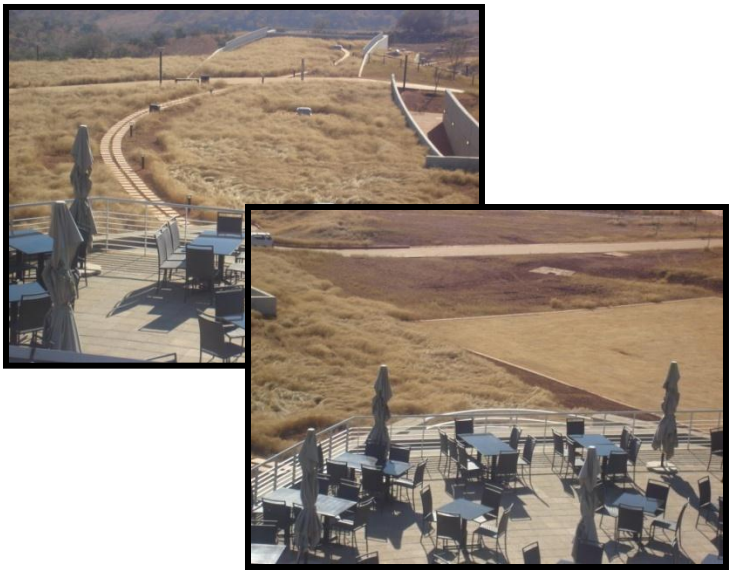
2. Study the infrastructure at the Maropeng Visitor Centre and make a list of all the infrastructure components available to support visitors to the centre. (10)

3. Based on your findings, identify **five** infrastructural gaps and make recommendations to improve each identified gap. (5x2)

4. List the supra-structure components available on the Maropeng site. (4)

5. Can you identify any gaps for improvement? Name **two**. Motivate your choices. (4)

6. Explain how improving these gaps will affect the tourist visiting the centre. (4)



FET: Learner Activity and Assessment Task

Learning Area: Tourism **Grade: 11**

Responsible and Sustainable Tourism

Lesson 2
Duration: 3 x 45 minute periods

Resources required
• Maps of the area where Maropeng and Sterkfontein are situated;
• Site visit to Maropeng Visitor Centre;
• Worksheet;
• A4 brown paper/different colour pens/kokis/paint, etc.; and
• Different examples of tourist maps.

Lesson objectives
To design a tourist map of the area surrounding Maropeng and Sterkfontein Caves.

Teacher Activities:

Pre-visit
• Revision of maps using various types of tourist maps as examples, focusing on important information needed on a map.
• Discussion of worksheet requirements.

During the visit
• Conduct site visit of Maropeng and Sterkfontein Caves.
• Provide opportunity to learners to note various aspects covered in the worksheet.

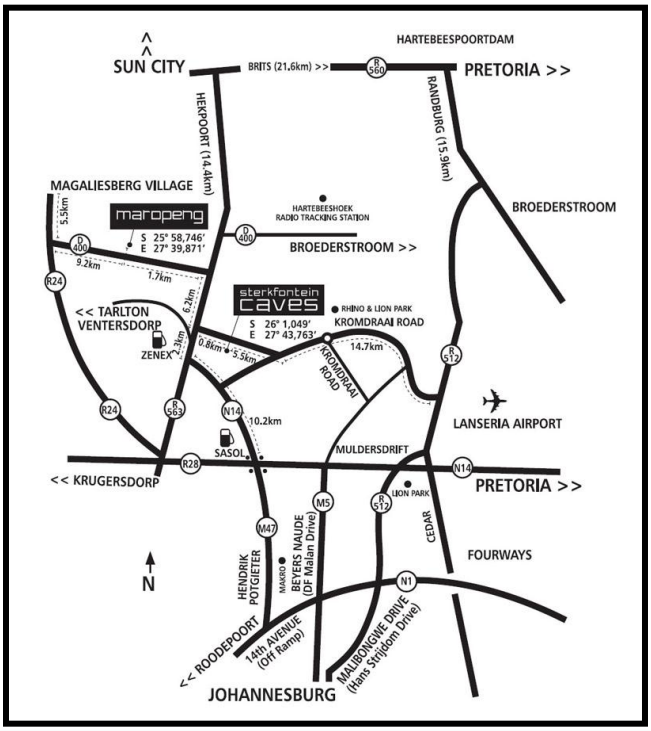
Post-visit
• Provide Activity 2 to learners for completion.
• Assessment of Activity 2.

Learner Activities:

Pre-visit
• Participate in class discussion.
• Note down key aspects in preparation for assessment activity.

During the visit
• Note down all the information according to worksheet instructions.
• Draw a freehand map of the Maropeng area to use during Activity 2.

Post-visit
Complete Activity 2 using the notes and drawings compiled during the visit to Maropeng Visitor Centre.



FET: Learner Activity and Assessment Task

Learning Area: Tourism **Grade: 11**

Activity 2

Design a tourist map

Read the following instructions carefully and make sure that all the necessary items are shown on the meander map. Use your own creativity to make the map visually interesting. Use the notes and drawings that you made to assist you in completing this assignment.

1. While you drive to Maropeng make notes of the following aspects to indicate on your map.

- Three types of accommodation (different) and provide their names;
- Three other activities in the area that the tourist can do while in the vicinity of Maropeng;
- Roads leading to the site from the different directions;
- One complete site map of **either** the Sterkfontein caves site **or** Maropeng Visitor Centre. This site should indicate all the buildings, parking and actual location of the caves, accommodation, etc.;
- Direction arrows: north, west, south, east;
- Surrounding restaurants;
- Surrounding shops/shopping centres;
- Surrounding mountain ranges; and
- Three other activities that the tourist can engage in when visiting the Maropeng and Sterkfontein sites.

2. Design at least four original symbols to indicate items on the map. Include your complete key on the side of the map.

2. Use colour to make your map interesting.

3. Your map will be judged according to the following criteria:

- Creativity;
- Accuracy;
- Originality;
- Map reference/key; compass direction;
- All required accommodation, restaurants, shops/ shopping centres, mountain ranges and activities indicated;
- Detailed site map of Maropeng Visitor Centre or Sterkfontein Caves; and
- General presentation/overview.

Write an itinerary for Maropeng.
What factors would you consider when planning an itinerary.

Background Knowledge

Learning Area: Tourism **Grade: 12**

Career Opportunities in the Tourism Industry

Important Concepts

Working conditions

This refers to a set of rules and regulations based on government statues and laws, as well as internal regulations, which must be adhered to and implemented by employers and employees.

Code of conduct

This refers to rules that govern the behaviour of everybody in an organisation.

Opportunities for further development

These refers to further opportunities that exist for promotion based on experience and professional development.

Duration: 3 x 45 min periods

Resources required:

- Examples of questionnaires;
- Notes on effective questions on a questionnaire; and
- Worksheet.

Lesson 1

Lesson objectives:

Learners should be able to:

- Understand the elements of a good questionnaire;
- Design their own questionnaire covering all the outlined aspects;
- Complete the questionnaire on site; and
- Use responses to complete final activities.

Teacher Activities:

Pre-visit

- Pre-visit introduction to Maropeng and Sterkfontein.
- Explain the use and function of questionnaires.
- Describe the characteristics of good questionnaires.
- Discuss examples of questionnaires with learners.
- Identify good and poor examples of questionnaires.
- Assist learners to design questionnaires to ensure coverage of all the aspects of the worksheet.

During the visit

Arrange with a tour guide either to present a session on his or her job requirements, duties, working conditions and the qualities needed to be successful, or to participate in a question-and-answer session based on the questionnaires that the learners have designed at school.

Post-visit

Provide learners with worksheet to complete using the responses they obtained during the visit.

Learner Activities:

Pre-visit (pair activity)

Compile a questionnaire to use during the visit.

The questionnaire must cover the following areas:

- Vocational requirements;
- Inherent qualities required to be successful in the job;
- Promotional opportunities available at Maropeng for a tour guide;
- General working conditions; and
- Purpose and role of a code of conduct.

Your teacher must approve your final questionnaire before the visit to Maropeng.

During the visit (individual activity)

Complete your questionnaire based on the presentation or questions asked during the question-and-answer session with the tour guide.

Post-visit (individual activity)

Use your responses on the questionnaire to complete the worksheet and present your completed work.

FET: Learner Activity and/or Assessment Task

Learning Area: Tourism **Grade: 12**

Career Opportunities in the Tourism Industry

Activity 1

Jerry Rambau saw the following advertisement for a tour guide for Maropeng and Sterkfontein in the local newspaper. Your details are listed in the advertisement and he calls you with some questions regarding the post. Do you understand what all the requirements listed mean?

Tour Guide Required by Maropeng and Sterkfontein

Requirements:
Grade 12 or equivalent
Registered tour guide accreditation
Valid first aid certificate
Must be able to speak English well

For more information, contact: 011 702 6578

1. Explain the importance of the following requirements with reference to the advertisement:

- Tour guide accreditation; (2)
- Valid first aid certificate; and (2)
- Must be able to speak English well. (2)

2. Besides the requirements listed in the advertisement, a tour guide needs inherent qualities to be successful in the job. Make a spider diagram indicating at least five inherent qualities needed by a tour guide. (5)

3. Based on the requirements in the advertisement and the inherent qualities you identified in 2, design a code of conduct listing a minimum of five criteria that all tour guides to Maropeng must follow. (5)

4. Identify one possible promotional opportunity for a tour guide at Maropeng and Sterkfontein. (1)

5. Briefly discuss the working conditions of a tour guide at Maropeng or Sterkfontein Caves with reference to:

- Appropriate clothing/uniform; and (2)
- Working hours. (2)

Background Knowledge

Learning Area: Tourism **Grade: 12**

Developing a Basic Marketing Plan

Lesson 2
Duration: 2 x 45 min lessons

Resources required:

- Background information/brochures on Maropeng and the Sterkfontein World Heritage Site; and
- Site visit to Maropeng and the market place.

Lesson objectives:

To develop a basic marketing plan and promotional material.

Teacher Activities:

Pre-visit

- Discussion an impending visit to Maropeng to introduce learners to the Visitor Centre, what to expect, what to look out for, etc.
- Discussion on the required notes to make during the visit.
- Discussion of the activities and criteria that must be completed upon return from the site visit, to ensure learners understand the assessment.

During the visit

Arrange visit to the market place and instruct learners to visit the different shops/ kiosks where they should make short notes on every shop/kiosk and the products on offer by them.

Post-visit

Learners should use their notes to complete the activity in class.

Learner Activities:

Pre-visit

Read the information brochures/ background information on Maropeng provided by your teacher. Participate in the pre-visit discussion by asking questions. Study the activity that must be completed during and after the site visit.

During the visit

Visit the market place at Maropeng and compile notes on the shops/kiosks and the products or services they offer.

Post-visit

Complete the activities explained in the worksheet.

FET: Learner Activity and/or Assessment Task

Learning Area: Tourism **Grade: 12**

Activity 2

Developing a Basic Marketing Plan

Assessment Rubric:

See second-last and last page.

1. Visit the market place at Maropeng and identify and select one retail shop/kiosk as your focus.

1.1 Identify the shop and briefly describe the products/services available to tourists.

1.2 Identify one or a group of product/s or service/s that can be improved or added to the shop/kiosk.

2. Suppose you are appointed as the marketing agent of the shop identified in 1.1. Your brief is to increase the number of sales of the product/service identified in 1.2.

2.1 Develop a basic marketing plan that will attract more tourists to the shop to improve the number of sales. Present your plan on two A4 sized pages, describing and explaining the following:

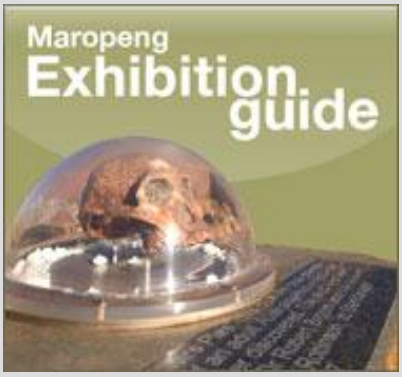
- Product/service;
- Price;
- Promotion; and
- Place.

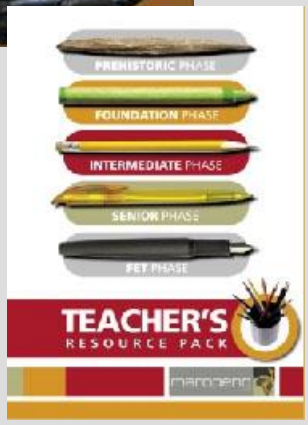
3. Suppose one of your promotion ideas is to develop a flyer to hand to tourists at the gates.

3.1 Use an A5-sized (half of A4) paper and design a flyer to hand to tourists. Consider the following criteria in the design of your flyer:

- Correct size;
- Interestingly folded;
- Use of colour to attract attention;
- Summary of product/service and price; and
- Effective, original slogan to attract potential customers' attention.

Examples of marketing and promotional materials at Maropeng





Memorandum

Learning Area: Tourism **Grade: 10**

Sustainable and Responsible Tourism

Activity 1: Part 1

The Dodo

1. Australia. (1)

2. The dodo walked straight up to the sailors who thought the friendly bird was stupid. (2)

3. Dogs, sailors and other animals that ate their eggs. (3)

4. Ostrich. (1)

5. Oudtshoorn, Western Cape. (2)

The Quagga

1. Karoo, Free State. (2)

2. The quagga ate the same grass as cattle, the invaders didn't care about them, and farmers shot them. (3)

3. 1883. (1)

4. Breeding of Burchell's zebras. (2)

5. Zebra. (1)

The Black Rhino

1. Over 1,000 kg. (1)

2. Speed, fierceness, strength. (3)

3. Humans hacking horns off and humans shooting them with guns. (2)

4. Medicinal, magical powers, aphrodisiac. (2)

5. The black rhino is not extinct. (1)

The Woolly Mammoth

1. The size of the Asian elephant, with long thick fur covering its entire body. (2)

2. The fur grew longer and thicker, the ears grew smaller and the legs shorter. (3)

3. Humans. (1)

4. Humans hunted them. (1)

5. Climate grew warmer and forests replaced grasslands so the mammoths couldn't find the 90 kg of food per day that they needed. (2)

6. Protect, be responsible, sustain the environment. (3)

7. Sensibility. (1)

Part 2

1. **Physical environment** – Maropeng is situated in natural highveld grasslands has planted 2,000 indigenous trees, has rehabilitated the soil and has designated walkways. (5)

Building – Maropeng maintains the structure of the natural flow of the hills. The building has a prehistoric side covered in grass, a view of untamed scenery, a water feature that represents "life" and structured in half moons to let the natural light in. All exhibitions are underground to restore the environment. (7)

Water – Maropeng saves water by budgeting – a number of kilolitres are awarded per section or unit per month. An eco-friendly septic system is used where water is purified five times, then goes through a rock system. This is called grey water and is used to water the plants at the parking area and in front of the hotel. (5)

Waste – Paper and other waste such as compost matter from the kitchens is recycled. SAPPI collects the paper and Collect-a-Can collects the tins. (3)

Energy – Sun panels generate light at night. Lights are put off at 17h15. All bulbs are energy-saving. The air conditioner is only put on when guests arrive. (4)

Accreditation – Silver accreditation, winner of the Welcome Awards in 2008. (2)

2. Some ideas are:

Leave only footprints behind, take only photos, remove all rubbish, use the dustbins provided, stay on designated walkways, don't interfere with natural surroundings, be co-operative at exhibitions, keep noise levels down, read up on information before visiting the site, don't vandalise, support the local community and treat all employees with respect and dignity. (10)

Memorandum

Learning Area: Tourism **Grade: 10**

Sustainable and Responsible Tourism

Activity 2: Part 1

1. "Mrs Ples" and "Little Foot". (2)

2. "Mrs Ples" – *Australopithecus africanus* is seen at the Meet the Family exhibition. Born over 2-million years ago. Died at The Cradle of Humankind. She could walk upright, had a smaller brain and was discovered at the Sterkfontein Caves. Robert Broom discovered her. Recent research suggests that "she" is a young male. (6)

"Little Foot" – is 4.17-million years old. He was discovered in the 1990s, lying in Sterkfontein Caves, where Ron Clark is still busy excavating him. It is the most important hominid discovery ever made and contributed to the declaration of the Cradle of Humankind as a World Heritage Site. "Little Foot" was killed and eaten by scavengers. His bones washed into the caves, where he lies face down with his arm outstretched above his head. (6)

3. Judaism, Hinduism, AmaZulu, Khalakhali, Batswana and Islam. (5)

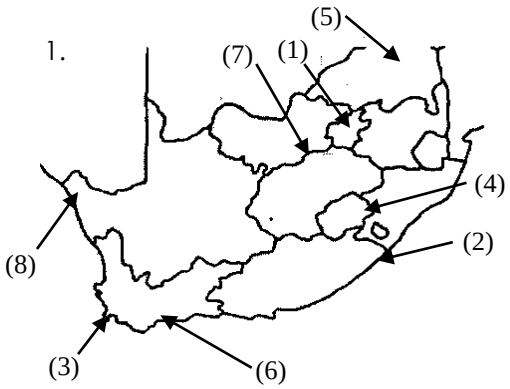
4. **Human-made** – buildings, exhibitions, vortex tunnel, market place, etc. (2)
Natural attractions – fossils on display, natural environment, caves, surroundings. (2)

5.

Name of World Heritage Site	Date
Cradle of Humankind (1)	1999
Great St Lucia Wetlands (2)	1999
Robben Island (3)	1999
Ukhahlamba Drakensberg (4)	2000
Mapungubwe (5)	2003
Cape Floral Region (6)	2004
Vredefort Dome (7)	2005
Richtersveld (8)	2007

(8)

Part 2

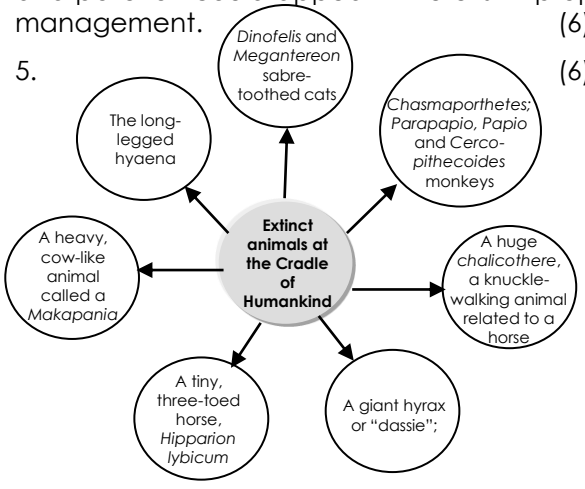
1. 

2. The criteria for the declaration of this World Heritage Site: cultural heritage site – witness to cultural civilisation and associated with living tradition. (1)

3. It attracts tourists from around the world, increasing tax revenues, creates opportunities for partnerships, preserves cultures, creates global awareness of SA, broadens knowledge, promotes the infrastructure around the sites, enhances national and community pride, builds cross-cultural awareness, and helps in upliftment of the local community. (10)

4. If the carrying capacity is exceeded, the site becomes fragile, there will be insufficient funds to maintain the site or to repair the site in case of a disaster, tourists may disrespect the site or the people at the site, the environmental responsibility becomes bigger, and commercialisation of cultural products at the site and pollution could appear if there isn't proper management. (6)

5. (6)



Fun class activity
The nine-letter word is **HUMANKIND.**

Memorandum

Learning Area: Tourism **Grade: 11**

Sustainable and Responsible Tourism

Activity 1

1.

• Texture of the soil is not suitable for a building because of the lime and dolomite stone.

• Carrying capacity of the ground.

• Weight of the building and architecture. (3)

2.

• Water supply

• Electricity

• Sewerage

• Telecommunications

• Banking facilities

• Public facilities for visitors (toilets, washrooms)

• Facilities for disabled (parking lot, ramps, lifts, wide open doors)

• Roads

• Airports (Lanseria)

• Accommodation

• Restaurants (10)

3. Accept all relevant answers. Use the following as a guide:

Transport

Accessibility of public transport to this centre – buses from Johannesburg station/OR Tambo airport/Roodepoort and Krugersdorp/Pretoria on regular basis so that people without own transport can visit the attraction.

Far away from the rest of the heritage site/ people need transport between the two sites.

Accommodation

No cheap accommodation on the site – dormitories just for learners; hotel very expensive; investigate cheaper accommodation in the vicinity (Magaliesburg).

Attractions

Other activities to bring people to the area; combine a trip with the Magalies Meander to attract people; Magaliesburg Mampoer Festival. More activities for the people who visit Maropeng so that they can stay longer and spend more money on the site.

(any 5 x 2 = 10)

4. Accept all relevant answers. Use the following as a guide:

Supra-structure components available at Maropeng visitors centre:

• ATM

• Curio shop

• Restaurant

• Hotel (4)

5. Accept all relevant answers. Allocate marks for the motivation. Below are some examples.

• More variety in food outlets, but still healthy options, such as Juicy Lucy;

• Children's amusement area to occupy small children while adults visit the exhibition;

• A small "zoo" area with animals mentioned in the exhibition so people can study what exists today against what they've learnt about in the exhibition (e.g. zebras, reptiles, amphibians, primates); and

• Banking facilities for the tourist. (2 x 2 = 4)

6. The learner should be able to mention the advantages of the improvements, e.g.

• Increase visitors to the centre;

• Visitors will increase spending;

• Increased spending leads to increased profitability;

• More funds available to support local community; and

• More funds for conservation. (4)

TOTAL: 35

Memorandum

Learning Area: Tourism **Grade: 11**

Sustainable and Responsible Tourism

Activity 2

Map Assessment Rubric

Criteria	Not achieved	Partially achieved	Achieved
Creativity and originality Judge the creativity and originality of the map presented by the learner	Uninteresting map, no creativity shown. Very similar to an existing map. No original symbols designed.	Some effort towards creativity shown. Some interesting use of colour. Some effort towards originality. One or two original symbols designed.	Interesting map. Good to excellent use of colour. Original design. Four or more original symbols designed and used on the map.
Accuracy	Most aspects of the map are inaccurately shown.	Most aspects are accurately shown.	All aspects are accurately shown.
Map reference/key; compass direction	No map reference indicated. No compass indicated.	Only map reference indicated or only compass indicated or incomplete map reference indicated.	Both map reference and compass correctly indicated. Complete map reference included.
Accommodation, restaurants, shops, shopping centres, mountain ranges and activities	More than 50 percent of the required items not on map. Some items indicated are fictitious.	51 percent to 80 percent of the items required are on the map.	81 percent to 100 percent of the required items are accurately indicated on the map. No fictitious items indicated.
Sterkfontein or Maropeng site map	Inaccurate or no site map included.	Site map partially accurate included.	Accurate site map included.
General presentation/ overview	Poor presentation, congested, ineffective use of space. Visually unattractive. Does not match the Maropeng image.	Reasonable presentation. Most of the space used effectively. Somewhat attractive visually. Shows some sensitivity to the Maropeng image.	Good presentation. Effective use of space. Visually attractive. Eye-catching design. In keeping with the Maropeng image.

Memorandum

Learning Area: Tourism **Grade: 12**

Sustainable and Responsible Tourism

Activity 1

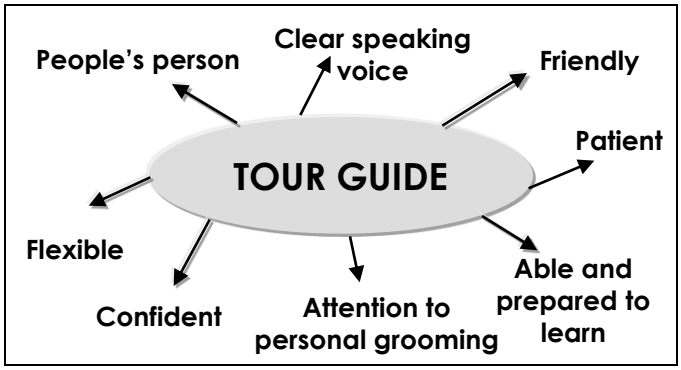
1. Advertisement requirements:

• Accreditation assures the client/employer that you have completed the necessary courses and that you have the necessary knowledge that is required to be an effective guide. (2)

• All guides must be able to provide basic medical assistance if a client needs it, until specialised medical help arrives. (2)

• A guide must be able to express him/herself and answer client questions with confidence. As English is generally universally spoken, particularly by foreign tourists, the tour guide must be able to converse in it with confidence. (2)

2. Consider all relevant answers. Use the following as a guide: (5)



3. Consider all relevant answers. The learner must be able to highlight five criteria for tour guides to adhere to. (5)

4. Supervisor (1)

5. Consider all relevant answers. Use the following as a guide:
• Prescribed uniform must be worn at all times;
• Working hours span from 08:00 to 17:00; and
• Guides must be willing to work overtime if requested to do so. (4)

Learning Area: Tourism **Grade: 12**

Sustainable and Responsible Tourism

Activity 2

Assessment Rubrics

1. Shop/Kiosk Description				
Criteria	**Not achieved**	**Partially achieved**	**Achieved**	**Excellently achieved**
Name of shop	No shop/kiosk identified or the identified shop does not exist at Maropeng.	Shop/kiosk identified but incorrectly named or spelled.	Shop clearly identified.	Something extra added (such as a photograph or sketch).
Description of products/ services	Vague, irrelevant or no description of products.	Only some of the products and services offered by shop described.	Clear description of all the products and services offered by the shop.	Pictures included.
Product/s or service/s that can be improved	No product or service identified for improvement.	Impractical or unrealistic idea/s suggested.	Existing or new product or service identified for improvement.	Original idea/s included, in keeping with image of Maropeng.
2. Development of a Marketing Plan				
Product/service	No description of product.	Vague or irrelevant description of product.	Clear relevant description of all the products and services offered by the shop.	Something extra added for clarity.
Price	Unrealistic price with no motivation.	Reasonable price was set but irrelevant or no motivation/ reasons.	Realistic price was set with relevant motivation/ reasons.	Realistic price was set with excellent motivation/ reasons.
Promotion	No or unrealistic promotional idea.	A vague promotional idea, not clearly defined.	A viable promotional idea, which will improve sales.	An excellent/ unique promotional idea that will improve sales.
Place	No location indicated.	Location not clearly defined.	Specific and clear location has been communicated that may contribute to sales of product.	Excellent location has been specified which will definitely improve sales of the product.

Learning Area: Tourism **Grade: 12**

Criteria	Not achieved	Partially achieved	Achieved	Excellently achieved
		3. Develop a Flyer		
Correct size	Incorrect size of flyer; too big or too small.	Correct size but not all space used.	Correct size of flyer and space used effectively.	Correct size of flyer and creative/original use of space.
Interestingly folded; use of colour; general presentation	Not folded; poor, unprofessional presentation.	Unattractive presentation; basic fold use.	Neat presentation; interestingly folded; good use of colour to attract attention.	Excellent presentation; unique or different and interesting fold; excellent use of colour to attract attention.
Summary of product/service and price	No summary of product/service and price.	Some evidence of a summary of the product/ service and price.	All relevant info included in the flyer.	All relevant info interestingly presented.
Original slogan	No slogan or existing slogan used.	Some elements of an existing slogan used.	Original slogan developed.	Original and effective slogan developed.

First Additional Language

Who am I?

maropeng

Developed by:

Nandipha Nonkwelo

Gerrit Geyser

Zakhele Mathebula

Subject: English – First Additional Language

Grade 10 (CAPS)	Grade 11 (CAPS)	Grade 12 (CAPS)
Topic:	**Topic:**	**Topic:**
Listening and speaking	Listening and speaking	
Reading and viewing	Reading and viewing	
Writing and presenting	Writing and presenting	

Grade 10	Grade 11	Grade 12
Content:	**Content:**	**Content:**
Listening and speaking • Speaking/oral text form: Giving directions • Listen for information **Writing and presenting** Written interpersonal and transactional texts: • Email • Diary **Reading and viewing** Written text in the media: Newspaper article	**Listening and speaking** • Speaking/oral text form: Giving directions • Listen for information **Writing and presenting** Informative written or visual text • Simple summary of important facts **Reading and viewing** Written text for information • Textbooks	**Listening and speaking** Explain the internal and external structures of poems, e.g. poetic and rhetorical devices Listening to texts for appreciation and pleasure, e.g. music, songs, poems, extracts from setworks, etc. **Group discussion:** • Discuss the features of literary texts/newspaper or magazine articles • Link to extended reading project of newspaper/ news casts etc. **Intensive reading.** • Summary revision using text on newspapers/reporting/media **Summary notes and final summary (possible assessment)** • Write a letter to the Press or write a notice for a newspaper or magazine or a review **Formal letter:** Write a letter of request, e.g. donation, sponsorship, etc.

Background Knowledge

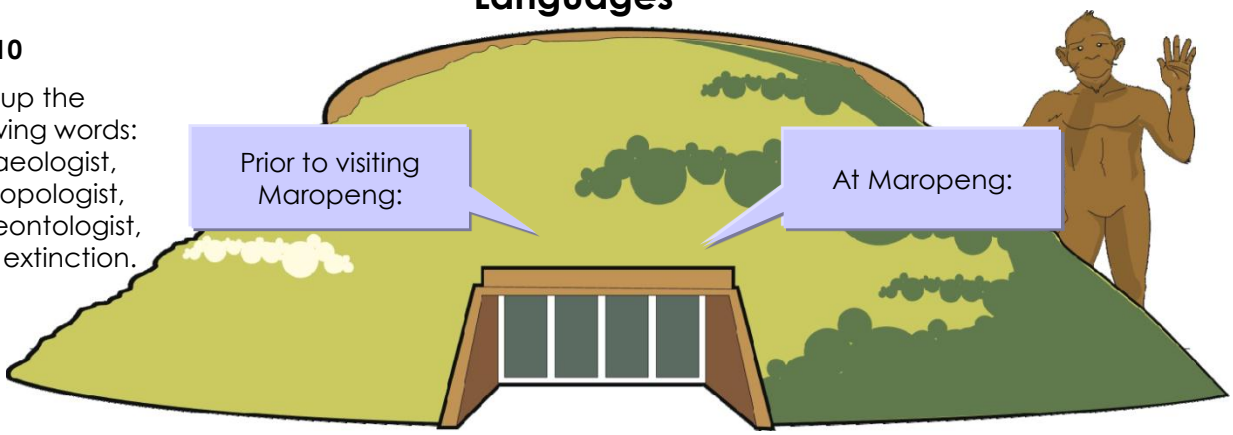
Subject: English – First Additional Language **Grades: 10-12**

Teacher's Notes

Teachers and learners will never forget their visit to the Cradle of Humankind and its two visitor centres – the main one packed with exciting, interactive exhibits at Maropeng, and a smaller one which is the gateway to the fascinating Sterkfontein Caves and their secrets about our past.

In this section you and your learners will discover:

Languages



Grade 10

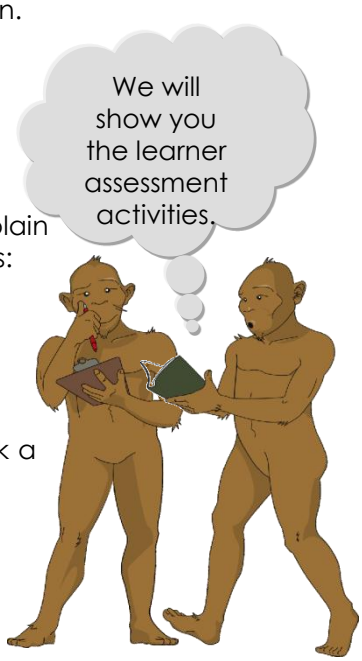
- Look up the following words: archaeologist, anthropologist, palaeontologist, fossil, extinction.
- How does an email differ from a business letter?
- Practise reading a map and see if you can find a route to your destination.

Grade 11

- Why do you think the finding of fossils is so important?
- Use a dictionary to explain the following acronyms:
  - Unesco
  - HOPE
  - INDABA
- What is a CT scan? (Ask a doctor or refer to a dictionary.)

Grade 12

- What is the difference between literal and figurative language?
- Give at least five examples of literary devices.
- Find out what is meant by "the four elements".



Grade 10

- How do archaeologists find fossils?
- How did means of communication in the pre-historic period differ from modern-day methods of communication?
- Research different ways to prevent the extinction of endangered species like the rhinoceros, and write a speech that you would present to your local nature conservation forum.

Grade 11

- What have we learnt about "Mrs Ples" from fossils and modern-day technology?
- What are the differences between *Australopithecus*, *Homo erectus* and *Homo sapiens sapiens*?
- Research different ways to prevent the extinction of species like the rhinoceros.
- Read a map and use it to write directions to Maropeng.

Grade 12

- What is meant by the saying "extinction is forever"?
- Learn about the discovery of the first adult *Australopithecus*.
- Learn to critically analyse a poem and write your own poem about one or more of the four elements.

Background Knowledge

Subject: English – First Additional Language **Grade: 10**

Discovering Information about the Discoverers

Search the exhibition area for information about the discoverers of famous fossil finds. Names to look out for are:

- Robert Broom and John Robinson;
- Raymond Dart;
- Ron Clarke, Stephen Motsumi and Nkwane Molefe; and
- Donald Johanson

Write a short paragraph on each discoverer or "discovery team" using the sources you have found.

Your paragraph should include what famous fossil/s they found, where they found them, and why the finds were significant.

This exercise will test your sourcing skills. Not all the information will be found in one place.

- Which zone is most likely to have the information you require?

- What about asking a guide at Maropeng to help you? Is there any audio-visual material that can give you information on the topics?

Dr Robert Broom discovered "Mrs Ples" at Sterkfontein Caves in 1947

Professor Ron Clarke working on the "Little Foot" skeleton

Activity 1

Tracking Down "Little Foot"

Read this newspaper clipping, found in *The Path to Humanity*, and answer the questions that follow.

A remarkable find

The story of how "Little Foot" was found, more than 3-million years after he fell into a cave, is almost as remarkable as the skeleton itself.

In 1994, Professor Ron Clarke, a palaeoanthropologist, was in the workroom at Sterkfontein, sorting through a box of animal bones from the Silberberg Grotto, when he came across four foot bones which he realised belonged to an *Australopithecus*. The foot bones were officially named fossil Stw 573, but became better known by their nickname, "Little Foot". The following year, Clarke and Professor Phillip Tobias officially announced the discovery of fossil Stw 573 to the world. The bones had actually been found in 1980, but it had taken 14 years for someone to recognise what they were.

Then, in 1997, Clarke discovered more bones in a box of monkey fossils which he realised also belonged to Stw 573. One of the leg bones appeared to have been broken recently. Clarke guessed that because there were bones from two feet, the rest of the skeleton could still be in the caves.

He showed his technical assistants, Stephen Motsumi and Nkwane Molefe, a cast of the broken tibia, or shin bone, and asked them to search for the piece from which it had been snapped in the vast and dark Silberberg Grotto – a task akin to finding the proverbial needle in a haystack. Searching with only hand-held lamps, the two men astonishingly found the matching bone after just two days. It was embedded in breccia, deep inside the Silberberg Grotto.

"Little Foot" is still lying partially in breccia while Clarke painstakingly excavates it. Once fully revealed, "Little Foot" will give us unique insights into the world of our early ancestors.

Background Knowledge

Subject: English – First Additional Language **Grade: 10**

Questions

1. Who is "Little Foot"?

2. How did the nickname "Little Foot" come about?

3. What is the scientific name of "Little Foot"?

4. In what year was the discovery of "Little Foot" officially announced?

5. "Finding a needle in a haystack"
   5.1 What does this proverb mean?
   5.2 Why was asking someone to search for "Little Foot" like asking them to find a needle in a haystack?

6. What do the following words mean?
   6.1 Painstakingly (par 5)
   6.2 Tibia (par 4)
   6.3 Excavate (par 5)
   6.4 Astonishingly (par 5)

7. Who should be credited for finding "Little Foot"? Substantiate your answer.

8. Do you think it is important to search for fossils such as "Little Foot"? Motivate your answer.

Writing and Presenting

Communication

- What would life be like if you could not talk to your friends?
- What would life be like if you could not talk to your brother or sister?
- What would life be like if you could not talk on your cellphone?

Our sophisticated ability to communicate across time and space sets us apart from other animals, and has helped us to populate the Earth and travel to its most inaccessible regions. It has allowed us to gather food better, to live in groups better, and to express ourselves better.

Nowadays, humans do not only communicate by speaking. Writing is one of the most important communication and language skills that humans need to learn in order to function effectively in the modern world. One of the different types of writing that people use on a daily basis is diary entries and emails.

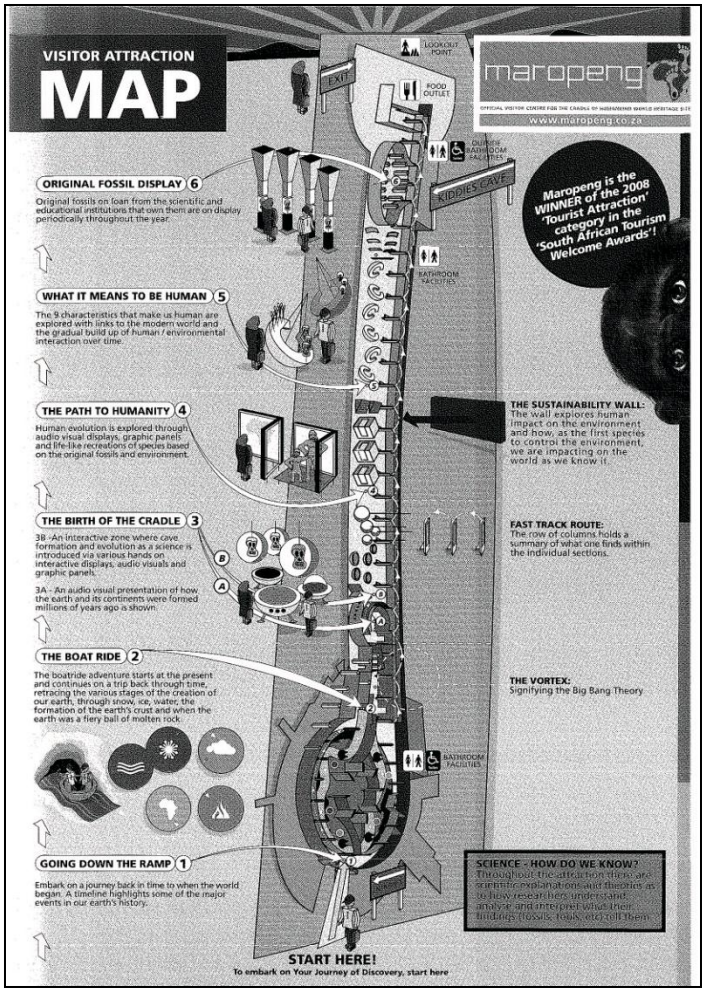
Background Knowledge

Subject: English – First Additional Language **Grade: 10**

Activity 2

Listening and Speaking

Divide your learners into pairs.



Directions

Work in pairs to test each other's listening skills and knowledge of the underground visitor attractions at Maropeng.

Study the visitor attraction map and familiarise yourself with the six main attractions exhibited.

Take turns telling each other about the attractions, the audio-visual displays and fossils exhibited at each point of the journey, while the other listens and checks from the map if the information given is correct.

Subtract one point for each error.

FET: Learner Activity and/or Assessment Task

Subject: English – First Additional Language **Grade: 10**

Activity 3

Diary Entry

A personal diary is a record that one keeps to express one's feelings and thoughts about daily experiences in one's life. In the business world, people keep diaries to plan ahead and to keep a reminder about meetings and activities planned. It is a way in which people stay organised. Do you have a diary? How often do you write in your diary?

Pretend that it is 2-million years ago and you are a member of the *Australopithecus africanus* family. Write three diary entries in which you comment about daily activities that different members of the family engaged in. What kind of tools did you use? What food did you eat and how was it prepared?

(20 marks)

Activity 4

Email

People no longer depend on postal services to deliver messages or written communication. Information technology and computers make it easy for people to process information and to communicate faster than before. Emails are preferred more and more because the message can be received instantly by the recipient on his/her computer. Email communication can be both formal and informal.

Write a reply to the email below, in which you provide answers to the questions asked and provide any additional information the writer might find useful. Even though the primary aim is to provide information, try to encourage the writer to visit the centre by making your response interesting.

Here are a few suggestions about how you can structure your email response:

- Thank the writer for enquiring.
- Provide a brief background of the purpose and history of the centre.
- Provide information requested on all the questions asked.
- Suggest ways in which the writer can continue to communicate with the centre and can get additional information.
- End on a positive note. (30 marks)

From: angelas@webmail.co.za
Sent: 24 June 2009 09:00 AM
To: **albertus@gmail.com**
Subject: Request for information

Importance: High

Dear Albert

Recently I saw an advertisement on TV for Maropeng which is said to be the visitor centre of the Cradle of Humankind. I am interested in visiting the centre with my school mates and would like to tell them and my teacher more about what the centre offers. I would like you to send me more information about the centre. What are the visiting times and what kind of accommodation is available? Is there a special price for group bookings? What kinds of fun activities can one take part in? I understand that there is also a fossil display. What kinds of fossils are there and why are they important? Is the information available from the centre relevant to school subjects? Is there a map available for visitors travelling from different parts of the Gauteng province?

Regards
Angela Makgoba

"Mrs Ples" has been identified as an example of *Australopithecus africanus*

FET: Learner Activity and/or Assessment Task

Subject: English – First Additional Language **Grade: 10**

Activity 5

Listening Comprehension

Listen to the recording of the quagga, which is one of the extinct and endangered species, at the Dial a Dodo exhibit.

(If an audio text of the account is not available, the teacher can read the account below to learners.)

Learners interact with the extinct dodo at an interactive exhibit at the Maropeng Visitor Centre.

Quagga

I am a quagga, a beautiful striped horse, similar to a zebra. My family and I used to roam in great herds across the plains of the Karoo and Free State of South Africa.

We were hunted into extinction for our beautiful, striped hides and because we ate the same grass that settlers wanted their animals to eat. The invaders were greedy and didn't care about killing us.

The last quagga died in the Amsterdam zoo in 1883, but she went without fanfare. It was only years later that people realised she had been the last living quagga.

Today there is a project to bring quaggas back to life. The quagga project is attempting to breed, through selection, a population of Burchell's zebras, which in its external appearance, and possibly genetically, will be closer, if not identical, to the former population known as quagga, which was exterminated during the second half of the 19th century.

Many animals have been bred and look similar to the quaggas in the museums, but more refinements still need to be made.

Maybe one day, there will be great numbers of quaggas again.

1. Which animal is the quagga likened with and why? (1)

2. In your own words, give two reasons that quaggas were hunted. (2)

3. What, according to the quagga, is the main reason that quaggas became extinct? Quote one sentence from the quagga's account. (1)

4. "… she went without fanfare."

How would you describe the tone of these words?

Excited

Sad

Sarcastic (1)

5. Do you agree that the death of the last quagga should have been marked with fanfare? (1)

6. What lesson can be learnt from the account of the quagga? (1)

7. Give one word used in the quagga's account which is a synonym of "killed". (1)

8. What is the quagga project? Do you think it is going to make a difference? (2)

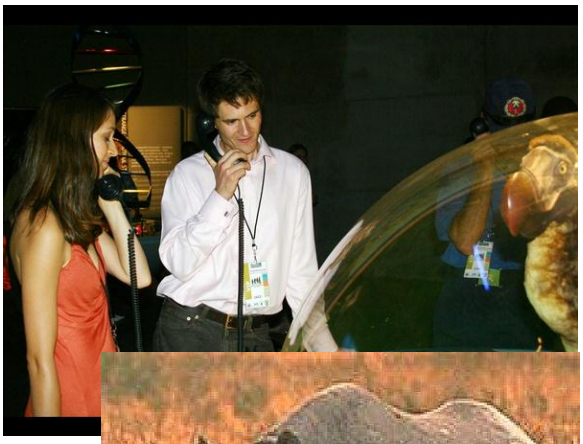
(10 marks)

Background Knowledge

Subject: English – First Additional Language **Grade: 11**

The Black Rhinoceros (*Diceros bicornis)*

In this activity learners will listen to information through electronic media and respond to questions.



1. What, according to the source, may the reasons be for classifying the black rhino as one of the rare and endangered species? (2)

2. What is the approximate weight of most black rhinos? (1)

3. How many rhinos were there in the 1990s and what did people/nature conservationists start to realise by then? (2)

4. What is still the major threat to this endangered species? (1)

5. Name three other species that became extinct. (3)

6. What is the rhino's plea at the end of this extract? (1)

(10 marks)

Black Rinoceros

I am a black rhino. My species is rare and endangered. We are a beautiful species – big and strong, weighing over 1 000 kg. We are known and feared for our fierceness.

But our strength and fierceness is useless against guns.

A few decades ago, in the 1970s, Africa had 70,000 black rhinos. However, we were shot all over the continent, mostly for our horns, which some people believe have special medicinal and magical powers.

Often when we were shot, our horns were hacked off and our bodies left in the field for scavengers.

But the early 1990s, there were only about 2,000 black rhinos left in the wild. Then people started to notice; started to worry that another unique and special species would soon become extinct.

There was a big campaign to save us and slowly, very slowly, our numbers started to creep up. Now there are about 4,000 rhinos. However, we are still under threat from poachers.

Please humans, do not let me become extinct, like the mammoth, the dodo and the quagga. Please protect me, so that your children and your children's children may also have the opportunity of seeing a black rhino in the wild.

FET: Learner Activity and/or Assessment Task

Subject: – English First Additional Language **Grade: 11**

Activity 1

Read the following text attentively and answer the questions that follow.

"Mrs Ples" and our Distant Relatives

"Mrs Ples" *has graced the cover of magazines and has been the centre of much media attention. Dr Thackeray explains why this fossil find is so important and how we shall continue to hear more about the famous "Mrs Ples" as new technology and new fossils found across Africa bring fresh information on the origins of "Mrs Ples". Or was that "Mr Ples"?*

"Mrs Ples" is the nickname for a fossil that was discovered by Dr Robert Broom of the Transvaal Museum at the Sterkfontein Caves in 1947.

Although that discovery received a well-deserved blaze of publicity following its announcement, it is regrettable that the subject of evolution was excluded from school curricula for many years in South Africa. Fortunately, in recent years, fossils from Sterkfontein and other sites in Gauteng have begun to feature prominently in new school books, and more and more children are being exposed to the richness of our country's palaeontological heritage. Moreover , Unesco's declaration of the Sterkfontein area as a World Heritage Site, and the recent discovery of a complete skeleton by Dr Ron Clarke, Stephen Motsumi and Nkwane Molefe of the University of the Witwatersrand, have contributed to growing public awareness of the significance of Sterkfontein and adjacent sites in Gauteng.

"Mrs Ples" is believed to be a distant relative of all humankind, having a small cranium (similar to that of a chimpanzee). She certainly stood upright like humans. Robert Broom put "Mrs Ples" in the genus *Plesianthropus* (meaning "almost human"), but it is now recognised as *Australopithecus africanus*, the species which is also represented at Taung in the North West Province and at Makapansgat in Limpopo.

The discoveries of *Australopithecus africanus* at Taung, Sterkfontein and Makapansgat served to confirm Charles Darwin's prediction that Africa was the continent from which human ancestors would be found. Darwin had studied the skull and skeletons of living primates and, based on comparative anatomy, he had reached the conclusion that of all living primates, humans are the closest to chimpanzees and gorillas. Since chimps and gorillas are known only from the African continent, Darwin believed that the common ancestor of humans and apes would have lived in Africa many millions of years ago. This view was cautiously expressed in a book called *The Descent of Man,* published in 1871.

Just 44 years later, in 1925, Professor Raymond Dart of the University of the Witwatersrand reported the discovery of the "Taung child", a juvenile specimen of *Australopithecus africanus* from a lime-works quarry north-west of Kimberley, supporting Darwin's view.

The "Taung child" was not immediately accepted as a distant relative of humankind. As a juvenile, it showed ape-like characteristics, and some critics considered that it was an ape. However, the discovery of adult specimens of the same species, including "Mrs Ples" from Sterkfontein, showed that these fossils are members of the human lineage.

Within the last 75 years, we have seen a growing number of fossils being reported in scientific journals, the most recent of which are the remarkable specimens from Kenya, described as *Kenyanthropus platyops* by Meave Leakey and her colleagues. These flat-faced fossils are between 3.5-million and 3.2-million years old, similar in age to the skeleton that was discovered at Sterkfontein by Dr Ron Clarke and his team, and are reported to be representatives of the genus *Australopithecus*. Fossils with flat faces have previously been discovered at the sites of Kromdraai and Swartkrans near Sterkfontein in the 1930s and 1940s, and also from Olduvai Gorge and Lake Turkana in Kenya. Such flat-faced fossils have been described as "robust" australopithecines, belonging to the species *Australopithecus robustus* (in South Africa) and *Australopithecus boisei* (in East Africa).

The very flat-faced "robust" hominid was discovered in 1938 by a schoolboy, Gert Terblanche, at Kromdraai, where the Transvaal Museum continues to undertake excavations. A notable feature of the assemblage of "robust" hominids from Kromdraai is that they have relatively small teeth and flat faces.

Although "Mrs Ples" was discovered in 1947, she continues to be a subject of great interest and surprises are revealed as technology develops, permitting new ways of analysing the fossils. The possibility that "Mrs Ples" was a young individual, rather than an old adult, is being given attention with help of CT scans, whereby X-rays reveal details of internal anatomical structures. The possibility that "Mrs Ples" was really a male is currently being given attention, based in part on studies of prominent ridges ("anterior pillars") associated with roots of canine teeth, analysed by CT scans. The CT scanning of "Mrs Ples" has been undertaken to contribute to an INternational DAta BAse (with the acronym INDABA), with the objective of obtaining new information from old fossils, recognising them as components of world heritage.

Dr F Thackeray

Curator: Human Origins and Past Environments (HOPE), Transvaal Museum

Article adapted from
www.scienceinafrica.co.za/2001/may/ples

1. What do each of these acronyms stand for?

1.1 Unesco

1.2 HOPE

1.3 INDABA

(3)

2. Explain the meaning of the following terms:

2.1 Palaeontological.

2.2 World Heritage Site.

2.3 *Plesianthropus*.

2.4 *Australopithecus africanus*.

2.5 *Australopithecus robustus*.

(5)

3. "The remarkable specimens from Kenya were described as *Kenyanthropus platyops* by Meave Leakey and her colleagues."

Rewrite the sentence above in the active voice. (1)

4. "Darwin believed that the common ancestor of humans and apes would have lived in Africa many millions of years ago." Rewrite this quotation in:

4.1 The present tense.

4.2 The future tense. (2)

5. Why was the "Taung Child" not immediately accepted as a distant relative of humankind? (2)

6. Explain the following expressions:

6.1 "Well-deserved blaze of publicity".

6.2 "To feature prominently". (2)

7. What is a "CT-scan"? Explain it in your own words. (2)

8. Draw up a timeline to indicate the discoveries made by scientists referred to in this article. (6)

9. Write a short dialogue between Dr Broom and a colleague on that wonderful day when they discovered "Mrs Ples" at Sterkfontein Caves. (Total words: 30-50) (20)

10. What originally prevented children from being exposed to information regarding "Mrs Ples"? (1)

11. Why did Darwin believe that the common ancestor of humankind would have lived on the African continent? (2)

12. "Mrs Ples" could possibly have been a young individual. Explain how this belief could be verified. (2)

13. "Mrs Ples" could also have been "Mr Ples". What would determine the truth or not of this belief? (2)

(Marks: 50)

FET: Learner Activity and/or Assessment Task

Subject: English – First Additional Language **Grade: 11**

Activity 2

Read the passage on the right and summarise it in 70-80 words.

Make sure your summary is in point form, but still use full sentences. (10)

Evolution of the Human Skull

Illustration A

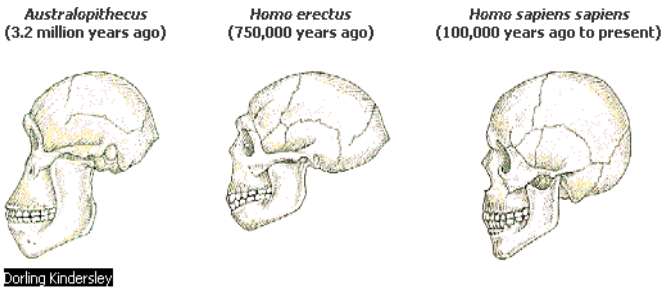
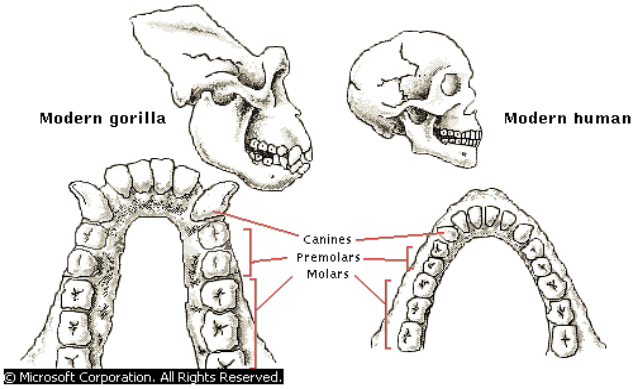


Illustration B



In Illustration A, changes of the human skull are clearly indicated. During the past 3-million years, as the skull evolved from *Australopithecus* to *Homo (sapiens) sapiens,* the capacity of the cranium increased (to accommodate the growth of the brain), the face flattened, the chin receded, and the size of the teeth decreased. Scientists believe that the incredible growth in the size of the brain may be related to the increasing sophistication of hominid behaviour. Anthropologists also theorise that the brain evolved a high capacity for learning and reasoning, and after that, cultural, not physical, evolution changed the way human beings live.

Modern human beings, like gorillas, tarsiers, and chimpanzees, are primates. At some point in the course of primate evolution, human development diverged from that of other primates. Although many similarities exist between other primates, particularly gorillas and chimpanzees, and modern humans, fundamental differences attest to the divergence in development. The second illustration (B) of the skulls of a modern gorilla and a modern human being depict some of these differences. The gorilla possesses larger canine teeth and a more protruding jaw than members of the hominid line.

Source: Microsoft ® Encarta ® 2007. © 1993-2006 Microsoft Corporation.

FET: Learner Activity and/or Assessment Task

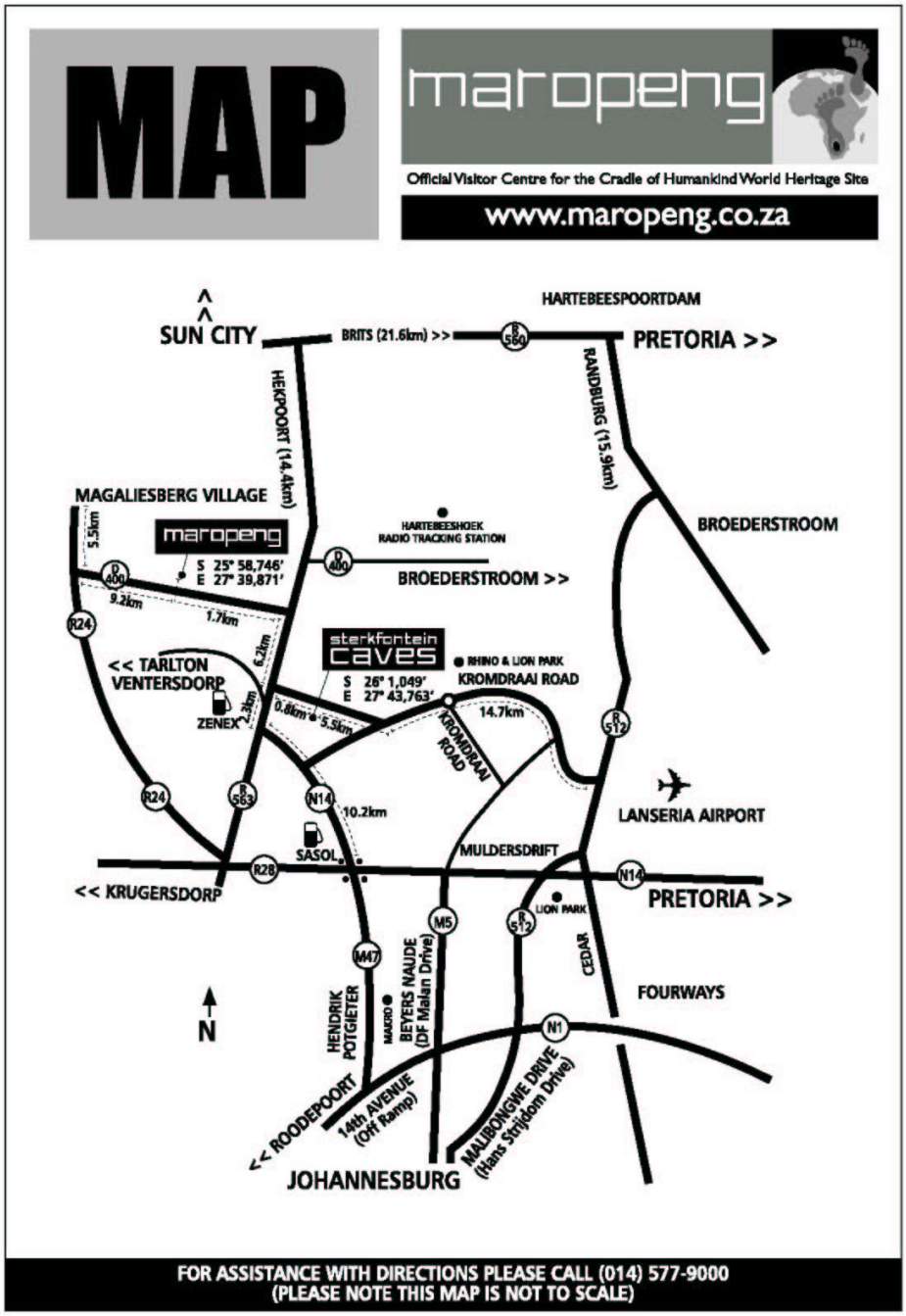
Subject: English – First Additional Language **Grade: 11**

Activity 3

Directions

Assume that your friend from the Johannesburg area wants to visit Maropeng, Cradle of Humankind. Give your friend directions using the map below.

(10)



Background Knowledge

Subject: English – First Additional Language **Grade: 12**

Extinction is Forever (Oral Activity)

Text: Dodo's story

- Take a walk to the story wheel.
- Follow the instructions below.

Instructions

Learners must:

- Listen to Dodo's story a first time.
- Listen to the story again, paying attention to the literary devices used.
- Give the questions to learners. These can be found on the learner worksheet further on.) Learners must answer questions 1 – 5, working individually.
- Learners must then work in pairs or small groups to tell their stories (question 6 on the learner worksheet).

Reading and Creative Writing

How the First Adult *Australopithecus* was found

In the early part of the 20th century, palaeontologists believed that humankind's origins lay in Asia or Europe. Professor Raymond Dart's theory that the "Taung Child" – a juvenile skull he described in 1925 – was a human ancestor was therefore not well received. He did have a supporter, however, in Dr Robert Broom, a keen palaeontologist who had until then specialised in fossils of mammal-like reptiles found in the Karoo.

After the "Taung Child" was discovered, Broom, determined to find an adult *Australopithecus*, went looking in dolomite caves west of Pretoria. He discovered instead the fossil of a giant baboon, which received considerable press coverage.

After reading about the baboon in a newspaper, two students who had found monkey fossils in the Sterkfontein Caves approached Broom and encouraged him to visit the caves with them.

At Sterkfontein, Broom met George Barlow, the site manager, who, as luck would have it, had also worked at Taung. Broom asked Barlow to keep a look out for anything similar to the "Taung Child", and a few days later, Barlow handed him a rare find, the world's first adult specimen of *Australopithecus*, later catalogued as TM 1511.

In his 1950 book, *Finding the Missing Link*, Broom described the moment:

"On the Monday following, August 17, 1936, I was again at Sterkfontein and when I saw Barlow, he handed me a beautiful brain-cast and said 'Is this what you're after?' ... It was clearly the anterior two-thirds of a brain-cast of an anthropoid ape or ape-man, and in perfect condition. It had been blasted out that morning. I hunted for some hours for further remains, but without success. But I found the natural cast of the top of the skull in the side of the quarry and had this carefully cut out ... Next day I was back and discovered the base of the skull on which the brain-cast had rested, with all the blocks that had been attached to it ... To have started to look for an adult skull of *Australopithecus* and to have found an adult of at least an allied form in about three months was a record ... And to have gone to Sterkfontein and found what we wanted within nine days was even better."

Take a walk through the Sterkfontein Caves and Maropeng Visitor Centre, and observe baboon fossils.

Instructions

Learners must:

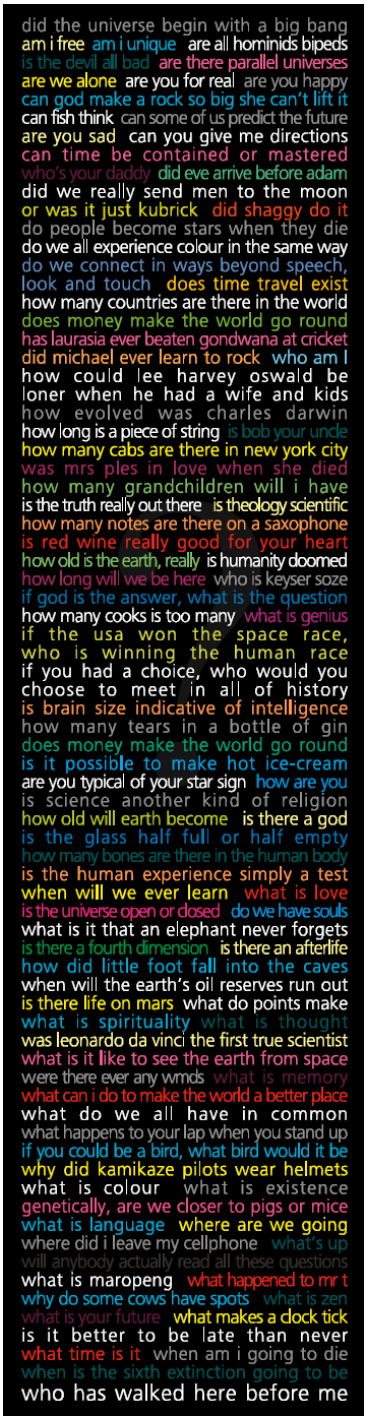
- Individually read the text on how *Australopithecus* was found and discuss in pairs what the article is about. They should compare what they each learnt, understood and remember from reading the article.

Background Knowledge

Subject: English – First Additional Language **Grade: 12**

Focusing on Literature

Take a walk through the Maropeng Visitor Centre. Pay attention to the banner of 100 questions in the lobby of Maropeng.



Text: Poetry

• Writing poetry can be a voyage of discovery for the poet and for the readers of the poem.

• Read the following poems, based on the four elements, written by South African poet Mari Pete after visiting the Cradle of Humankind in 2005, and her explanatory notes.

air
photons flutter spirit breathes in ether.
soars strives aspires glides ...
rockets pierce the atmosphere,
bluegreen membrane quivers

This poem alludes to the birth of the human spirit and to its paradoxical nature – inventive and ingenious, but also able to destroy its own beautiful and fragile environment. MP

water
snow dew steam
hail rain smog
fog sea ice
source of life

This poem plays with the three forms in which water occurs – solid, liquid and gas. MP

Background Knowledge

Subject: English – First Additional Language **Grade: 12**

water
strung round ankles, small seeds click
in moth cocoons, to the beat of shuffling
feet. waists sway with ostrich beads:
rain pelts down like bones and reeds

This poem is a reference to the
San/Bushman rain dance. MP

fire
where sabre tooth shadows
f l i c k e r,
stinkwood coal stories glow
in the hearth

This poem is a reference to the important role fire played in the protection of early humans, and to the influence it had on the development of communication, culture and literature. Sabre-toothed tigers roamed the Sterkfontein area and white stinkwood was used for firewood in the Cradle of Humankind. MP

earth
underground, small stirring beneath inland sea.
space expands water recedes
air seeps in.
moisture drips through pores in rocks.
silt and shells wash down. minerals
permeate bones. cements in time,
waits for sounds
of dynamite and drills

This poem is based on the steps involved in the formation of the Sterkfontein Caves, and refers to the process in which fossils were cemented into lime-bearing cave breccia, later discovered by humans who used dynamite in mining for lime. MP

fire
women heat ochre under amber moon,
grind pigment between stones:
eland's blood, clay and coal,
spirits seep
down
cracks in rocks –
scents that
glow
in golden drops

This poem is a reference to the Bushmen/San paint-making ritual (ochre for yellow, eland blood for red and charcoal for black), and to the shape-shifting trance dances that followed, to heal or cross over to life on the other side of death. MP

FET: Learner Activity and/or Assessment Task

Subject: English – First Additional Language **Grade: 12**

Oral Assessment

Extinction is Forever

Text: Dodo's Story

- Listen to Dodo's story a first time.
- Listen to the story again, paying attention to the literary devices used.
- Answer the questions below. Questions 1-5 require a written response while question 6 requires an oral response:

Activity 1

1. What is a dodo? (1)

2. What does the name "dodo" imply ? (1)

3. What is the irony in people calling the bird "dodo"? (2)

4. Fill in the missing words to complete the idioms below:
"as dead as a
4.1 _____" or "as dead as a
4.2 _____" (2)

5. Explain why the title "Extinction is Forever" is relevant to the story. (2)

6. That was a story of a dodo. Share a story with a friend or friends. Your story must evoke the same emotions as the dodo's. (2)

Total: 10

Activity 2

Using Context to Discover Hidden Facts

1. Small group exercise (brainstorming)

After reading the text on page 17, answer the following questions as fully as you can. Remember that literal answers won't stand out in the text and some can only be inferred. It is up to you to use your understanding of the English language and contextual clues to answer the questions.

1.1 What does a palaeontologist do?

1.2 Near to which town was the "Taung Child" found?

1.3 Using Broom's description, determine on what date he arrived at Sterkfontein.

1.4 George Barlow is described as a "site manager". What type of site do you think he managed?

What is context?

Context is background information that helps us understand what we are reading.

2. Creative writing exercise

Imagine you are a palaeontologist and have just made a startling discovery that will rock science, right here in the Cradle of Humankind.

Write:

2.1 A <u>newspaper article</u> announcing the discovery, which includes an interview with yourself and any other important people associated with the find.

OR

2.2 <u>A letter</u> to a colleague explaining what you have found and confiding why you do not wish to make the find public yet.

(30 marks)

FET: Learner Activity and/or Assessment Task

Subject: English – First Additional Language **Grade: 12**

Activity 3

1. Poetry questions

1.1 How has the poet used positioning of text in her poetry about the Cradle of Humankind? Do you think this is effective or not? Why or why not?

1.2 A metaphor is a figure of speech that compares one thing to another without using the words "like" or "as". Can you find an example of a metaphor in one of these poems?

1.3 Which is your favourite of the poems and why?

1.4 Look for examples in the poetry where Mari Pete has appealed to people's senses. How many examples can you find? List them.

2. Write your own poem (or set of poems) based on one or more of the elements and the Cradle of Humankind. If you like, use space like Mari Pete does in her poetry.

Memorandum

Subject: English – First Additional Language **Grade: 10**

Activity 1

1. "Little Foot" is the name given to a skeleton that fell into a cave more than 3-million years ago.

2. Four foot bones were first discovered by Professor Ron Clarke, which led to the search for the rest of the skeleton.

3. Stw 573.

4. 1995.

5.1 A very difficult search for something small in a wide area.
5.2 The assistants were asked to find the piece from which the bone had broken from a vast and dark area. They would not know where to start searching as the area was very wide.

6.1.Painstakingly (par 5) – thoroughly or carefully.
6.2. Tibia (par 4) – the inner bone of the lower leg between the knee and the ankle.
6.3. Excavate (par 5) – to dig out carefully to find objects of archaeological interest.
6.4. Astonishingly (par 5) – amazingly.

7. Learners can state both Professor Ron Clarke, and/or Stephen Motsumi and Nkwane Molefe. Answers should be well substantiated.

8. Any well substantiated answer is acceptable.

Activity 2

Refer to the map on page 9 for answers.

Activity 3

See rubric for shorter transactional text (page 23).

Activity 4

See rubric for longer transactional text (page 29).

Activity 5

1. It looks like a zebra because of its stripes.

2. They were killed for their hides. Farmers wanted to save the grass that quaggas fed on for their stock.

3. "Invaders were greedy and did not care about killing us."

4. Sad.

5. Yes. It would have made people aware of the extinction of quaggas and would have saved more animals from extinction.

6. It is important to respect animal rights and to take care of our environment. People should be less greedy and selfish in order to preserve nature.

7. Exterminated.

8. It is a project that attempts to breed quaggas from animals that possibly have the same genetic make-up and appearance as quaggas.
Any well substantiated answer to the second part of the question is acceptable.

Activity 3 : Rubric

Rubric for assessing shorter transactional text (20 marks)

	Code 7: Outstanding 80%-100%	Code 6: Meritorious 70%-79%	Code 5: Substantial 60%-69%	Code 4: Adequate 50%-59%	Code 3: Moderate 40%-49%	Code 2: Elementary 30%-39%	Code 1: Not achieved 0-29%
Content, planning and format (13 marks)	**10½-13** - Specialised knowledge of requirements of text. - Disciplined writing – learner maintains thorough focus, no digressions. - Text fully coherent in content and ideas, and all details support topic. - Evidence of planning and/or drafting has produced a virtually flawless, presentable text. - Has applied all the necessary rules of format.	**9½-10** - Good knowledge of requirements of text. - Disciplined writing – learner maintains focus, hardly any digressions. - Text is coherent in content and ideas with all details supporting the topic. - Evidence of planning and/or drafting has produced a well crafted and presentable text. - Has applied the necessary rules of format.	**8-9** - Fair knowledge of requirements of the text. - Writing – learner maintains focus, with minor digressions. - Text is coherent in content and ideas, and details support topic. - Evidence of planning and/or drafting has produced a presentable and good text. - Has applied most of the necessary rules of format.	**6½-7½** - Adequate knowledge of requirements of text. - Writing – learner digresses but does not impede overall meaning. - Text adequately coherent in content and ideas and some details support topic. - Evidence of planning and/or drafting has produced a satisfactorily presented text. - Has applied an adequate idea of the requirements of format.	**5½-6** - Moderate knowledge of requirements of the text. Response to writing task reveals a narrow focus. - Writing – learner digresses, meaning vague in places. - Text moderately coherent in content and ideas and has basic details which support the topic. - Evidence of planning and/or drafting that has produced a moderately presentable and coherent text. - Has a moderate idea of requirements of the format – some critical oversights.	**4-5** - Elementary knowledge of requirements of the text. Response to writing task reveals a limited focus. - Writing – learner digresses, meaning obscure in places. - Text not always coherent in content and ideas, and has few details which support topic. - Planning/ drafting inadequate. Text not well presented, - Has vaguely applied the necessary rules of format.	**0-3½** - No knowledge of requirements of the text. - Writing – learner digresses, meaning is obscure in places. - Text not coherent in content and ideas and too few details to support the topic. - Planning and drafting non-existent. Poorly presented text. - Has not applied the necessary rules of format.
Language, style and editing (7 marks)	**6-7** - Text is grammatically accurate and well constructed. - Vocabulary is very appropriate to purpose, audience and context. - Style, tone, register very appropriate. - Text virtually error free following proof reading and editing. - Length correct.	**5-5½** - Text is well constructed and accurate. - Vocabulary is mostly appropriate to purpose, audience and context. - Style, tone and register mostly appropriate. - Text largely error free following proof reading, editing. -Length correct.	**4½** - Text is well constructed and easy to read. - Vocabulary is appropriate to purpose, audience and context. - Style, tone, register generally appropriate. - Text mostly error free following proof reading, editing. - Length correct.	**3½-4** - Text is adequately constructed. Errors do not impede flow. - Vocabulary is adequate for purpose, audience and context. - Style, tone and register adequately appropriate. - Text still contains a few errors following proof reading, editing. - Length almost correct.	**3** - Text is basically constructed. Several errors. - Vocabulary is limited and not very suitable for purpose, audience and context. - Lapses in style, tone and register. - Text contains several errors following proof reading, editing. - Length – too long/short.	**2½** - Text is poorly constructed and difficult to follow. - Vocabulary requires some remediation and not suitable for purpose, audience and context. - Style, tone and register inappropriate. - Text error ridden despite proof reading, editing. - Length – too long/short.	**0- 2** - Text is poorly constructed and muddled. - Vocabulary requires serious remediation and not suitable for purpose. - Style, tone and register do not correspond with topic - Text error ridden and confused following proof reading, editing. - Length – far too long/short.

Memorandum

Subject: English – First Additional Language **Grade: 11**

Background Activity

1. In the 1970s, there were 70,000, now there are only 4,000. They are a unique and special species. (2)

2. Over 1,000 kg (1)

3. About 2,000. That the species was heading towards extinction. (2)

4. Rhino horns – people shoot rhinos mostly for their horns, which some people believe have special medical and magical powers.

OR poachers. (1)

5. Mammoth, dodo, quagga. (3)

6. That the species must be protected for future generations. (1)

Activity 1

1.1 United Nations Educational, Scientific, and Cultural Organisation.

(Learners may use dictionaries to search for this answer)

1.2 Human Origins and Past Environments.

1.3 INternational DAta Base. (3)

2.1 Science concerned with animal and plant fossils (Greek *palaeo* ["old"] + *onta* ["beings"] + *logy* ["discourse"/"science"] (1)

(Learners may use dictionaries to search for answer)

2.2 A natural or human-made site or structure recognised as being of outstanding international importance and as deserving special protection. (1)

2.3 Almost human. (1)

2.4 The species which is also represented at Taung in the North-West Province and at Makapansgat. (1)

Australopithecus – a genus of fossil bipedal primates, with both ape-like and human characteristics, found in Pliocene and Lower Pleistocene deposits in Africa. (1)

2.5 "Robust", sturdy or resilient, strong and healthy. (Latin – firm and hard) (1)

3. Meave Leaky and her colleagues described the remarkable specimens from Kenya as *Kenyanthropus platyops*. (1)

4.1 Darwin believed that the common ancestor of humans and apes would have lived in Africa many millions of years ago. (1)

4.2 Darwin believed that the common ancestor of humans and apes would have lived in Africa many millions of years ago. (1)

5. Some critics considered it an ape, because of its ape-like characteristics. (1)

6.1 Sudden and wide attention from the public which has been earned.

6.2 To become known as central to the involvement of something. (2)

7.CT – computerised (or computed) tomography. (Learners may use dictionaries)

Scan – to convert a document/picture into digital form for storage or processing on a computer. (2)

8. Time line:

1871 Darwin believed that the common ancestor of humans and apes would have lived in Africa million years ago.

This view expressed in a book *The Descent of Man* published in 1871.

1925 Professor Raymond Dart reported the discovery of the "Taung Child".

1930s & 1940s "Flat-faced" fossils discovered.

1938 Flat-faced "robust" hominid discovered by a school boy, Gert Terreblanche, at Kromdraai.

1947 "Mrs Ples" – fossil discovered at Sterkfontein Caves. (6)

Question 9 – Dialogue Marking Rubric

	Code 7: Outstanding 80%-100%	Code 6: Meritorious 70%-79%	Code 5: Substantial 60%-69%	Code 4: Adequate 50%-59%	Code 3: Moderate 40%-49%	Code 2: Elementary 30%-39%	Code 1: Not achieved 0-29%
Content planning and format (12 marks)	**10-12** - Extensive specialised knowledge of requirements of text. - Exhibits a profound awareness of wider contexts in writing. - Disciplined writing – learner maintains rigorous focus, no digressions. - Total coherence in content and ideas, highly elaborated and all details support topic. - Evidence of planning and/or drafting has produced a flawlessly presentable text. - Has produced a highly appropriate format.	**8½-9½** - Very good knowledge of requirements of text. - Exhibits a broad awareness of wider contexts in writing. - Disciplined writing – learner maintains focus, no digressions. - Text is coherent in content and ideas, very well elaborated and all details support topic. - Evidence of planning and/or drafting has produced a well crafted and presentable text. - Has applied the necessary rules of format very well.	**7½-8** - Fair knowledge of requirements of text. - Exhibits a general awareness of wider contexts in writing tasks. - Writing – learner maintains focus, with minor digressions. - Text is mostly coherent in content and ideas, elaborated and most details support topic. -Evidence of planning and/or drafting has produced a presentable and very good text. - Has applied the necessary rules of format.	**6-7** - Adequate knowledge of requirements of text. - Exhibits some awareness of wider context in writing tasks Writing – learner digresses but does not impede overall meaning. - Text adequately coherent in content and ideas, some details support topic. - Evidence of planning and/or drafting has produced a satisfactorily presented text. - Has applied an adequate idea of requirements of format.	**5-5½** - Moderate knowledge of requirements of text. Response to writing task reveals a narrow focus. - Exhibits rather limited knowledge of wider contexts in writing tasks. - Writing – learner digresses, meaning vague in places. - Text moderately coherent in content and ideas, some details support topic. - Evidence of planning and/or drafting has produced a moderately presentable and coherent text. - Has a moderate idea of requirements of format – some critical oversights.	**4-4½** - Elementary knowledge of requirements of text. Response to writing task reveals a limited focus. - Exhibits a limited knowledge of wider contexts in writing tasks - Writing – learner digresses, meaning obscure in places. - Text not always coherent in content and ideas, has few details which support topic. - Inadequate for home language level despite planning and/or drafting. Text not well presented. - Has vaguely applied necessary rules of format.	**0-3½** - No knowledge of requirements of text. - Exhibits no knowledge of wider contexts in writing tasks. - Writing – learner digresses, meaning obscure in places. - Text not coherent in content and ideas, has few details which support topic. - Inadequate planning/ drafting. Poorly presented text. - Has not applied necessary rules of format.
Language style and editing (8 marks)	**6½-8** - Text grammatically accurate and brilliantly constructed. - Vocabulary is highly appropriate to purpose, audience and context. - Style, tone, register highly appropriate. - Text virtually error free following proof reading. - Length correct.	**6** - Text very well constructed and accurate. - Vocabulary very appropriate to purpose, audience and context. - Suitable style, tone and register considering demands of task. - Text largely error free following proof reading and editing. - Length correct.	**5-5½** - Text well constructed and easy to read. - Vocabulary appropriate to purpose, audience and context. - Style, tone, register mostly appropriate. - Text mostly error free following proof reading and editing. - Length correct.	**4-4½** - Text adequately constructed. Errors do not impede flow. - Vocabulary adequate for purpose, audience and context. - Style, tone, register fairly appropriate. - Text still contains few errors following proof reading and editing. - Length almost correct.	**3½** - Text is basically constructed. Several errors. - Vocabulary limited & not very suitable for purpose, audience & context. - Lapses in style, tone & register. - Text contains several errors following proof reading and editing. - Length – too long/short.	**2½-3** - Text is poorly constructed and difficult to follow. - Vocabulary requires some remediation and not suitable for purpose, audience and context. - Style, tone and register inappropriate. - Text error ridden despite proof reading, editing. - Length – too long/short.	**0-2** - Text is poorly constructed and very difficult to follow.

10. The subject of evolution was not allowed to be taught in public schools in South Africa. (1)

11. Chimpanzees and gorillas are only found on the African continent, and the skull and skeleton of humans is so similar to those of these primates. (2)

12. With the help of CT-scans, whereby X-rays reveal details of internal anatomical structures. (2)

13. The possibility that "Mrs Ples" was really a male is currently being given attention, based on the studies of prominent ridges associated with roots of canine teeth, analysed by CT scans. (2)

Activity 2

Exemplar answer:

• The human skull has changed over the past 3-million years from *Australopithecus* to *Homo (sapiens) sapiens.*

• The cranium increased because of brain growth, face flattened, chin receded, size of teeth decreased.

• The brain evolved physically to accommodate a higher capacity for learning and reasoning.

• Thereafter, cultural evolution changed the way humans live.

• Humans are primates; our development diverged from other primates.

• Some differences between skulls of modern gorillas and modern humans: gorillas have larger canine teeth and a more protruding jaw.

Take note:

• Candidates must present the summary in the required format. **(Summaries presented in the incorrect format will not be assessed.)**

• Award marks only for those points that are presented in **full sentences.**

• Planning/drafts must be clearly indicated. If not, **mark the first summary presented.**

• Candidates **must** indicate the **word count** correctly.

• For FAL award the marks as follows:

- 7 marks for 7 points;

- 3 marks for language.

Penalties:

• For summaries that are too long: Read only up to five words beyond the required length and **ignore the rest of the answer.**

• Summaries that are too short but contain all the required main points **should not** be penalised.

• Language errors (grammar, spelling, punctuation): deduct from the 3 marks for languages as follows:

0-4 errors – no penalty.

5-10 errors – subtract 1 mark.

11-15 errors –subtract 2 marks.

16 errors or more – subtract 3 marks.

• For direct quotations of **whole sentences,** penalise as follows from the total mark awarded for the points and language usage:

1-3 whole sentences quoted: no penalty.

4-5 whole sentences quoted: deduct 1 mark.

6-7 whole sentences quoted: deduct 2 marks.

• Subtract 1 mark from the total marks awarded for the points and language usage for not indicating the word count, or for an incorrect word count.

NOTE: Abbreviations should not be used but should they appear in the summary, they must be counted as the number of the words that they represent.

Activity 3

See rubric on the next page.

Note that there are many different possible routes. For example: one could start on the M47 (Hendrik Potgieter), or one could start on the M5 (Beyers Naude), or one could start on the R512 (Malibongwe Drive), or one could start on Cedar Avenue. All of these would be correct as starting points, as they all come from different suburbs of Johannesburg.

Accept any route starting on one of these roads, which does end up at Maropeng.

Learners should use directions involving mileage where possible (e.g. "From the turnoff, travel 1.7 km); landmarks (e.g. lion park, Sasol petrol station, traffic lights, T-junction); direction (left/right or north, west, etc.).

	Code 7 Outstanding 8-10	Code 6 Meritorious 7	Code 5 Substantial 6	Code 4 Adequate 5	Code 3 Moderate 4	Code 2 Elementary 3	Code 1 Not achieved 0-2
Research skills and presentation	Convincing evidence that a wide range of relevant sources have been consulted. Presentation impressive.	Sound evidence that a wide range of relevant sources have been consulted. A well-structured presentation.	Good evidence that a wide range of relevant sources have been consulted. Substantially structured presentation.	Satisfactory evidence that relevant sources have been consulted. Presentation is adequate.	Some evidence that relevant sources were used. Presentation is moderately acceptable.	Limited evidence of partial use of sources. Elementary presentation.	If sources were used, there is little or no evidence in the presentation. Ineffective presentation.
Planning and organisation of contents	Thoroughly planned according to task, audience context and format. Striking introduction which immediately grasps audience attention. Brilliant development of ideas and argument. Skilful ending thoroughly drawn together.	Very well planned according to task, audience, context and format. Very good and appropriate introduction which immediately arouses interest. Very good, and sustained development of ideas and argument. Very good conclusion.	Well planned according to task, audience, context and format Good and appropriate introduction which arouses interest. Good, and sustained development of ideas and argument. Good conclusion.	Satisfactory planning according to task, audience, context and format Reasonably good and appropriate introduction which still arouses interest. Good development of argument which can be followed easily. Reasonably good ending, but sometimes lacks cohesion.	Adequate planning according to task, audience, context and format Introduction able to rouse moderate interest. Moderate development of ideas and argument but has problems with cohesion. Moderate acceptable conclusion, but lacks cohesion.	Evidence of some planning according to task, audience, context and format Some evidence of introduction , but barely arouses interest. Some arguments can be followed, but others are inconsistent/ can barely be followed. Hardly any evidence of conclusion.	No evidence of planning according to task, context audience or format. Introduction poor and arouses no audience interest. Cannot sustain argument Shows little understanding of topic. Conclusion lacking.
Tone, speaking and delivery skills	A skilled and animated presenter, appropriate style and register. Eye contact, facial expressions, gestures and body language outstanding, functional and convincing. Confident delivery with very little use of notes.	Very good presenter, natural and fluent presentation, appropriate style and register. Eye contact, facial expression, gestures and body language functional and convincing. Notes used effectively and with confidence.	Good presenter natural and appropriate style and register. Eye contact, facial expression, gestures and body language largely functional and convincing. Notes used effectively.	Style and register mostly appropriate. Eye contact, facial expressions, gestures and body language reasonably convincing. Some dependency on notes but still good contact with the audience.	Presentation lacks appropriate style and register. Adequate eye contact, facial expressions, gestures and body language but not always convincing. Use of notes often detract from presentation.	Hesitant, lacks expression – mostly inappropriate style and register. Very little eye contact/ facial expressions/ body language. Dependent on notes.	Inappropriate tone, style and register. Almost non-existent eyes contact, inappropriate facial expression and body language. Totally dependent on notes.
Critical awareness of language usage	Excellent vocabulary and creative language use. Excellent ability to manipulate language in order to evoke audience response. Exceptional awareness of, and sensitivity to language use on cultural issues.	Very good vocabulary and creative language use. Very good ability to manipulate language in order to evoke audience response. Very good awareness of, and sensitivity to language use on cultural issues.	Good vocabulary and creative language use . Good language manipulation in order to evoke audience response. Good awareness of, and sensitivity to language use on cultural issues.	Adequate vocabulary and creative language use. Reasonable language manipulation in order to evoke audience response. Adequate awareness of, and sensitivity to language use on cultural issues.	Moderate vocabulary and language use. Some language manipulation in order to evoke audience response. Moderate awareness of, and sensitivity to language use on cultural issues.	Limited vocabulary and language use. Struggles to manipulate language in order to evoke audience response. Seldom aware or sensitive or respectful to language use on cultural issues.	Very limited vocabulary and language. Unable to manipulate language. Hardly ever aware of sensitive or respectful language on cultural issues.
Choice, design and use of audio and/ or visual aids	Excellent and totally appropriate choice and presentation of visual aids. Visual aids make an impact on the audience and effectively contribute to the success of the presentation.	Very good and appropriate choice and use of visual aids. Presenter is able to use visual aids effectively to enhance the presentation.	Good and appropriate choice and use of visual aids. Presenter is able to use visual aids to enhance the presentation.	Visual aids are mostly relevant to the topic. Most of the visual aids used contribute to the success of the presentation.	Visual aids adequately used, but not always totally appropriate. Visual aids do not always contribute to presentation.	Seldom uses visual aids. Use of aids sometimes clumsy and not functional.	Makes no use of visual aids.

Memorandum

Subject: English – First Additional Language **Grade: 12**

Activity 1

1. A large, extrinct bird from Mauritius that couldn't fly.

2. The name "dodo" implies stupid or foolish.

3. Actually the dodo was not stupid but the people who killed it were. Cruelty to animals is an act of foolishness which resulted in dodos being extinct.

4.1 Doornail/dodo

4.2 Dodo/doornail

5. As quoted in the story: "The world will never see another living dodo" or dodos are gone forever. (Anything to that effect.)

6. A learner must tell a **sad** short story about an animal, pet or themselves.

Activity 2

1. Small group exercise.
1.1 A palaeontologist studies fossils as a guide to the history of life on earth/to trace the origin of life on earth/to understand where life originates. (Any one of these or anything to that effect.)

1.2 The "Taung Child" was discovered near Krugersdorp or Ventersdorp (not Pretoria).

1.3 Broom arrived at Sterkfontein on August 17 1936.

1.4 George Barlow managed Sterkfontein Caves, a site where fossils can be studied.

2. Creative writing exercise.
See the rubric on the following page for longer transactional text.

2.1 Newspaper article or,
2.2 Letter to a colleague.

Activity 3

1.1 The poet has separated the four elements of life in boxes creating a structural effect in which the texts:
• Can be seen as different poems or just one poem with different stanzas;
• Can attract the attention of the inquisitive young minds.

• As one poem, the positioning of texts points to the fact that these elements are entirely connected and totally indispensable to life.

• As different poems, the positioning of texts implies that each poem must be seen as equally important to life but uniquely different from the rest.

1.2 any one of the examples below:
• AIR – " rockets pierce the atmosphere".
• FIRE – "where sabre tooth shadows flicker".
• FIRE – "…coal stories glow in the hearth".

1.3 Any one of the poems and a reason must be given for any choice made. (Accept any reasonable reason.)

1.4 At least one example for <u>any three</u> of the five senses:
• SOUND: click, shuffling (poem about water).
• SIGHT: flicker, glow, amber (poem about fire).
• SMELL: scents.

Total: 10

Activity 2: Rubric

Rubric for assessing longer transactional text (30 marks)

	Code 7: Outstanding 80%-100%	Code 6: Meritorious 70%-79%	Code 5: Substantial 60%-69%	Code 4: Adequate 50%-59%	Code 3: Moderate 40%-49%	Code 2: Elementary 30%-39%	Code 1: Not achieved 0-29%
Content, planning and format (20 marks)	**16-20** - Specialised knowledge of requirements of the text. - Disciplined writing – maintains thorough focus, no digressions. - Text fully coherent in content and ideas and all detail support the topic. - Evidence of planning and/or drafting has produced a virtually flawlessly presentable text. - Has applied all the necessary rules of format.	**14-15½** - Good knowledge of requirements of the text. - Disciplined writing – learner maintains focus, hardly any digressions. - Text is coherent in content and ideas, with all details supporting the topic. - Evidence of planning and/or drafting has produced a well crafted, presentable text. - Has applied the necessary rules of format.	**12-13½** - Fair knowledge of requirements of the text. - Writing – learner maintains focus, with minor digressions. - Text is coherent in content and ideas, and details support the topic. -Evidence of planning and/or drafting has produced a presentable and good text. - Has applied most of the necessary rules of format.	**10-11½** - Adequate knowledge of requirements of the text. - Writing – learner digresses from topic but does not impede overall meaning. - Text adequately coherent in content and ideas and some details support the topic. - Evidence of planning and/or drafting has produced a satisfactorily presented text. - Has applied an adequate idea of the requirements of format.	**8-9½** - Moderate knowledge of requirements of the text. Response to writing task reveals a narrow focus. - Writing – learner digresses, meaning is vague in places. - Text moderately coherent in content and ideas and has basic details which support the topic. - Evidence of planning and/or drafting has produced a moderately presentable and coherent text. - Has a moderate idea of requirements of format – some critical oversights.	**6-7½** - Elementary knowledge of requirements of the text. Response to writing task reveals a limited focus. - Writing – learner digresses, meaning is obscure in places. - Text not always coherent in content & ideas, and has few details which support the topic. - Inadequate planning and/or drafting. Text not well presented. - Has vaguely applied the necessary rules of format.	**0-5½** - No knowledge of requirements of the text. - Writing – learner digresses, meaning is obscure in places. - Text not coherent in content and ideas, too few details to support topic. - Planning/ drafting non-existent. Poorly presented text. - Has not applied the necessary rules of format.
Language, style and editing (10 marks)	**8-10** - Text is grammatically accurate and well constructed. - Vocabulary is very appropriate to purpose, audience and context. - Style, tone, register very appropriate. - Text virtually error free following proof reading, editing. - Length correct.	**7- 7½** - Text is well constructed and accurate. - Vocabulary is mostly appropriate to purpose, audience and context. - Style, tone and register mostly appropriate - Text largely error free following proof reading, editing. - Length correct.	**6-6½** - Text is well constructed and easy to read. - Vocabulary is appropriate to purpose, audience and context. - Style, tone, register generally appropriate. - Text mostly error free following proof reading, editing. - Length correct.	**5-5½** - Text is adequately constructed. Errors do not impede flow. - Vocabulary is adequate for the purpose, audience and context. - Style, tone, register adequately appropriate. - Text still contains a few errors following proof reading, editing. - Length almost correct.	**4-4½** - Text is basically constructed. Several errors. - Vocabulary is limited and not very suitable for the purpose, audience and context. - Lapses in style. - Text contains several errors following proof reading, editing. - Length – too long/short.	**3-3½** -Text is poorly constructed and difficult to follow. - Vocabulary requires remediation and not suitable for purpose, audience and context. - Style, tone and register inappropriate. - Text error ridden despite proof reading, editing. - Length – too long/short.	**0- 2½** - Text is poorly constructed and muddled. - Vocabulary requires serious remediation and not suitable for purpose. - Style, tone and register do not correspond with topic - Text error ridden and confused following proof reading, editing. - Length – far too long/short.

Life Sciences

Who am I?

maropeng

Developed by:

Kanthan Naidoo

Susan Wiese

Audrey Hutton

Lounell White

Subject: Life Sciences

Grade 10 (CAPS)	Grade 11 (CAPS)	Grade 12 (CAPS)
Strand	**-**	**Strand**

Strand 4: Diversity and continuity

- Life exists in a huge array of forms and modes of life at present, which scientists organise according to man-made classification systems. Modern life forms have a long history, extending from the first cells, around 3.5 billion years ago. South Africa has a rich fossil record of some key events in the history of life. Changes in life forms are related to climate changes as well as movements of continents and oceans over long periods of time.

Content

Life's history: Different representations of the history of life on earth. The relationship to changes in climate (e.g. increase in oxygen levels, ice ages) and geological events (e.g. movement of continents; introduction to biogeography); bivalves and ammonites on the Makhatini flats in northern KZN, whale fossils in the Sahara, trilobites in the Karoo.

Life's history: Different representations of the history of life on earth. The relationship to changes in climate (e.g. increase in oxygen levels, ice ages) and geological events (e.g. movement of continents; introduction to biogeography); bivalves and ammonites on the Makhatini flats in northern KZN, whale fossils in the Sahara, trilobites in the Karoo.

Geological timescale: Meaning and use of timescales *(details not to be memorised)*

Mass extinctions: There have been five, two of which are particularly important: 250 mya (resulted in the extinction of about 90% of all life on Earth) and 65 mya (resulted in the extinction of many species, including the dinosaurs).

Diversity, Change and Continuity

- Human evolution

Fossil: Evidence of common ancestors for living hominids including humans: Anatomical differences and similarities between African apes and humans:

- Fossil evidence: key features: bipedalism (spine and pelvic girdle), brain size, teeth (dentition), prognathism and palate shape, cranial and brow ridges. The number of fossils that have been found (it is important to know that thousands of fossil fragments have been found).

Out of Africa hypothesis
Evidence African origins for all modern humans:
genetic links, mitochondrial DNA:

- Rift valley fossil sites in East Africa (Kenya and Tanzania) and in Ethiopia. Scientists e.g., Johansen and White, the Leaky family
- Fossils discovered at these sites: *Ardipithecus*, *Australopithecus*, *Homo*
- Fossils sites in South Africa: Fossils discovered at these sites: *Australopithecus* and *Homo*

Evolution by Natural Selection
Origin of ideas about origins

- brief overview of history of different theories of development: Lamarckism, Darwinism, and Punctuated Equilibrium.

Subject: Life Sciences

Grade 10 (CAPS_	Grade 11 (CAPS)	Grade 12 (CAPS)
-	-	

Importance of the Cradle of Humankind:

- **Main fossil sites in South Africa, e.g.,** Taung, Sterkfontein, Kromdraai, Swartkrans, Malapa, Plovers Lake, Gladysvale, Makapansgat, Florisbad, Border Cave, Blombos: Evidence and evolutionary trends from these sites (*refer to dating of fossils Grade 10)*. At least two examples should be studied to see evolutionary trends.

DNA: The Code of Life
Deoxyribonucleic acid (DNA)

- Location in the cell; chromosomes, genes and entrance unclear DNA;
- Discovery of the structure DNA by Watson, Crick, Franklin and Wilkins;
- Structure of DNA;
- Role of DNA: genes and non coding DNA;

Ribonucleic Acid (RNA)

- Transcription from DNA;

Genetics and inheritance
Mutations

- Mention mitochondrial DNA and the tracing of genetic Links
- Paternity testing and DNA finger printing (forensics)

Background Knowledge

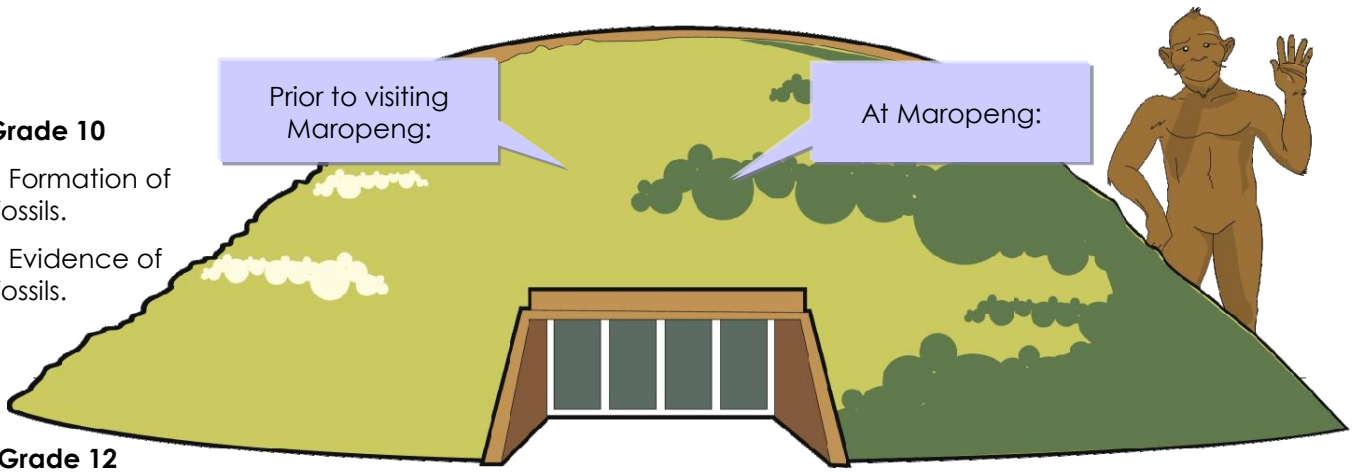
Subject: Life Sciences **Grades: 10 and 12**

Teacher's Notes

Teachers and learners will never forget their visit to the Cradle of Humankind and its two visitor centres – the main one packed with exciting, interactive exhibits at Maropeng, and a smaller one which is the gateway to the fascinating Sterkfontein Caves and their secrets about our past.

In this section, Life Sciences, you and your learners will discover your heritage and learn more about genetics.

Life Sciences



Grade 10

- Formation of fossils.
- Evidence of fossils.

Grade 12

- Protein synthesis.
- Human evolution.
- Darwin's and Lamarck theories.

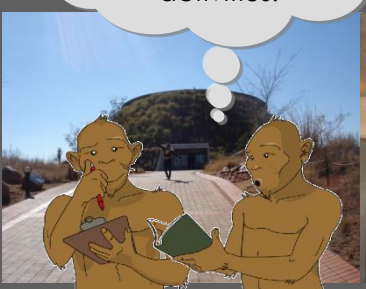
Grade 10

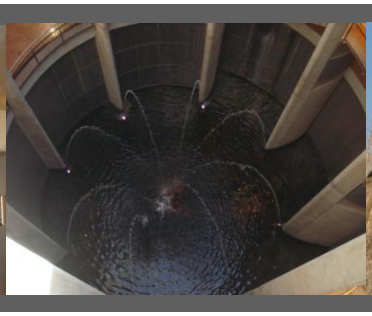
- What type of fossils do we get?
- Where do humans fit in on the time scale?

Grade 12

- What killed the "Taung child"?
- Can we trace our genetic lineage?

We will show you the learner assessment activities.





Background Knowledge

Subject: Life Sciences **Grade: 10**

Diversity, Change and Continuity

Maropeng offers a great opportunity to explore diversity, continuity and change. We will give you a few activities to help you get started.

What is diversity?

The quality of being made of many different elements, forms, kinds, or individuals.

What is continuity?

Uninterrupted existence or succession. (Succession: a way in which things follow each other in space or time.)

What is change?

A transformation or transition from one state, condition, or phase to another.

Source: www.answers.com

Hunt for answers

It is now time to explore …

Find things that tell us more about the three points below, and make notes. You can also support your answers by drawing pictures.

- Diversity
- Continuity
- Change

What does the Diversity Banner tell us?

Do you think people will have different interpretations? Why?

Diversity **Maropeng**

Since the first life appeared in the Earth's oceans about 3.8-billion years ago, the pattern of life on our planet has become increasingly complex.

Life has developed from those simple organisms, exploding into more than 1.3-million documented species of living things on Earth today. There may be up to 100-million species in total – the vast majority have not yet been documented.

The development of life on Earth as we know it has generally been gradual, although there have been periods of rapid change. The most prolific profusion of species has occurred during the last eighth of Earth's history, known as the Phanerozoic Era, within the past 543-million years.

Among the Earth's first organisms were cyanobacteria: tiny, single-celled creatures which formed a film over the surface of mud and trapped coats of it, making layered structures called stromatolites. Stromatolites emerged soon after the Earth cooled and the atmosphere and oceans formed. Although now nearly extinct, these microbial mats are still forming in some places, such as in the highly saline waters of Shark Bay, in Western Australia.

Fossil stromatolites have been discovered in a wide variety of environments, from thermal springs to lakes, the sea and even below ice-covered lakes in Antarctica. Scientists have found fossil traces of stromatolites which are about 3.5-billion years old – some of the world's oldest – near Barberton in the Mpumalanga Province of South Africa. Stromatolite fossils of a similar age have also been found in north-western Australia and Greenland. Fossil stromatolites have also been found at Sterkfontein.

The stromatolite fossil record is almost the only evidence we have of life on Earth for the first seven-eighths of the planet's existence.

The last eighth of the Earth's history saw an explosion of life. About 600-million years ago, the first sponges, jellyfish and flat worms appeared in the oceans. The first arthropods – millipedes and centipedes, and later spiders and scorpions – moved onto land about 450-million years ago. Insects first evolved about 400-million years ago and reptiles about 330-million years ago. The first mammals appeared about 220-million years ago, and the first birds about 150-million years ago. The first flowering plants began to grow about 118-million years ago. The last dinosaurs were wiped out about 65-million years ago, and the first primates – our ancient ancestors – appeared about 55-million years ago.

At present, classified species include 4,000 different mammals, 9,000 birds and 750,000 types of insects.

But hundreds – possibly thousands – of species are becoming extinct every year. Some estimates put the number of species dying out at about 100 every day; even conservative records of extinctions run to more than 500 a year.

Scientists regard Africa as a remnant of the Earth's past diversity. Its relatively sparse human populations until now have allowed people and a great range of other species to co-exist. But this is changing fast. The amazing biodiversity of life on Earth is now under serious threat.

Background Knowledge

Subject: Life Sciences **Grade: 10**

What are fossils?

Maropeng

Fossils are the remains of plants and animals that have been preserved in sedimentary rocks. Fossils are generally rare. For every animal that dies, its chances of becoming fossilised are estimated to be less than one in a million. But at the Cradle of Humankind, the chances are greater because the area has the right mix of conditions that promote fossilisation.

How are fossils formed?

For a fossil to be successfully formed and found a number of steps have to take place in succession. One missed step, and the ancient remains of an animal or plant will either not be preserved, or not be discovered.

Fossils are formed when minerals such as calcium carbonate envelop or replace bones and other organic matter, hardening or casting them within a rock matrix such as breccia that remains unchanged for millions of years.

If the sediment is composed of the right minerals, it can suffuse through the bones and organic material, making them as hard as rock in a process called "mineralisation". Over millions of years, these fossils are covered by layers of new rock and sediments.

Finally, either through natural occurrences like erosion, earthquakes or human activity, such as limestone mining, the fossils can become exposed again, giving scientists a window to our past.

Maropeng shows a variety of original fossils throughout the year

A palaeontologist at work in the laboratory

The science of studying fossils

The search for fossils begins with geological surveys. Some areas are more likely to yield fossils than others, and researchers normally concentrate their efforts on regions that have good, fossil-bearing rock such as the dolomitic limestone of the Cradle of Humankind and the ancient lake beds of East Africa.

But a good measure of luck is also needed sometimes, as was the case in many of the Cradle of Humankind sites, which were first explored by miners.

Hundreds of palaeontological sites in South Africa have been exposed by miners. But sadly, many have been destroyed in the mining process.

Evidence from the study of fossils

Palaeontologists examine the age, characteristics and surrounding environment of a fossilised animal to understand its place on the evolutionary timeline.

The age of fossils can be determined using radio-isotope dating on rocks close to them. Some chemical elements occur in slightly different forms called isotopes, and some of these isotopes found in rocks are unstable and decay over millions of years at a set rate.

By checking the amount of decay of an isotope, scientists can work backwards and determine how old a rock is – and from that estimate the age of a fossil.

Once a few species have been classified, experts can start to examine trends in the evolution of animals.

For instance, with fossilised remains of *Australopithecus africanus* and *Homo ergaster* in the Sterkfontein deposits, we can see the trend towards a bigger brain as hominids evolved.

The Cradle of Humankind gives us some of the richest evidence of our earliest direct ancestors – *Australopithecus africanus* and *Homo ergaster* hominids – and our "distant cousins", *Paranthropus robustus*.

Fossils from some of the earliest organisms ever discovered have been found in South Africa and date to about 3.5-billion years ago.

Palaeontologists have also found remains of our distant mammalian ancestors that lived more than 200-million years ago and fossils of some of the earliest known dinosaurs from about the same period, in the Karoo.

Background Knowledge

Subject: Life Sciences **Grade: 10**

Maropeng

Extinction of Species, Red Data Listing and Endangered Species

Five major extinctions have rocked life on Earth. During these periods of mass extinction, huge numbers of species of life died out due to wide-scale environmental changes.

Many scientists claim that currently we are experiencing a sixth mass extinction.

After each of the mass extinction events, the number of species tended to increase rapidly. In fact, within a relatively short period of time, there were often more species than existed before the extinction.

About 65-million years ago, after the fifth extinction, in which the dinosaurs were wiped out, an explosion of early mammals brought about the emergence of our human ancestors – the early primates.

Some of the mass extinctions occurred slowly over long periods of time, through gradual climate change, for instance.

Others happened suddenly, through a catastrophic event like an asteroid impact. However they happened, all the mass extinctions had major effects on the way life evolved on Earth.

Most of the species that have ever lived on Earth are now extinct.

Of the five major extinctions, the last three are important to the evolution of humans.

A catastrophic mass extinction event occurred 250-million years ago, probably as a result of climate change, causing almost 95 percent of life on Earth to become extinct.

The Triassic period that followed saw the rise of dinosaurs and our early mammalian ancestors. Both these groups survived the next mass extinction, probably caused by asteroid impacts, which happened 210-million years ago.

Dinosaurs suddenly became extinct about 65-million years ago, after the world was rocked by the impact of a giant asteroid or volcanic eruptions, or a combination of both.

Often a new group of species dominates after a mass extinction because they are able to occupy niches that had previously been taken by other species.

In this case, 65-million years ago mammals started to occupy the places in the global ecosystem the dinosaurs had previously dominated. A huge diversity of new mammal species evolved, including the ancestors of all modern species of mammals, and our hominid predecessors.

Humans have sped up the extinction process by exploiting the Earth's resources. The serious damage we are inflicting on the world's richest areas of biodiversity has led many scientists to believe we are causing the sixth mass extinction. If this is indeed true, it is the first mass extinction caused by a species.

Geological Time Scale

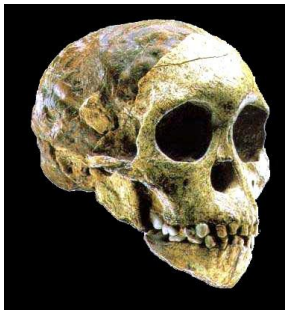
The geologic time scale is a chronologic schema (or idealised model) relating stratigraphy to time that is used by geologists, palaeontologists and other earth scientists to describe the timing and relationships between events that have occurred during the history of the Earth.

Source: http://en.wikipedia.org/wiki/Geologic_time_scale

4-billion years ago	Life originates
3.6-billion years ago	Cynabacteria exists
2.7-billion years ago	Photosynthesis
2.1-billion years ago	Single-celled organisms
1.5-billion years ago	First cells with nucleus
575-million years ago	Multicellular life originates
543-million years ago	Origin of first fish
430-million years ago	Fish with jaws
420-million years ago	First land plants exist
354-million years ago	Amphibians appear
320-million years ago	Reptiles originate
220-million years ago	Earliest dinosaurs
190-million years ago	First primitive mammals
150-million years ago	First flowering plants
55-million years ago	Ancestors of modern elephant
51-million years ago	Earliest Prosimian fossils
50-million years ago	Early ancestors of whales
30-million years ago	Earliest monkeys exist
7-million years ago	Oldest claimed hominids
4-million years ago	Mammoths first appear
3.2-million years ago	"Lucy", an *Australopithecus afarensis*
2.5-million years ago	*Paranthropus* exists
2.4-million years ago	*Homo habilis* appears
1.6-million years ago	*Homo erectus* exists
250,000 years ago	Middle Stone Age begins
190,000 years ago	*Homo sapiens* exists
25,000 years ago	Later Stone Age begins

Fossil Finds in South Africa

The fossil hominid sites in Southern Africa include the Cradle of Humankind, Taung and Makapans Valley. The Cradle of Humankind is a World Heritage Site which consists of 13 palaeontological sites.



"Taung Child"

At Swartkrans fossils of *Paranthropus robustus* and *Homo ergaster* were found. Fossils of sabre-toothed cats, which became extinct about 1-million years ago, were also found.

Sterkfontein is one of the world's richest hominid sites. Fossils of *Australopithecus africanus,* which lived 2.5-million to 2.1-million years ago, were found here.

In Cooper's cave, fossils of *Paranthropus robustus* were found as well as fossils of baboons which lived 1.8-million years ago.

At Bolt's farm 20 caves exist where fossils between 5-million and 4-million years old were found. These include fossils of sabre-toothed cats and baboons.

At Kromdraai the first specimen of *Paranthropus robustus* was discovered by a schoolboy in 1938. This fossil dates to 1.95-million years ago.

At Plover's lake artefacts have been excavated which date back to the Middle Stone Age (70,000 years ago).

A wealth of animal and hominid fossils stretching back more than 3-million years was found at Makapans Valley. This valley was declared part of the Cradle of Humankind World Heritage Site in 2005. This site is in the Limpopo Province.

The "Taung Child", a specimen of *Australopithecus africanus,* was found at the Taung fossil site in 1924. This site is in the North West Province (2.5-million years ago).

Palaeontologists have also found remains of mammalian ancestors which lived 200-million years ago, and fossils from dinosaurs from the same period, in the Karoo.

FET: Learner Activity and/or Assessment Task

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Fossil Finds in South Africa *continued …*

At Haasgat, fossils were found of the *Colobus* monkey, which lived 1.5-million years ago. Fossils of *Cersopithecoides* monkeys which lived 3-million to 1.5-million years ago were also found.

The hunting hyaena, *Chasmaporthetes*, lived 3-million to 1-million years ago in the Cradle of Humankind during the time of *Australopithecus* and P*aranthropus*.

Fossils of *Chalicotheres,* animals with horse-like heads that lived 45-million years ago, were found at Makapans Valley. Those of an ox-like animal, *Makapania*, which lived 3-million to 2.5-million years ago, were also found here. Makapans Valley is situated about 300 km from Sterkfontein.

"Little Foot", an earlier species of *Australopithecus,* who lived between 4.1-million and 3.3-million years ago, is currently being excavated from Sterkfontein caves. "Mrs Ples", which palaeontologists now suspect was a male, and who lived about 2.5-million years ago, was also found at Sterkfontein. S/he was a member of the *Australopithecus africanus* species.

Artefacts of the Early Stone Age, which dates back 2.5-million years, and of the Middle Stone Age, which dates back 260,000 years, are found in South Africa. Artefacts of the Later Stone Age, which dates back 40,000 years, are also found in South Africa. Evidence of artefacts of the Early Stone Age were found at Saldanha, Makapans Valley and in the Northern Cape. Artefacts of the Middle Stone Age were found in the Free State, Western Cape and Sterkfontein. Artefacts of the Later Stone Age are found in the Western Cape, Free State and KwaZulu-Natal.

Activity 1

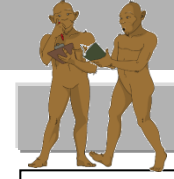
Use the information in the table and the "Fossil Finds in South Africa" article to draw a geological time line. Indicate the eras and periods when these fossils existed in South Africa. In your time line, indicate the different life forms that existed in South Africa. Also draw a map of South Africa, indicating on it where the fossils were found. This is important for fossil tourism in South Africa.

Did you know?

Our large brains have saved us from ***extinction***.

The evolution of the modern human brain has allowed us to think, feel, plan and act the way we do .

One of the interactive displays at Maropeng showcases the development of the brain over millennia



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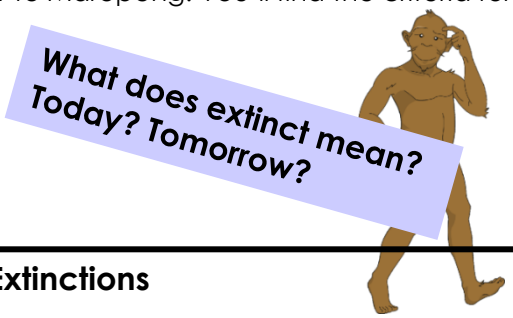
Activity 2

During your visit to Maropeng you will find and read information on extinctions, fossils of extinct animals and endangered species. What does this all mean for us **today** and for our children of **tomorrow**? In groups, prepare a poster on this. You will find some guidance on the pages that follow. When you've finished, send your poster to Maropeng. You'll find the criteria for the poster on the **next page.**



Recent Extinctions

The dodo is a famous example of extinction in modern times. The large, flightless bird was discovered on the Indian Ocean island of Mauritius in 1598 by sailors, but was extinct by 1681 – killed by humans and the dogs and pigs they introduced to the island.

Southern African animal extinctions in the past 200 years have included the bluebuck, an antelope with long curved horns, which was last seen at the beginning of the 19th century, and the quagga, a sub-species of zebra, which died out in 1883.

Some estimates suggest more than 100 species are becoming extinct each day, and there are thousands of endangered species in the world facing extinction, from pandas in China to tigers in India and wattled cranes in South Africa. Some predictions warn that a quarter of all mammals will be lost in the next 30 years.

Scientists agree that human activities, such as mining, agriculture, settlements, pollution and global warming, are causing a rapid loss of biodiversity.

It's up to us to reverse this trend.

Mass Extinctions

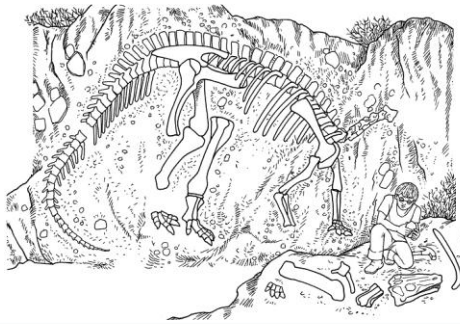
65-million years ago
End Cretaceous period
Probable cause: Asteroid impact and volcanism
Main victims: Dinosaurs, ammonites

210-million years ago
Late Triassic period
Probable cause: Asteroid impacts
Main victims: Mammal-like reptiles, gymnosperms

250-million years ago
End Permian period
Probable cause: Climatic change
Main victims: Foraminifera (simple, jelly-like sea creatures with shells), *Glossopteris* (ancient ferns)

360-million years ago
Late Devonian period
Probable cause: Asteroid impacts
Main victims: Marine invertebrates

440-million years ago
End Ordovican period
Probable cause: Climatic change
Main victims: Marine invertebrates



Fossils are the remains of ancient plants and animals.

The word "fossil" comes from the Latin word "*fossilis*", which means "dug up".

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Activity 3

Complete the following:

Modern humans have only been around for about 200,000 years, and their ancestors, the hominids, have only been around for about 7-million to 6-million years. Three of the five mass extinctions so far were probably caused by asteroid impacts, while the other two were probably caused by climate change. Some have argued that we are in the midst of the sixth mass extinction and that we are causing it.

- List ways in which we could stop the sixth mass extinction. (5)
- The dinosaurs lived for many millions of years longer than us. How might the human species need to adapt over time in order to survive? (5)

Poster Assessment Rubric

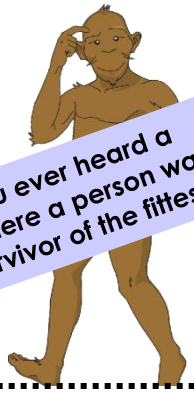
Criteria	Performance Indicator Levels		
	0	1	2
Title	No title.	Title present but incomplete.	Complete title.
Purpose of poster	Purpose vague.	Part of the purpose vague.	Purpose distinct.
Facts	Facts incorrect.	Some facts have little detail.	All facts are correct with interesting detail.
Organisation/layout	Disorganised.	Poster partly organised.	Organisation of poster logical and explicit.
Use of colour	No colour is used.	Colour partially used to enchance the poster.	Colour purposefully used to enhance the poster.
Letter size	Letters too small to read from a distance.	Some letters too small to read from a distance.	Letters big enough to read from a distance.
Pictures/diagrams (attractive)	Pictures/diagrams are not visually attractive.	Some pictures are attractive.	All pictures are attractive.
Pictures/diagrams (applicable)	Pictures/diagrams do not support the aim of the poster.	Some pictures/ diagrams support the aim of the poster.	All pictures/diagrams support the aim of the poster.
Labels	No labels at pictures.	Labels present but some are incorrect.	Correct labels for all pictures.
Creativity	No creativity.	Elements of creativity.	Very creative and original.
TOTAL: 20			

Note to teacher: The mark of the learner must be divided by two for a mark out of 20.

Background Knowledge

Subject: Life Sciences **Grade: 12**

Diversity, Change and Continuity

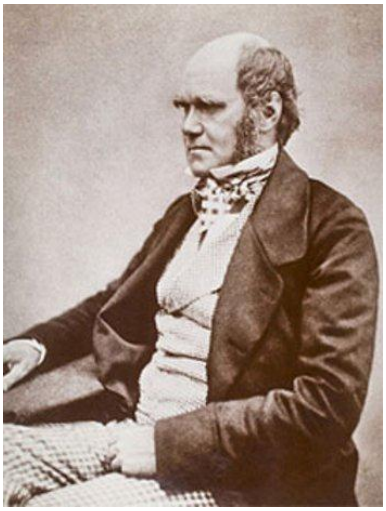


Have you ever heard a story where a person was the "survivor of the fittest"?

Survival of the fittest is a concept relating to competition for survival or predominance. The phrase was originally used by Herbert Spencer in his *Principles of Economics* of 1864. Spencer drew parallels between his ideas about economics and Charles Darwin's theories of evolution, in particular natural selection.

The phrase is a metaphor, not a scientific description; and it is not generally used by biologists, who almost exclusively use **natural selection** in preference.

Source: http://en.wikipedia.org/wiki/Survival_of_the_fittest



Charles Darwin

Adaptation and Survival

Charles Darwin (1809-82) was the first person to articulate the theory of evolution. He argued the case for natural selection – that over time creatures that are able to adapt biologically to changes in their environments (in other words, evolve) survive, while those that don't adapt become extinct.

Darwin also argued that all species of life on Earth are interrelated and have a common ancestry, dating back to the earliest forms of life.

Evidence supporting this theory can be seen in hominid fossils from Sterkfontein and other sites in the Cradle of Humankind. These fossils show that our early hominid ancestors had human-like teeth and could walk on two legs, but that they also had several ape-like features, including relatively small brains.

Many scientists believe that hominids diverged from the ape lineage between about 8-million and 7-million years ago.

It's only in the past 50 years or so that the theory of evolution has received wide-scale acceptance. But the Western world knew of the existence of human-like animals, the great apes, in Asia and Africa, by the 18th century.

Carl Linnaeus, a Swedish botanist who devised a scientific system with which to classify all living things in 1735, decided that humans and apes were similar enough to be classified together in the zoological order primates.

Forty years later, James Burnett, Lord Monboddo of Scotland, who was an eccentric judge and philosopher, suggested that humans were related to orangutans, and that Africa was humanity's ancestral home. Burnett is now credited as being one of the first scholars to introduce the concept of evolution.

In 1859, Charles Darwin published his theory of the evolution of species and suggested that humans had evolved from older, yet-to-be-discovered species.

The first fossil to be recognised as a human ancestor was a Neanderthal skullcap, found in 1856 in Germany. In the same year, a fossil of an early ape, *Dryopithecus*, was discovered in France. A more ancient type of human, *Pithecanthropus*, later reclassified as *Homo erectus* and now known popularly as "Java Man", was found in Java, Indonesia, in 1891.

In 1924, the skull of the most ape-like human ancestor yet, the "Taung Child", was found in what is now the North West Province of South Africa. It had an ape-sized brain, but human-like teeth.

Professor Raymond Dart, the anatomist who recognised it as a hominid, claimed this fossil represented a link between apes and humans and named it *Australopithecus africanus* ("southern ape of Africa"). In 1936, palaeontologist Dr Robert Broom found the first adult *Australopithecus* at Sterkfontein.

It is generally accepted that hominids evolved from an ape in a time known as the Miocene Epoch, more than 7-million years ago, as the oldest known hominid thus far is the 7-million-year-old *Sahelanthropus tchadensis* from Chad. Other early hominids are the 6-million-year-old *Orrorin tugenensis* from Kenya and the 5.8-million-year-old *Ardipithecus ramidus kadabba* from Ethiopia.

Leading Excavators of "Little Foot":

Professor Ron Clarke and Stephen Motsumi

In 1994 Professor Ron Clarke's discovery of four foot bones led to one of the most remarkable scientific discoveries of all time. Clarke started going through a box labelled "monkey fossils" and, relying on his keen memory for shapes and kinds of bones, was able to locate more left foot and ankle-bones, as well as fragments of the left and right shinbones. Now with 12 foot and leg bones of a single hominid, Clarke felt sure there was a chance of finding the entire skeleton. He made a cast of the end of the bone and then set what seemed an impossible task for Stephen Motsumi and Nkwane Molefe, two of the fossil excavators at Sterkfontein. In 1997 the three men began to excavate the leg bones in the hope of finding the rest of the skeleton. Clarke had made the find of the century, a near complete skeleton of an early hominid.

Professor Ron Clarke working on removing the "Little Foot" skeleton from the rock it is embedded in

FET: Learner Activity and/or Assessment Task

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Activity 1

Presentation Time

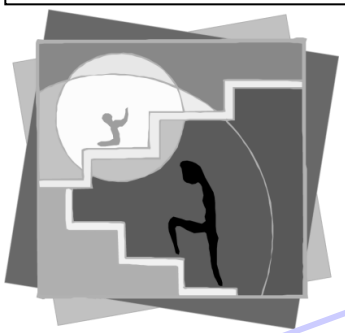
You are going to prepare a group presentation on "Adaptation and Survival". The criteria are listed in this rubric.

Group Presentation Rubric

Criteria	Great	Nice	Good start	Stop, I or we need more help
	3	2	1	0
Gathering information	Gathered a lot of information at Maropeng.	Gathered information at Maropeng.	Gathered some information at Maropeng.	Little information gathered at Maropeng.
Organising information	Information is very well organised.	Information is organised.	Tried to organise information.	Shows little skill in organising notes.
Using information	Shows in-depth insight in drawing conclusions from information.	Shows insight in using the information.	Uses some of the information to make a decision.	Shows little understanding of the purpose of gathering information.
Organisation of presentation	Uses support to present findings.	Presents findings.	Presents with some organisation.	Presentation is not organised.
Persuasiveness	Makes convincing argument.	Good argument.	Shows little evidence of persuasion.	Is not persuasive.
Teamwork	Works as a unit and makes a good presentation.	Works as a group to make the presentation.	Works together to make the presentation.	Does not work together.
Use of technology	Uses technology effectively.	Technology helps with message.	Uses some technology.	Does not use technology.
Team member participation	Members present equally.	One member leads.	Only one member presents.	Presentation was unrehearsed and disorganised.
Rehearsed	Presentation was well rehearsed.	Presentation was rehearsed.	Presentation showed little rehearsal.	Presentation was unrehearsed.
Vocal projection	Projects voice very well.	Projects voice well.	Difficult to hear	Cannot hear.
Vocal expression	Speaks fluently and expressively.	Speaks clearly.	Hard to understand.	No expression.
Posture and eye contact	Uses good posture and eye contact.	Uses posture and eye contact.	Unassuming posture and little eye contact.	Uses poor posture and no eye contact.
Facial expression and body language	Uses facial expression and body language well.	Uses facial expression and body language.	Uses little facial expression and body language.	No facial expression and body language.

Background Knowledge

Subject: Life Sciences **Grade: 12**



Creation Stories

Throughout history, the question of why humans are such a uniquely intelligent and cultured life form has been answered by special (cultural) creation stories.

Egyptian Creation Story

In the beginning, there was dark chaos called Nu, from which arose Atum, who had one eye. Atum and his shadow joined to make a son, the god of air, Shu, and the goddess of moisture, Tefnut, who organised the universe. Tefnut also gave birth to the god of the Earth, Geb, and the goddess of the sky, Nuf.

Geb and Nuf created all the other gods, including Osiris, the god of wisdom, and Seth, the god of evil. Once, Shu and Tefnut got lost in the dark waters of Nu. Atum sent his eye all over the Earth to look for them, and they at last returned with it. He cried with joy, and where his tears fell, men and women sprang up.

Chinese Creation Story

In the beginning, the universe was a cosmic egg.

A god called Pangu was born in the egg and hatched from it, breaking it into two halves that became the sky and the earth which grew further apart as Pangu himself grew. Pangu made the rivers and the mountains and put stars in the sky. Exhausted, he went to sleep forever, and his body parts became the different parts of the Earth.

Zulu Creation Story

The gods Umvelinqangi and Uhlanga gave birth to Unkulunkulu, the Zulu creator and Ancient One. He grew up in the reeds of a mythical swamp called Uthlanga in the sky, and when he became too heavy, fell to earth. He then created the people, cattle, mountains, snakes, and everything else. He taught the Zulu people how to hunt, make fire and grow food. He was the first person and is in everything that he created.

Hinduism

There is no one simple count of creation in Hinduism. Rather many different accounts of creation are found in the numerous Hindu scriptures. At the heart of these accounts is the idea that Brahman (the ultimate divine Reality) has three functions which are performed by the gods Brahma, Vishnu and Shiva, who together are known as the Trimurti. Brahma is the creator, the source of all creation. Vishnu is the preserver, responsible for sustaining the earth. Shiva is the destroyer, who brings change by universal destruction. With its cyclical understanding of time, Hinduism teaches that the material world is impermanent and is created not once, but repeatedly created, preserved and destroyed through the agency of the Trimurti.

In an account in the Rig Veda the universe and humans were created out of part of the body of a single cosmic Person. The four varnas (castes) of Indian society came from the body: the Brahman (priestly caste) from the mouth, the Kshatria (warrior caste) from the arms, the Vashya (general populace, peasant and merchants) from the thighs and the Sudia (servant caste) from the feet.

Judaism

Jewish understanding of creation is based on the Genesis account and reflects different views of that account. The one belief central to Judaism is that Elohim (God) created the world and that human beings are Elohim's special creation.

Islam

Islam is unequivocal that all creation originates from the will, intention and doing of Allah, the Almighty. The Holy Qur'an further states that the Almighty created the Heavens and Earth in six days.

Christianity

A fundamental belief is that God created the Universe out of nothing, reflected in the classic doctrine of creation, ex nihilo.

FET: Learner Activity and/or Assessment Task

Subject: Life Sciences **Grade: 12**

Activity 2

Choose one of the creation stories and design a poster to illustrate how the belief originated and the different components the belief is made up of. (20)

Poster Assessment Rubric

Criteria	Performance indicator levels		
	0	1	2
Title	No title.	Title present but incomplete.	Complete title.
Purpose of poster	Purpose vague.	Part of the purpose vague.	Purpose distinct.
Facts	Facts incorrect.	Some facts have little detail.	All facts are correct with interesting detail.
Organisation/layout	Disorganised.	Poster partly organised.	Organisation of poster logical and explicit.
Use of colour	No colour is used.	Colour partially used to enhance the poster.	Colour purposefully used to enhance the poster.
Letter size	Letters too small to read from a distance.	Some letters too small to read from a distance.	Letters big enough to read from a distance.
Pictures/diagrams (attractive)	Pictures/diagrams are not visually attractive.	Some pictures are attractive.	All pictures are attractive.
Pictures/diagrams (applicable)	Pictures/diagrams do not support the aim of the poster.	Some pictures/ diagrams support the aim of the poster.	All pictures/diagrams support the aim of the poster.
Labels	No labels at pictures.	Labels present but some are incorrect.	Correct labels at all pictures.
Creativity	No creativity.	Elements of creativity.	Very creative and original.
TOTAL: 20			

Note to teacher: The mark of the learner must be divided by two for a mark out of 20.

Background Knowledge

Subject: Life Sciences **Grade: 12**

Human Evolution

Meet the Family

Origins

The study of fossils and DNA suggests that our family tree begins with an ape species that lived between about 8-million and 7-million years ago. The same species is thought to have given rise to the African apes.

The earliest claim for a hominid found so far is *Sahelanthropus tchadensis,* found in Chad in 2001 and dated at about 7-million years old.

Other notable early ancestors are the 6-million-year-old *Orrorin tugenensis* and the 5.8-million-year-old *Ardipithecus ramidus kadabba,* both found in Ethiopia.

Branching out

The hominid tree begins to take more shape about 4-million years ago with *Australopithecus anamensis.* Next was *Australopithecus afarensis,* which lived between about 3.6-million years ago, and which is best represented by the Ethiopian fossil "Lucy". After this, the family tree displays at least two branches. One branch forms the *Paranthropus* genus, the other begins with *Australopithecus africanus.* Some researchers recognise a third branch beginning with *Kenyanthropus platyops* as giving rise to *Homo.*

Paranthropus (which means "parallel to human") evolved specialised teeth, jaws and jaw muscles to be able to grind hard foods such as roots, berries and seeds. But by about 1-million years ago, *Paranthropus* was extinct.

Australopithecus africanus had human-like teeth and hands, but also had some ape-like features, including a small brain, flattened nose and forward-projecting jaws. *Australopithecus africanus* – of which "Mrs Ples" and the "Taung Child" are examples – lived between about 3-million and 2-million years ago. Males were 1.38 m tall and weighed 41 kg, the females were 1.15 m tall and weighed 30 kg.

Making the link

A connection is usually drawn from *Australopithecus* to *Homo,* though researchers often place a question mark in their diagrams of the family tree because of the uncertainty of the link. Nevertheless, *Homo* probably evolved from something similar to *Australopithecus africanus.*

The genus *Homo,* to which we all belong, is first recognised in the form of *Homo habilis,* a hominid with a notably larger brain than the preceding *Australopithecus. Homo habilis,* which is represented by fossils from about 2-million years ago, was considered the first known species to be able to make stone tools. Males were 1.57 m tall and weighed 52 kg and females were 1.18 m tall and weighed 32 kg.

After *Homo habilis* there was *Homo ergaster,* also called the early African *Homo erectus* by some researchers. *Homo ergaster* had an even bigger brain, was about as tall as modern humans, used more advanced tools, and could possibly control fire. Males were 1.8 m tall and weighed 66 kg and females were 1.6 m tall and weighed 56 kg.

Early *Homo* spread out of Africa about 2-million years ago. Most palaeoanthropologists now believe that *Homo erectus* evolved in Asia about 1.6-million years ago, and used its relatively advanced intelligence to spread into Europe and to Africa, where it lived until about 250,000 years ago. *Homo erectus* probably gave rise to other evolutionary dead-ends in Europe and Asia: *Homo heidelbergensis,* which lived from about 600,000 to 300,000 years ago, and evolved into *Homo neanderthalensis,* which lived from about 200,000 to 20,000 years ago.

Modern humans emerge

Meanwhile, back in Africa, *Homo sapiens* emerged about 200,000 years ago, probably as direct descendants of *Homo ergaster.* These immediate ancestors looked like us and were fully "human". Males were 1.75 m tall and weighed 58 kg and females were 1.61 m tall and weighed 49 kg.

DNA analysis shows that modern humans spread out of Africa perhaps 60,000 to 40,000 years ago and replaced the last, now "dead branches" of the family tree in Europe and Asia. They could think and communicate symbolically, were self-aware, and created complex social and cultural ways of life.

FET: Learner Activity and/or Assessment Task

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Activity 3

Use the information on the previous page to complete the following worksheet on the Cradle of Humankind.

Fill in the table below and answer the questions to follow. You might need to redraw the table in your workbook. (12 x 6 = 72 marks)

	"Little Foot"	*Australopi-thecus africanus*	*Paranthro-pus robustus*	*Homo habilis*	*Homo ergaster*	*Homo sapiens*
Age						
Who discovered it?						
Where was it discovered?						
How did it move about?						
Could they have used fire?						
How might they have communicated?						
What technology did they use?						
Were they capable of symbolic thought?						
What impact did they have on the environment?						
What was their skin colour and cover?						
Did they wear clothes?						

Activity 4

1. Why do you think it was important for the evolution of modern humans that our direct ancestors stood up and walked on two legs? (2)

2. Why might an increasing brain size have been important in human evolution? (2)

3. Which do you think was more important in the evolution of humans: the use of tools or complex language? (2)

4. Many people say that humans are not animals. Critically evaluate this statement. Try to explain with reason why some people might say that we are not animals, while others would argue that we are animals. Give your opinion with reason. (2)

5. Do you think that it is fair to say that South Africa is the Cradle of Humankind? (2)

6. Recently Spain granted human rights to chimpanzees. What do you think of this decision? Chimpanzees are our closest relatives. Should they be granted human rights? Give a reason for your answer. (2)

7. a) Draw a bar graph to show the difference in height between the males and females of *Australopithecus africanus*, *Homo habilis*, *Homo erectus* and *Homo sapiens*. (5)

b) Draw a bar graph to show the difference in mass between the males and females of *Australopithecus africanus*, *Homo habilis*, *Homo erectus* and *Homo sapiens*. (5)

A model of an Australopithecus in the Sterkfontein human evolution display

Background Knowledge

Subject: Life Sciences Grade: 12

DNA

The Maropeng Exhibition
The exhibition is self-guided and can take anything from one to three hours, depending on your level of interest and time availability. It is highly interactive and enjoyable, and will engage you and your learners.

Did you know? Studies of DNA in modern human populations suggest that we all share common ancestors who lived in Africa some 200,000 years ago.

You and your learners will take the spectacular boat ride, and discover more about DNA.

Once you have stepped off the exhilarating boat ride through air, water, fire and earth, you'll walk into the first part of the Maropeng exhibition, which introduces some of its major themes, such as evolution, the formation of fossils, extinction, **DNA**, and the birth of the Earth and the Cradle of Humankind. In this section, you and your learners will find information about DNA.

Your DNA, passed on to you by your parents, will determine physical characteristics such as the colour of your hair and eyes

Maropeng

Introduction to DNA

The study of deoxyribonucleic acid (DNA) allows scientists to unlock the secrets of our ancestors and predict how we might evolve in the future.

DNA is a chemical that resides in the nucleus of every cell in our bodies. It contains a complete set of genetic instructions for building a body and controlling its metabolism.

DNA not only contains the human's anatomical blueprint – plans for details like two legs, two arms and hair on the head – but also specific instructions for building each person as a unique individual.

Your DNA contains details for things like how big your feet should grow, what colour your eyes will be and even whether you can twist and roll your tongue or not.

Unfortunately, DNA can also carry genetic defects that are harmful to us – such as a risk of developing diabetes or cancer.

By studying a particular type of DNA called "mitochondrial DNA" (mtDNA), scientists can trace all modern humans to a single common female ancestor who lived about 200,000 years ago – and she's from Africa.

So how can scientists tell from DNA that modern humans originated in Africa? Geneticists have found that mtDNA, transmitted only from mothers to their children, passes almost unchanged from generation to generation.

The slight changes that do occur result from mutations that geneticists think have been developing at a constant rate through time.

By measuring the amount of change in mtDNA in modern populations, it is possible to trace human genealogy over thousands of generations, back to a common female ancestor of all living humans.

When scientists have tested certain African groups, particularly the Khoisan people in Southern Africa and certain other populations in East Africa, they have found more variety in their mtDNA than in populations living outside Africa. That means those Africans have been around for more generations than any other people, according to DNA evidence.

The DNA studies correlate with fossil discoveries which suggest modern humans, *Homo sapiens*, have been living on the African continent longer than anywhere else. The oldest fossil evidence of modern humans thus far has been found in Ethiopia and South Africa.

This supports the "Out of Africa" theory, which argues that humans originated in Africa and then spread to populate the rest of the world.

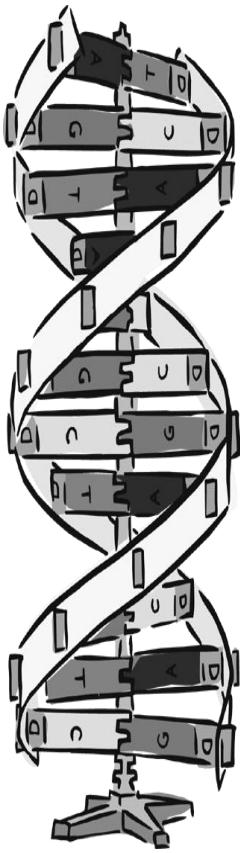
"We are survival machines – robot vehicles blindly programmed to preserve the selfish molecules known as genes."

– Richard Dawkins, biologist

FET: Learner Activity and/or Assessment Task

Subject: Life Sciences **Grade: 12**

Activity 1



You are a police officer investigating a crime scene. Which of the following are likely to contain evidence that is determined by DNA to some extent?

a) Muddy prints of large boots, left outside the window where the murderer apparently made his or her escape

b) Blood on the murder weapon, a knife

c) Video footage from a hidden security camera

d) Fingerprints left on the door

e) Testimony from a witness who saw a strange person enter the building at 2am

f) Hairs of a different colour to the victim's in the victim's hands, indicating a struggle

Activity 2

Word Search

Be a word detective. Find as many words as you can to describe DNA, from the following list: anatomical blueprint, building, cell, combination, common female ancestor, deoxyribonucleic acid, fossil discoveries, generations, genetic defects, mannerisms, metabolism, mitochondrial DNA, mutations, parents, populate, South Africa, unique individual

A	T	W	U	K	L	L	E	C	U	Q	W	J	G	S	L	P	D	U	D
H	N	E	L	X	A	C	L	C	N	A	V	J	A	K	M	L	A	H	I
W	I	E	M	L	U	E	V	D	O	H	F	C	W	Z	S	X	N	C	C
Z	R	J	Q	T	D	T	X	F	G	M	O	U	L	V	I	K	D	L	A
A	P	S	C	H	I	H	Y	U	N	S	B	L	A	J	L	L	L	E	C
S	E	I	R	E	V	O	C	S	I	D	L	I	S	S	O	F	A	R	I
U	U	K	G	G	I	P	W	G	D	Y	Q	P	N	F	B	U	I	X	E
P	L	X	V	E	D	I	O	U	L	D	F	O	X	A	A	Z	R	F	L
B	B	D	K	N	N	A	W	P	I	M	W	X	Y	V	T	D	D	S	C
Z	L	V	C	E	I	E	S	Z	U	X	B	S	Q	E	E	I	N	F	U
T	A	D	D	R	E	F	T	T	B	L	I	O	S	O	M	P	O	N	N
P	C	Y	R	A	U	T	A	I	N	Q	A	U	P	I	Z	L	H	N	O
A	I	A	O	T	Q	T	G	J	C	E	X	T	K	N	L	M	C	P	B
L	M	P	J	I	I	W	X	H	F	D	R	H	E	V	Q	K	O	C	I
C	O	M	M	O	N	F	E	M	A	L	E	A	N	C	E	S	T	O	R
Y	T	P	N	N	U	G	W	Z	M	O	C	F	P	Y	W	X	I	Z	Y
U	A	S	B	S	E	Q	T	S	M	S	I	R	E	N	N	A	M	V	X
L	N	P	S	Q	C	P	A	X	B	Q	I	I	Y	C	L	E	V	K	O
K	A	Q	U	W	D	F	D	W	F	W	M	C	X	H	T	S	H	U	E
S	G	K	N	U	L	P	X	C	O	R	V	A	X	K	P	S	T	D	D

Follow-up activity: Once you have found the words, write a sentence on each, explaining how it relates to DNA.

FET: Learner Activity and/or Assessment Task

Subject: Life Sciences **Grade: 12**

Activity 3

Quagga

I am a quagga, a beautiful striped horse, similar to a zebra. My family and I used to roam in great herds across the plains of the Karoo and Free State of South Africa.

We were hunted into extinction for our beautiful, striped hides and because we ate the same grass that settlers wanted their animals to eat. The invaders were greedy and didn't care about killing us.

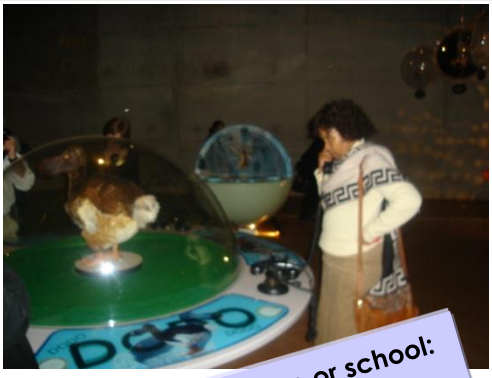
The last quagga died in the Amsterdam zoo in 1883, but she went without fanfare. It was only years later that people realised she had been the last living quagga.

Today there is a project to bring quaggas back to life. The quagga project is attempting to breed, through selection, a population of Burchell's zebras, which in its external appearance, and possibly genetically, will be closer, if not identical, to the former population known as quagga, which was exterminated during the second half of the 19th century.

Many animals have been bred and look similar to the quaggas in the museums, but more refinements still need to be made.

Maybe one day, there will be great numbers of quaggas again.

Hear from the quagga and other extinct and endangered species at Maropeng's Dial a Dodo exhibit.



Follow-up task for home or school:

Research the way that quaggas are currently being "brought to life" again by visiting the website: http://www.quaggaproject.org

The project is based at Iziko Museums of Cape Town

Your teacher will use the rubric below to assess your research.

Research Rubric

	Great	Nice	Good start	Stop, I or we need more help
Gathering information	Gathers a lot of information.	Gathers information.	Gathers some information.	Little information gathered.
Organising information	Information is very well organised.	Information is organised.	Tries to organise information.	Shows little skill in organising notes.
Using information	Shows in-depth insight in drawing conclusions from information.	Shows insight using the information.	Uses some of the information to make a decision.	Shows little understanding of the purpose of gathering information.
Organisation of presentation	Uses support to present findings.	Presents findings.	Presents with some organisation.	Presentation is not organised.
Persuasiveness	Makes convincing argument.	Good argument.	Shows little evidence of persuasion.	Is not persuasive.
Teamwork	Works as a unit and makes a good presentation.	Works as a group to make the presentation.	Works together to make the presentation.	Does not work together.
Team member participation	Members present equally.	One member leads.	Only one member presents.	Presentation was unrehearsed and disorganised.
Vocal expression	Speaks fluently and expressively.	Speaks clearly.	Hard to understand.	No expression.

FET: Learner Activity and/or Assessment Task

Subject: Life Sciences **Grade: 12**

Activity 4

Learn how understanding DNA can help us face some of humankind's biggest challenges.

The Human Genome Project

In 2003, scientists sequenced the 3.1-billion biochemical letters of human DNA that make up the human genome – opening a new chapter in the science of life, and promising new advances in health and medicine.

The human genome is the complete set of genetic material in a human cell.

The Human Genome Project was initiated in 1990 to map and sequence the human genome based on analysis of DNA (deoxyribonucleic acid), the "building blocks" of life. With this information, researchers are able to understand and respond to a variety of medical and environmental challenges facing humans.

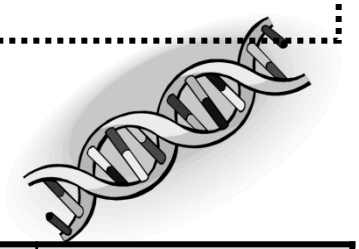
The human genome – which is freely available on the Internet – provides us with a virtual blueprint of a human being. This blueprint takes nearly a million pages to print out, but thanks to modern technology, it can fit onto an ordinary CD. The latest estimates identify about 30,000 genes in the human genome. Although 99.9 percent of our genes are identical, it is the remaining bit that scientists believe makes some people prone to heart disorders, and others to cancer, for example.

Scientists around the world are able to use this DNA information for a variety of tasks, including:

- Developing more accurate medical testing and treatments;
- Identifying genes that cause disease and developing gene therapies to tackle them;
- Modifying microbes to clean toxic waste and stem global climate change;
- Tracing our human lineage and migration patterns;
- Making crops and livestock more resistant to diseases, pests and adverse environmental conditions; and
- Enhancing DNA identification of everything from people to wines.

By understanding the building blocks of life humans may have a better chance of survival.

The African Human Genome Initiative ensures that Africa is not a mere observer of this exciting scientific breakthrough. Scientists throughout Africa are working with the new information to develop treatments and cures for some of Africa's most deadly diseases, including tuberculosis, malaria and HIV/Aids. Other exciting research includes South African geneticist Himla Soodyall's analysis of mitochondrial DNA which traces the first *Homo sapiens* back to Africa.



Write a report on how DNA can be used to identify the parents of a lost child.

Your teacher will use the rubric below to assess your report on DNA.

Research Rubric

	Great	Nice	Good start	Stop, I or we need more help
Topic	Focuses on topic.	Focuses on topic and includes a few loosely related ideas.	Contains ideas that are loosely connected to the topic.	Addresses topic but loses focus because of loosely related ideas.
Ideas	Logical progression of ideas.	Logical progression of ideas.	Includes a beginning, middle and end but elements are brief.	No logical progression at all.
Specific details	Specific details.	Some specific details.	Development of support is uneven.	Development of support is nonspecific.

Memorandum

Subject: Life Sciences **Grade: 10**

Activity 1

Era	Period	Start in millions of years	Fossil finds in South Africa
Caenozoic	Holocene	0.1	Artefacts of Later Stone Age Artefacts of Middle Stone Age Artefacts of Early Stone Age
	Pleistocene	1.6 – 0.1	*Colubus* monkey *Cersopithecoides* monkeys
	Pilocene	5.3	*Australopithecus africanus* *Paranthropus robustus* *Cersopithecoides* (monkeys) *Chasmaporthetes* (hunting hyena) *Makapania* (ox like animal) Sabre-toothed cats Baboons
	Miocene	23.7 – 5.3	
	Oligocene	36.3	
	Eocene	57.8	*Chalicotheres* (animals with horse-like heads)
	Paleocene	66.4	
Mesozoic	Cretaceous	144	
	Jurassic	208	Dinosaurs Mammalian ancestors
	Triassic	245	

Memorandum

Subject: Life Sciences **Grade: 12**

Activity 3

* A lot of controversy around this fossil – thought to be about 4-million years, but revised techniques reveal that it is about 1-million years old.

	*** "Little Foot"**	***Australopi-thecus africanus***	***Paranthropus robustus***	***Homo habilis***	***Homo ergaster***	***Homo sapiens***
Age	4.2-million – 3.9-million	2.8-million – 2.6-million	1.2-million	2.5-million	Between 1.9-million and 1.4-million	120,000 – 80,000
Who discovered it?	Ron Clarke	Raymond Dart	Robert Broom	Peter Nzube	Richard Leakey	Richard Leakey (Claimed)
Where was it discovered?	Sterkfontein	Taung, Northern Cape	Sterkfontein	Tanzania	Koobi Fora Kenya	Mt Carmel Israel
What was/is its habitat?	Never used tools	Never used tools	Used simple tools – bone tools	They were tool-makers – "handy man"	Used tools such as hand axes and cleavers	Skill of tool-making improved and refined; buried their dead
How did it move about?	Walked erect (most times)	Bipedal	Walked erect; ability to climb trees	Bipedal	Bipedal	Bipedal
Could they have used fire?	No	No	No	Yes	Yes	Yes
How might they have communicated?	Not clear	Symbols	Symbols	Symbols; non-verbal	Symbolic means of communication; lived in groups	Language; round speech
What technology and tools did they use?	Not clear	Used naturally occurring stone and rock material – unmodified	Used bone tools	"The handyman"; stone tool-makers	Used stone tools as hand axes and cleavers	Refined tool-making and crafts
Were they capable of symbolic thought?	No	Relatively minimal	Yes	Yes	Yes	Yes, complex symbolic thought
What impact did they have on the environment?	?	Consumed a lot of coarse vegetation	Ate nuts and tubers; lived in open woodlands	Depended more on meat – vegetation scarce	Cleaned tough meat and vegetation	Skilled hunters; artists
What was their skin colour and cover?	Not clear; probably dark	Dark skin	Dark skin	Dark skinned	Dark skinned	Skin covered with hair
Did they wear clothes?	No	No	No	Possibly	Yes, made from animal fur	Yes

Memorandum

Subject: Life Sciences Grade: 12

Activity 4

1. Bipedalism is important for the freeing of hands:

- To construct tools, carrying food and babies;
- To see potential "predators" from a distance (binocular vision, stereoscopic vision);
- Efficiency of movement; and
- Display of sex organs.

2. Improved nervous co-ordination that matches complex, efficient movements dictated by bipedalism.

- Increase in intelligence (cerebrum) and spatial awareness (co-ordination).
- Evolution of complex communication – verbal language and non-verbal cues/signals.

3. The reason that most might answer "complex language" is that complex language is driven by an increase in brain size, and leads to complex social and emotional behaviour, etc. (However, the question does ask for the learner's own opinion, and therefore other answers should be considered, as long as they are backed by informed argument.)

4. Discuss phenotype differences between animal and humans:

- Social behaviour;
- Intelligence – problem-solving skills;
- Complex social behaviour;
- Technology, etc.; and
- DNA sequences – amino acid composition.

5. Yes, South Africa is rich in fossils that are regarded as ancestors to modern humans.

"Little Foot", "Mrs Ples", the "Taung Child" are all examples which justify regarding the country as the Cradle of Humankind.

6. DNA sequencing methods reveal 98 percent homology between humans and chimpanzees, suggesting that they are our closest relatives.

7. Graph: See next page.

Grade 12 DNA Activity

Activity 1

Answers for DNA Detective activity

Correct: b, d, f.

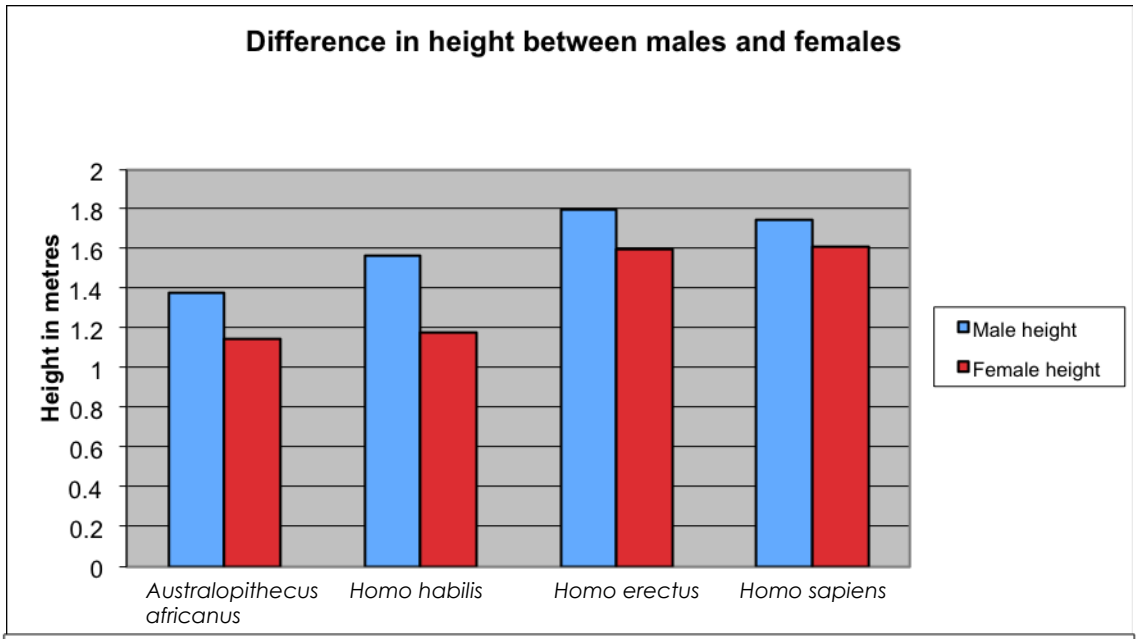
Blood would contain DNA evidence which could link a perpetrator to the crime. Each person's fingerprints are different, and are determined by their unique genetic make-up. Hair, like blood, contains mitochondrial information or DNA which is unique and could link the crime to the unique individual who committed it.

Table:

Person	Male height	Male mass	Female height	Female mass
Australopit-hecus africanus	1,38	41	1,15	30
Homo habilis	1,57	52	1,18	32
Homo. erectus	1,80	66	1,60	56
Homo sapiens	1,75	58	1,61	49

Graph:

a.



b.