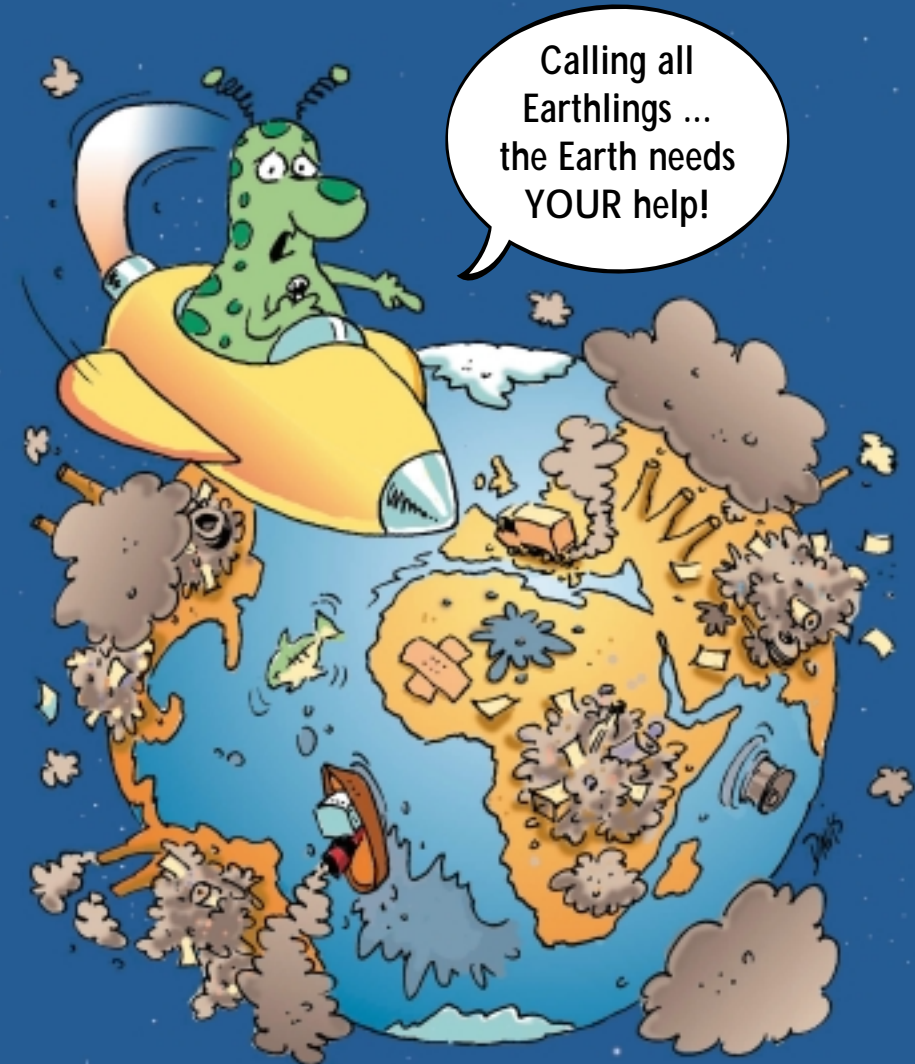




Department of Environmental
Affairs and Tourism

This publication is aimed at educating learners on issues relating to sustainable development. It includes information relating to the World Summit on Sustainable Development (WSSD) in 2002, but is relevant for use before, during and after the WSSD.



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Environmental Affairs and Tourism by the



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www.fest.org.za

AN EASY GUIDE TO SUSTAINABLE DEVELOPMENT



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We call upon the youth of South Africa to make the difference through sustainable development. The future of the planet is in your hands. Think globally and act locally. We hope this document will make a meaningful contribution to Environmental Education in South Africa.

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FOOD SECURITY: The ability of all people to access at all times the food needed for a healthy and active life.

HABITAT: The natural home of plants or animals.

HEALTH: A state of complete physical, mental, and social well-being, and the prevention of disease.

HOT SPOTS: A small region that is greatly affected by something.

IMMUNE SYSTEM: Cells in the human body that protect it against infections and keep it healthy.

INDIGENOUS: Someone or something that belongs to a specific country or place.

NATURAL RESOURCES: The supply of materials or conditions occurring in nature available for use by humans.

POLLUTION: To change and contaminate the natural environment so that it harms the living things in it.

POVERTY: Being poor, and lacking your everyday needs.

SANITATION: The collection and disposal of waste, such as human excrement, household waste and water.

SEMI-ARID COUNTRY: A country that has a low rainfall and is dry, but not as dry as an arid country.

SEWAGE: Human waste and water.

SPECIES: A group of animals or plants having some common characteristics and able to breed with each other.

SUSTAINABLE DEVELOPMENT: Development that meets the needs of the present without compromising the ability of the future generations to meet their own needs.

TECHNOLOGY: The use of scientific knowledge to provide tools for mankind.

UNDERNOURISHED: When the body does not get all the nutrients it needs to be healthy.

UNITED NATIONS: An international organisation aiming to seek peace, which countries can join.

URBANISATION: The movement of people from urban (country) to urban (city) areas.

WEATHER: The condition of the atmosphere on a particular place and time such as temperature, rain, snow, sunshine, etc.

Specific OBE outcomes covered by this publication:

Literacy & Communication (LIC): SO#1, SO#4.

Natural Sciences (NS): SO#1; SO#2, SO#3, SO#4, SO#5, SO#6, SO#7, SO#8, SO#9.

Technology (T): SO#2, SO#4, SO#5, SO#6, SO#7.

Human & Social Sciences (HSS): SO#1, SO#2, SO#3, SO#4, SO#5, SO#6, SO#7.

Life Orientation (LO): SO#2, SO#4, SO#8.

Economic & Management Sciences (EMS): SO#7, SO#8.

Think globally, act locally – you can

Designed by Words'worth (011) 381-7700. Cartoons by Jonathan Davis.




CONTENTS

What is Sustainable Development?	2
1. Biodiversity	4
2. Food, Security and Agriculture	6
3. Technology	8
4. Climate change	10
5. Water	12
6. Energy	14
7. Health	16
8. Pollution	18
What does the word mean?	20

make a difference



WHAT IS SUSTAINABLE DEVELOPMENT?



“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

When you grow up, will there be enough food to feed your family? We are currently using 30% more of the Earth's natural resources than it can provide. If we continue to live this way, we will soon use up all the resources we need to live. However, we can still restore the balance with the environment if we act now.

The environment became a global issue in 1972 when the first Earth Summit was held in Sweden and the United Nations Environmental

Programme (UNEP) was created. Countries were concerned about

poverty and hunger of the growing World population, sickness and inadequate healthcare, and the destruction of the environment. They realised that there is a link between the environmental problems we have and the way that we live. Many of the industrial advances and developments in rich countries have also destroyed their natural resources. This development is not sustainable.

Twenty years later – in 1992 – the

For more information on the WSSD, visit: www.joburgsummit2002.com or www.worldsummit.org.za, www.environment.gov.za or contact the National Department of Environmental Affairs and Tourism (DEAT) at Private Bag X447, Pretoria 0001, by phoning (012) 310-3911.




United Nations Conference on the Environment and Development (UNCED) was held in Brazil, where World leaders met to suggest solutions for the problems facing the World. A major conclusion of the meeting was that although we have to feed the growing World population, this cannot be done at the expense of the environment. An action plan (Agenda 21) on how to “do” sustainable development was written. Countries signing this agreement promised to take responsibility for their natural resources, to use them in a sustainable way, and to combine development with conserving the environment.

However, despite agreeing that sustainable development was important and promising to change things in 1992, very little has happened since then. Rich countries that said they would give money to help development in poorer countries have not fulfilled their promises either.

The most recent World Summit on Sustainable Development (WSSD) held in Johannesburg between 26 August and 4 September 2002 had the theme: “People, Planet and Prosperity” and aimed to renew the commitment to sustainable development and to assess the progress made since the last Summit. It is hoped that by the time the next summit is held – in 2012 – people who are poor now will have a better life and more opportunities, and we will all live in a healthier and safer environment.

The Johannesburg WSSD is one of the largest gatherings the World



has ever seen, involving 65 000 people. These included the heads of state and media, plus the nine major groups of people recognised by the United Nations: women, children and youth, indigenous people, Non Governmental Organisations (NGO's), local authorities, workers and trade unions, business and industry, scientific and technological communities and farmers.

After being isolated from the rest of the World for many years because of political reasons, South Africa was allowed back into the international community in the early 1990's. This enabled South Africa to become fully involved in international activities again, including sustainable development. Hosting the WSSD in South Africa, helps us to better understand sustainable development and how it affects our everyday lives.

This booklet focuses on eight themes of sustainable development which are linked to poverty alleviation in the future: biodiversity, climate change, energy, food security and agriculture, health, pollution, technology, and water.

“It is hoped that in ten years time – in 2012 – people who are poor now will have a better life and more opportunities, and we will all live in a healthier and safer environment.”



1. BIODIVERSITY

“Bio” means life and “diversity” means variety or differences, and so biodiversity is the variety of life found on Earth. This includes plants, animals, insects, trees, sea creatures, micro-organisms and people. Biodiversity also indicates the overall health of the Earth. It can be better understood when divided into the three different types of variety:

● **Ecosystem or Environment diversity:**

The diversity of environments on Earth, which are made up of the habitats that plants and animals call home.

● **Differences Between (“Inter”) species:** The variety of species within an area, measured by how many species there are or by how closely related they are in a habitat. We only know the details of about 1,7 million of the World’s species, and over half of these are insects.

● **Genetic Diversity within (“intra”) species:** There are big differences between members of the same species due to a variation in the genes. Just as there are differences between people there are differences within other species. Look around: you are not identical to the person you are sitting next to.

What’s the problem?
Biodiversity provides us with the

resources we need to live. However, we are living beyond the capabilities of these resources. Our population is growing too fast – there are more than six billion people – while species are becoming extinct and the climate is changing. We are not using our natural resources in a sustainable way and we are losing the diversity that we need to adapt to changes, such as new diseases.

Over-fishing, pollution, habitat loss, industry, intensive agriculture and forestry are examples of how we abuse our environment. We are using biodiversity to fulfil our needs now and not considering the needs of future generations.

National and International concerns

South Africa is one of the World’s most biologically diverse countries, with more than 23 000 plant species (more than 8% of the World’s total). This diversity is mainly due to the mix of tropical and temperate climates and habitats. Two of the World’s 25 threatened biodiversity hotspots are found in South Africa. These are the Succulent Karoo Biome, the semi-desert of the Northern Cape; and the Cape Floral Kingdom.

Biodiversity is so important that in 1992 World leaders wrote an

action plan called Agenda 21, which outlined how to use our natural resources in a sustainable way. One of the aims of the WSSD is to check what has actually been done around the World.

How does it affect me and how can I get involved?

Biodiversity is a part of our everyday life and includes the food we eat, the

clothes we wear and the books we read. Do you want to destroy our biodiversity or are you committed to conserving it? Think of five things you can do in your everyday life to use your resources in a sustainable way.

Note for Educators:

Contact Mondi and organise a recycling drive at your school including newspapers, glass and plastic.



WHERE CAN I FIND OUT MORE?

- The Biodiversity Trust – www.thebiodiversitytrust.org
- Centre for Applied Biodiversity Science – www.biodiversityscience.org
- Investigate Biodiversity – <http://investigate.conservation.org>
- Delta Environmental Centre – www.deltaenviro.org.za. Private Bag X6, Parkview, 2122 Johannesburg. Tel: (011) 888-4831.
- Wildlife Society and Environment Society of SA (WESSA) – www.wildlifesociety.org.za. PO Box 44344, Linden, 2104 Johannesburg. Tel: (011) 462-5663.
- Mondi Recycling – www.mondi.co.za. PO Box 12168, 1689 Vorna Valley. Tel: (011) 315-8450.



2. FOOD SECURITY AND AGRICULTURE

Food security means all people have access at all times to the food they need for a healthy and active life. Agriculture is how we try to provide food security, by using land to grow crops and rearing animals to provide food. In South Africa, 87% of the total land area is used for agriculture.

What's the problem?

It is estimated that there are 800 million hungry people around the World. The situation will get worse as the population increases to nine billion people by 2050, especially in Africa and Asia. When people are hungry, their health and education suffer and this affects the economy of a country.

Agricultural production cannot produce enough food to feed this growing population using the current agricultural methods, even if more land is used for farming. One of the ways to increase food supplies is to increase the amount of food produced per area of land.

This can be done by using new tools and technologies such as biotechnology, irrigation and farm management.

Distributing the food available is also difficult, and sometimes people living in rural areas where the food is produced can still go hungry because they either can't afford to buy it, or don't know how to prepare it.

National and international concerns

As a result of urbanisation, more than half of the World's population will live in cities by 2005. Distributing safe and affordable food to them will strain the food supply to breaking point, as the food production areas are further away. Levels of poverty in cities are often higher than 50%, and this is made worse by the high cost of food. On average, city people spend 30% more on food than those living in rural areas, even though they consume fewer calories.

Since food security is so important, at the World Food Summit held in 1996, 186 countries committed themselves to a target of halving the current number of undernourished people by 2015. Richer countries also promised money, which will be used to transfer technologies,



increase food production and provide food aid. In Sub-Saharan Africa, 12,8 million people are facing starvation in six southern Africa countries, including many of South Africa's neighbours (Lesotho, Swaziland Mozambique and Zimbabwe). Without food aid, the situation will not improve until the 2003 harvest.

How does it affect me and how can I make a difference?

Perhaps you are lucky and you have never been really hungry. Maybe you know exactly what it is like to go without food (a lot of people in South

Africa go hungry every day). How would you be affected if you didn't have food? How do you think you would feel if someone ate in front of you if you had nothing to eat and were hungry?

Note for Educators:

Contact the Food Gardens Foundation and create a vegetable garden at your school to teach your pupils how to grow their own food. The produce could then be given to hungry families and learners could then teach them how to grow food in their communities.

"It is estimated that there are 800 million hungry people around the World. The situation will get worse as the population increases ..."

WHERE CAN I FIND OUT MORE?

- Food and Agricultural Organization of the United Nations – www.fao.org
- World Food Programme – www.wfp.org
- Food Gardens Foundation – www.cityfarmer.org/s.africa. PO Box 41250 Craighall, 2024 Johannesburg. Tel: (011) 880-5956.
- Department of Agriculture – www.nda.agric.za, Private Bag X250, 0001 Pretoria. Tel: (012) 319-6000



3. TECHNOLOGY

Technology is the use of science and knowledge to create tools. There are many different technologies or tools that have been developed around the World that could help poorer countries feed their people, fight disease and help improve the quality of life of millions of people. Technology transfer is when these new methods are shared with others, including teaching people how to use and apply technology in their own country.

What's the problem?

The World population is increasing but the amount of land for growing food is not. Many people around the World

are already hungry and do not have enough food and this will get worse unless food production is increased. Biotechnology, which is the use of living organisms to make things, is one tool that could help do this. Biotechnology is not new and has been around for thousands of years: it is used in the fermenting of beer, the making of cheese and when using yeast to make bread.

Recent discoveries in biotechnology include ways of increasing food production, improving our health and protecting the environment. Crops can now produce larger harvests and can be "made" tolerant to insects and diseases that attack and destroy them. With this built-in tolerance, the farmer uses fewer chemicals or pesticides to kill weeds and pests, which



helps to protect the environment. Biotechnology may also enable crops to be grown in areas that could not be used before, such as poor soils and dry areas. This also helps protect the environment because protected areas conserving biodiversity will not be used for food production. Our health can also benefit from biotechnology when it is used to improve the nutrition of food. Extra vitamin A is being added to rice to help prevent blindness and the level of protein is being increased in other crops. Food could also be grown containing medicines, such as vaccines in bananas: so, when you eat a banana treated in this way, you can be protected against a disease instead of going to the doctor for an injection.

National and international concerns

These new techniques are not being used much in Africa and these skills need to be transferred. However, as with all new technologies, we must be cautious and consider both risks and benefits. There are national and international agreements that control how biotechnology is used, and these rules must be respected.

"Recent discoveries in biotechnology include ways of increasing food production, improving our health and protecting the environment."

How does it affect me and how can I make a difference?

Find out all you can about biotechnology and make sure you have all the information. Since there are risks associated with the new discoveries of biotechnology, it is important that you know what the risks and the benefits are. Collect information about biotechnology from places like Pick & Pay, the Food Advisory Consumer Service (FACS), and AfricaBio.

Note for Educators:

Investigate biotechnology, including the benefits and risks, and hold a group debate in class, with one group for biotechnology and one group against. Do you think biotechnology should be used to help feed hungry people if there are risks involved? Consider how we deal with risk in other technologies such as agriculture, transport, electricity, medicines, etc.

WHERE CAN I FIND OUT MORE?

Council for Biotechnology Information – www.whybiotech.com
Museum Stuff Dot Com – www.museumstuff.com/links/science/biotechnology
AfricaBio – www.africabio.com,
PO Box 873, Irene, 0062 Centurion. Tel: (012) 667-2689
Food Advisory Consumer Service – PO Box 74241, Lynwood Ridge, Pretoria.
Tel: (012) 349-1448



4. CLIMATE CHANGE

Climate is controlled by balancing the Earth's and the atmosphere's energy levels. Light energy from the sun passes through the atmosphere to the Earth, and then some of this energy goes back out into space as heat. Gases in the atmosphere (carbon dioxide, water, methane and nitrous oxide) trap some of this heat energy, which is distributed over the surface of the Earth by winds and ocean currents. This is called the Greenhouse Effect and ensures the Earth stays warm. If this did not occur naturally, the Earth would be 33°C colder and covered in ice!

What's the problem?

The balance between the energy coming into the Earth's atmosphere and the amount of energy being released back into space has changed. Deforestation (clearing and burning forests), the burning of fossil fuels (coal, oil, gas) and increased transportation fumes has upset this balance by increasing the amount of greenhouse gases. These build up and prevent heat from escaping, which raises the average temperature of the Earth's surface. Carbon dioxide in the atmosphere has gone up by 30% in the last 200 years. The forests and vegetation, which convert carbon dioxide into oxygen through photosynthesis, cannot keep up with the amount of carbon dioxide we produce. We are destroying the forests that do remain.



National and international concerns

The use of fossil fuels accounts for 80-85% of the carbon dioxide that is added to the atmosphere. In 1998, 76% of the total energy consumption in South Africa was from coal consumption and this was responsible for 1,2% of the total global warming effect in 1990. The USA is the worst polluter, responsible for 22% of all greenhouse gases, although only 7% of the total World population lives there.

An international agreement between countries, the Kyoto Protocol, puts limits on greenhouse gas emissions for developed countries, which are the worst polluters. This agreement also keeps a check on the levels of gases being released globally. South Africa is signing this agreement along with around 80 other countries. But some countries, such as the USA, will not sign. Why is this?

How does it affect me and how can I make a difference?

The Earth will experience a 3°C increase in temperature before the end of the next century. This sounds small, but it could have a dramatic effect and cause many changes, including:

- Rise in sea level and flooding;
- Food and water shortages due to

droughts in major food-producing countries;

- Changing weather patterns, including an increase in hurricanes, cyclones, heat-waves and droughts;
- Loss of biodiversity through the extinction of animals and plants which need specific conditions to survive;
- Contamination of freshwater by sea water;
- An effect on human health by increasing the spread of infectious diseases such as malaria.

How can I make a difference?

- Reduce car usage and emissions: ride a bike, or walk when possible.
- Get involved in saving the rainforests.
- Use electricity rather than coal, oil or gas.

Note for Educators:

Encourage your learners to write a letter to our President or the Minister of Environmental Affairs urging them to reduce greenhouse gas emissions in South Africa. Find out why President Bush won't sign the Kyoto Protocol and write him a letter. Remember his decision affects the rest of the world.

WHERE CAN I FIND OUT MORE?

Climate Ark – www.climateark.org

Rainforest Action Network – www.ran.org

Earth Trends: the Environmental Information Portal – www.earthtrends.wri.org

CSIR – www.csir.co.za, PO Box 395, 0001 Pretoria. Tel: (012) 841-2911.



5. WATER

Water is the source of life and Earth is the only planet in our solar system where water is found as a liquid, rather than as a solid (ice) or a gas (steam). The water we have is very old and is recycled, and was used millions of years ago by the dinosaurs.

Drinking water is used for washing, cooking, gardening, manufacturing, drinking and flushing toilets. Once used, it must be cleaned before it can be used again.

What's the problem?

Seventy percent of the Earth's surface is covered by water and this amount cannot be increased or decreased. Of this, 97% is salt water and only 3% fresh water. Less than 1% of our fresh water is available for life on Earth, since the rest is in the form of ice at the poles.

Water is already in short supply around the World and this will get worse with the increasing population. The quality of the water available is also important, as it must be safe, drinkable and appealing to all life on Earth. The quality of our water is decreasing because of the pollution and destruction of rivers. This will also get worse as the population increases, and the sad thing is ... we are causing the damage! Most diseases in the

World are related to water and poor sanitation, especially if drinking water is contaminated by sewage. This is often the case in rural communities that do not have access to running water or toilets.

National and international concerns

The water on Earth is unevenly distributed and some places have less water than others. The average rainfall in South Africa is 492 mm, compared to the World average of 985 mm. This makes South Africa a semi-arid country, and the western half of the country is much drier than the eastern part. Getting enough drinkable water to everybody is a problem and this has been made worse by frequent droughts and the increase in population.

In South Africa, most water is stored in dams, but this will not be enough as the demand for more water increases and more boreholes to access groundwater will be needed. Although water is a natural resource, we have to pay for the service of having it brought to us in pipes and taps from where it is stored, and it also has to be cleaned again after we have used it. However, some people don't have access to clean water and so the

South African Government is providing free basic water (6 000 litres of safe water per household per month) to households. People cannot go without water just because they can't afford the service. It is especially needed in rural areas where often people have to walk long distances to collect drinking water.

How does it affect me and how can I make a difference?

We must all become "water wise" which means we must respect water and not waste it, stop polluting rivers, pay for water services and take action to conserve water and solve water problems.

- Undertake a water quantity and quality audit at your school by measuring how much water your school uses, the different ways it is used and how clean it is. Contact your local water provider to find out how – you may be able to save water for South Africa and money for your school.

- Write down at least five ways of how you can save water at school and at home every day.

Educator tips:

Find out where your water comes from – which dam/river, who supplies it to you and where are the nearest purification plants? What is the cleaning process water has to go through before we can drink it again? Investigate with your learners why wetlands are important in water purification.



WHERE CAN I FIND OUT MORE?

- The Water Page – www.thewaterpage.com
- The International Water Management Institute – www.iwmi.org
- Water Research Commission – www.wrc.org.za
- Department of Water Affairs and Forestry (DWAF) – www.dwaf.gov.za. Private Bag X313, 0001 Pretoria. Tel: (012) 336-7500.
- Rand Water – www.waterwise.co.za. PO Box 1127, Johannesburg, 2000. Tel: (011)682-0911



6. ENERGY

We use energy every day for cooking, heating, travelling and manufacturing. There are many different forms of energy, including fossil fuels, electricity, nuclear, water, solar and wind power.

What's the problem?

Throughout the World, the main sources of energy used are fossil fuels such as coal, oil and natural gas. These pollute the air by releasing greenhouse gases and causing acid rain. These resources are also limited, and will eventually be used up. Different types of energy need to be found which are renewable (will never run out) and are less damaging to the environment. We also need to reduce energy use and use what we have more efficiently.

National & international concerns

All sources of energy have advantages and disadvantages. Some types

of energy are more expensive to produce than others, and some are cheaper but cause more damage to the environment. Nuclear power, hydropower (water), coal and wood are the cheapest forms available today, but shifts in technologies and environmental rules may change this.

South Africa's energy industry is dominated by coal as the main energy source, and electricity is the most important secondary fuel. A survey is being undertaken in South Africa on the cost and supply of different types of energy. Studies are also being done on the impact on the environment from burning coal and using paraffin stoves, as well as nuclear power and chemical plants. The greatest concern is the level of greenhouse gases released by burning fossil fuels, which is causing global warming and climate change.

Use of renewable energy can help both to slow global warming and to reduce air pollution, which would reduce acid rain. Renewable sources could provide 40% of the energy needed in the World by the year 2050. But we have to act now!

How does it affect me and how can I make a difference?

We use energy every day in many

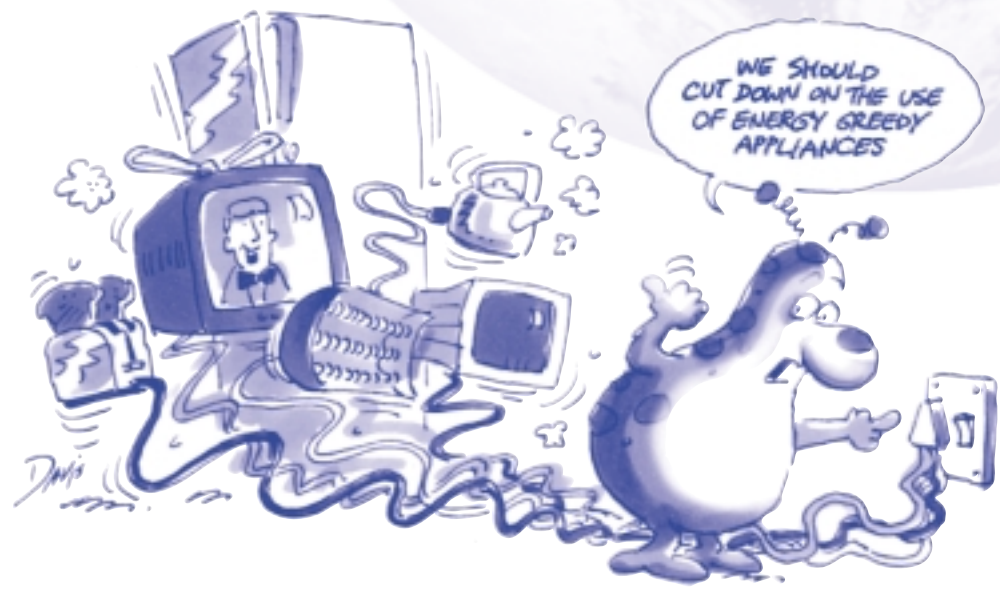
different ways. We need to be more efficient in the way we use energy, such as:

- Make sure energy-saving light bulbs are used in your school and at home.
- Turn off lights, computers, and other appliances when you're not using them.
- Use energy-efficient appliances: lighting, air conditioners, heaters, refrigerators, washing machines, etc.

- Try to find alternatives to burning coal and paraffin.

Educator tips:

Investigate the different forms of energy and how they are being used today. Which renewable sources of energy are the fuels of the future, and why? How do they affect the environment? Which type of energy is best, and why?



“Renewable sources could provide 40% of the energy needed in the World by the year 2050. But we have to act now!”

WHERE CAN I FIND OUT MORE?

- Energy efficiency and renewable energy network – www.eren.doe.gov
- World Nuclear Association – www.World-nuclear.org/sustdev
- International Energy Agency – www.iea.org
- Alliance to Save Energy – www.ase.org
- Department of Minerals and Energy – www.dme.gov.za. Private Bag X59, 0001 Pretoria. Tel: (012) 317-9000.



7. HEALTH

Health is not just the absence of disease but a state of complete physical, mental, and social well-being and the prevention of disease. To be healthy you need a balanced diet and regular exercise. The advances in medicine mean that we will live a lot longer than our ancestors did, and we have also developed vaccines that prevent us catching certain life-threatening diseases.

What's the problem?

Although we are a lot healthier than we used to be, not everyone in the World has access to basic healthcare. This includes basic medicines and vaccines against infectious diseases such as typhoid, TB (Tuberculosis)

and rubella, as well as educating people how to eat well, exercise and look after themselves. It is better to prevent people getting ill instead of treating them later. However, if you don't have enough food, then knowing what to eat and how to behave doesn't help to keep you healthy.

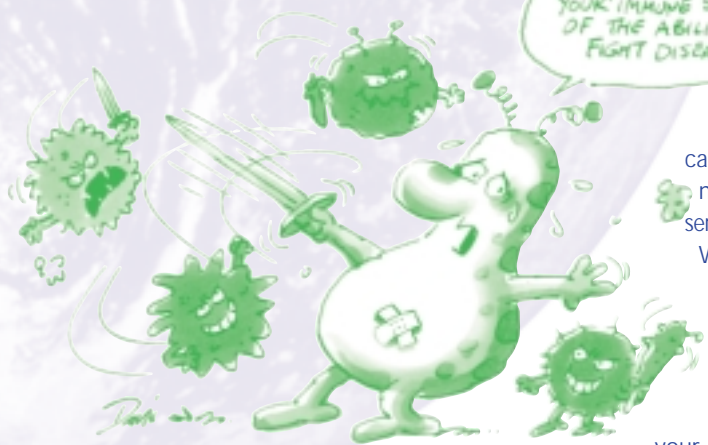
Human Immuno Deficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (Aids) is currently the biggest health problem in South Africa and around the World. There is no known cure for this virus and it continues to claim millions of lives. Therefore, preventing infections is the only way to control it.

National and international concerns:

Creating sustainable health services, resources and care is a priority in developing nations. HIV/Aids is the most serious health risk facing the World: 22 million people have died from Aids-related illnesses, almost 60 million people are infected, and 36 million are living with HIV.

HIV is a virus that attacks your immune system and, many

HIV/AIDS ROBBS YOUR IMMUNE SYSTEM OF THE ABILITY TO FIGHT DISEASES



years after being infected, your body no longer has the strength to fight off infections you would normally have no trouble with. You can become infected with the virus through exchanging bodily fluids, and pregnant mothers can also infect their babies. Having sex is the main way people become infected, and so abstinence from sex outside of a faithful, lifelong relationship is the best way to prevent infection. Condoms help, but do not guarantee 100% "safe sex". Using them wrongly could mean an unwanted pregnancy or HIV infection.

A blood test is needed to check if you have the virus and it can take up to six months for the test to show the correct result. If you do become infected, ask for help and advice and make sure you have the right information and medical treatment. Many people live with HIV for years before they show symptoms.

It is estimated that between 50-65% of 15-year-old South Africans will die of HIV/Aids-related illnesses within the next 30 years. This will have a major impact on the economy of South Africa as the working

population of the future is the worst affected. The education sector is already experiencing this as 44 000 teachers are infected and many are dying from Aids-related illnesses.

How does it affect me and what can I do?

You could be directly affected if you contract HIV. You carry the highest risk in the worst epidemic the World has known. How would you want to be treated if you do become infected with the virus? What should your attitude be towards those that are infected? Insist that your school becomes HIV/Aids aware, and make your school a centre of hope and care in the community, providing a supportive environment for those infected or affected by HIV/Aids. Read up and lead your school in the right direction. Ignorance kills!

Educator tips:

Create a quiz on HIV/Aids and separate fact from fiction. Can you get it from sharing a cup, shaking a hand, or from a mosquito bite? Send learners home to find out what their family knows and discuss their findings.

WHERE CAN I FIND OUT MORE?

- United Nations Aids Programme – www.unaids.org
- World Health Organisation – www.who.int.
- Beyond Awareness Campaign – www.aidsinfo.co.za. Suite 355, Private Bag X7, Parkview 2122, Johannesburg. Tel: (011) 646-1276.
- National Toll free Aids Helpline – 0800-0123-22
- Youth Information Helpline – 0800-000-001



8. POLLUTION

Pollution is the changing of the natural environment, either by natural or artificial means, so that it becomes harmful to living things. This is usually caused by poisonous chemicals, which are released into the environment to cause many different types of pollution.

What's the problem?

Air and water pollution are major problems in South Africa and around the World. Acid rain is caused by air pollution, but leads to water pollution as well and affects large areas.

Acid rain is caused when gases are released into the air and travel long distances carried by winds. These gases dissolve into the water in the atmosphere that falls as acid rain, snow or fog. Most of the acid rain

comes from sulphur dioxide, which forms sulphuric acid, and the rest from nitrogen oxides. These gases are produced from fossil fuels, power stations and traffic fumes.

National and international concerns

Although acid rain looks, feels, and tastes just like clean rain, it causes rivers and lakes to become acidic, killing off the fish and plant life. It weakens trees and causes forests to grow more slowly and to be unhealthy or to die early. Our health is also affected by air pollution and by acid



rain when the particles get into people's lungs and cause illnesses such as asthma and bronchitis. Chemical reactions can cause poisonous metals such as mercury to be released into rivers and lakes and contaminating our water supplies and the fish we eat.

Other types of water pollution occur when chemical waste products are released directly into rivers or into groundwater by factories and farmers. When sewage is not treated, germs that cause diseases like malaria, cholera and bilharzias could also pollute water. Most ports in South Africa suffer with air and water pollution as well as litter and sewage disposal. The coast of South Africa is also prone to oil spills as many oil tankers carrying oil from the Middle East to Europe and the USA travel around our coastline.

What can I do to make a difference?

- Reduce car emissions by using car-pools, and walk or cycle whenever possible.
- Check if the cars at your school or home are low on emissions.
- When changing the oil on cars, dispose of the oil correctly and

don't dump it.

- Use biodegradable detergents at home for doing the washing and dishes.
- Wash your hands with soap and water after going to the toilet.
- Wash all fruit and vegetables well before eating them and do not cook with unclean water.
- Do not drink water that you think might be unclean – boil it if you are unsure.
- Do not leave empty containers or any litter lying around for disease-transmitting insects to breed in.
- Be well informed – Are there any industries close to your school or home? Investigate and see if they are polluting the air or waterways in your area. Work out what you can do to help.

Educator tips:

Watch a recent film that tackles pollution issues, such as "A Civil Action" or "Erin Brokovich". Follow this up with discussions on local pollution problems and see how your school can get involved in the local community by raising awareness on these issues.

WHERE CAN I FIND OUT MORE?

Pollution.com – www.pollution.com

Pollution Probe – www.pollutionprobe.org

Earth Trends: the Environmental Information Portal – www.earthtrends.wri.org
Envirofacts, Sharenet, PO Box 394, Howick. Tel: (033) 330-3931.

Department of Environmental Affairs and Tourism – www.environment.gov.za.
Private Bag X447, 0001 Pretoria. Tel: (012) 310-3911.

WHAT DOES THE WORD MEAN?

ABSTINENCE: Not doing something.

ACID RAIN: Caused when gases, such as sulphur dioxide, dissolve into the water in the atmosphere that falls as rain which is mildly acidic.

ATMOSPHERE: The gases surrounding the Earth.

BIODEGRADABLE: A material or substance that can be broken down naturally by bacteria or other living organisms.

BIODIVERSITY: The variety of life found on Earth, including plants, animals, insects, trees, sea creatures, micro-organisms and people.

BIOTECHNOLOGY: The use of living organisms and processes to make things.

CLIMATE: The weather conditions and patterns of a place/country over long period of time (at least 20 years).

CONSERVATION: To look after and keep from being lost, spoilt or destroyed.

CONSUME: To use up or to destroy a resource or supply.

DEFORESTATION: The removal, clearing and destruction of forests, usually by burning.

DEVELOPMENT: The process of growing or advancing.

DEVELOPED/INDUSTRIALISED COUNTRIES: Richer, more advanced countries.

DEVELOPING COUNTRIES: Poorer, more primitive countries.

DINOSAURS: Animals that walked the Earth in pre-historic times, before we existed, and are now extinct.

ECOSYSTEM: A community of living organisms interacting with one another and their environment.

ENERGY: The capacity for doing work. The two main forms of energy are potential energy and kinetic energy.

ENVIRONMENT: Our natural surroundings on Earth – trees, animals, fish, water.

EXTINCT: When a species dies out and there are no examples left anywhere on Earth.

FOSSIL FUELS: Naturally-occurring fuels found in the ground, such as oil and coal.

GLOBAL ISSUE: Something that is important to countries all over the World.

GLOBAL WARMING: An increase in the average temperature of the Earth, which could lead to a rise in sea levels, food shortages, loss of biodiversity and increase the spread of infectious diseases.

GREENHOUSE EFFECT: The heating of the Earth by gases in the atmosphere that trap energy from the sun.

GREENHOUSE GASES: Gases released into the atmosphere resulting from human activity (e.g. carbon dioxide, water, methane and nitrous oxide), which contribute to the greenhouse effect.