



Learners' Information and Activities Booklet

Global Change - Green Audit Toolkit



Green Audit Toolkit

The Green Audit Toolkit includes this Learners' Information and Activities Booklet, an Educator's Guide and Audit and Activity Sheets. A copy of the Smart Living Handbook developed by the City of Cape Town will also be made available as part of the toolkit.

This toolkit has been developed as support documentation for Grade 10 learners who wish to implement a Green Audit in their schools. It is critical that the audit is not a stand-alone action, but becomes an integral part of the curriculum and/or a practical action of an environmental club.

It is anticipated that the implementation of the Green Audit Project in schools within Cape Town could offer opportunities for carbon trading in the future. Audits are required as a baseline for measuring energy efficiency over the long term to access funding for implementing further sustainable education projects within schools.

The material of this Green Audit Toolkit has been developed in partnership between the Africa Centre for Climate and Earth Systems Science (ACCESS) and the City of Cape Town, Environmental Resource Management Department (ERMD). These resources were published by ACCESS (January 2009).

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Additional information is available at www.africaclimatescience.org and www.capetown.gov.za/environment

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- Hin Wah Li and Pavs Pillay, ACCESS
- Lindie Buirski and Julia Karl, City of Cape Town
- Grace Stead, Steadfast Greening
- Fran Cox

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Introduction

Why are we doing this?

The purpose of this Green Audit Toolkit is to present you with knowledge and understanding of how your actions in and around your home and school affect the **environment** and invariably planet Earth.

An audit is an evaluation of how well or poorly something is working. By doing a '**green audit**' at your school or home, you can determine how your actions, non-actions and/or reactions impact on the environment, either in a positive or negative manner. By doing a green audit we can determine what we need to do to help our planet and how you can live a more sustainable lifestyle.

A green audit is also known as an '*eco audit*' or an '*environmental audit*' which is a 'snap shot' of the environmental resources being used at a specific venue during a specific time to use as motivation to implement cleaner production projects.

What kinds of audits are we going to do?

This booklet provides background information and guidance around five different areas of focus that are included in the green audit process: waste, water, energy, transport (carbon footprint) and biodiversity.

What does the Green Audit Toolkit contain?

Background information;
Guidelines on how to do a green audit (some audits take place at school and some at home – use both for comparative information);
Suggestions and practical tips about what you can do;
Additional information, relevant websites and publications;
Teachers will receive a copy of the Smart Living handbook and audit sheets which you can use during the audits.

At the end of the audit process:

We hope that you will have developed a greater appreciation and understanding of the impact of your actions on the environment;
That you have successfully been able to determine your impacts on the environment through the various auditing exercises;
That you have brainstormed and implemented practical ways to reduce your negative impact on the environment;
That you will create awareness around the use of the Earth's resources in your home, school, local community and beyond.



Green Audit

In a time when climate change and the over-exploitation of non-renewable natural resources are growing issues—green auditing allows all of us to play an effective role in reducing our impacts on the planet; and at the same time, enhance our relationships with the planet's other inhabitants and the environment. A green audit is generally done to determine a baseline (a starting point). This baseline guides us on how to improve a situation.

A green audit can be a useful tool for a school to determine where they are using the most energy or water; the school can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or waste minimisation plan. Green auditing and the implementation of mitigation measures is a win-win situation for all—the school, the learners and the planet.

Assessment methodology

1. You should work in a team – preferably a small team. The team needs to define a strategy for collecting and analysing data – ensuring that data collection methods are simple, systematic, and fully understood by all the people collecting the data. The details of the data should be captured on to a spreadsheet and any assumptions that are made should be indicated so that they can be referred to during the analysis. Ensure that specific people in your team are responsible for collecting data; this process needs to be well managed. All the data will be interpreted at the end of the audit project and used to design a retrofit plan. This retrofit will be implemented at the school; resulting in savings over the long term.

2. The green audit begins with the teams walking through all the different facilities at your school, determining the different types of appliances and utilities (lights, taps, toilets, fridges, etc.) as well as measuring the usage per item (Watts indicated on the appliance or measuring water from a tap) and identifying the relevant consumption patterns (such as how often an appliance is used) and the impact that they have. Remember to indicate the unit of measurement.

3. You will need to interview staff or other learners to get details around usage, frequency or general characteristics of certain appliances (such



as fridges). Surveys are useful tools for measuring less quantitative activities, such as meeting awareness-raising objectives. For example, how often does your household consume meat-derived products or how often do you use the photocopier in a week?

4. A brief description needs to be provided about the use of the venue (school), number and type of rooms (for example 10 classrooms, one office) and an indication of occupancy (i.e. one room used as a store room, others used 220 days per year on average).

Within the venue, you will be required to identify the key activity areas, which could be the kitchen, office, library or other classrooms. This will assist in comparing different key activity areas that are in different venues. As an example, most of the classrooms could be clustered together during the audit, whereas the kitchen and office should be kept separately.

5. To ensure an accurate audit, it is essential to obtain accurate data. Utility bills (municipal accounts) usually include energy and water consumption with associated costs. These are very helpful and should be collected over a period of time (preferably about 36 months). You will need to interpret the information and provide a summary about the amount of water (kilolitres) and energy (kilowatts) used. Note that a school could have more than one metering point.

6. Policies referring to your school's management of, and approach towards the use of resources need to be considered. Where there are policies they need to be listed as part of your analysis documentation. If possible obtain copies of these policies; if no written policies exist then transcribe conversations and interviews. Also make note of any awareness raising or training programmes that might be in place at your school (for ground staff or kitchen staff for example) and check if the school has a procurement policy (the school's policy for purchasing materials).

7. Assumptions that are made during the audit need to be recorded and be transparent; they give credibility to the process. Assumptions need to be constant throughout the process of the audit, so your audit team needs to work together to ensure this.

8. Once the data have been collected it needs to be collated and analysed to ensure that the right conclusions are reached. These conclusions will then be used to make recommendations for the implementation of a retrofit plan.



WASTE

What is waste?

Waste is defined as any material that is discarded as it is no longer seen as serving a purpose.

Solid waste can be divided into two categories: general waste and hazardous waste. General waste includes what is usually thrown away in homes and schools such as tins and glass bottles. Hazardous waste is waste that is likely to be a threat to your health or the environment like cleaning chemicals and petrol.

Where does our waste end up?

Everyday large amounts of waste from homes, offices, schools and factories end up in landfills. In Cape Town 6000 tonnes of waste are produced every day. That is around 2kilograms of waste per resident each day!



Why is waste a problem?

When waste is piled up and left untreated, it causes pollution, which can be harmful to the environment and to your health. In a landfill, as the waste begins to decompose or breakdown, it releases a liquid called

EXPLAIN: What happens during the process of decomposition? What are the stages of decomposition? What are the differences between aerobic and anaerobic decomposition? What can you do to avoid the negative impact of decomposition?

leach which can poison the soil and **groundwater**.

Organic matter like food, tree clippings and grass in landfills produce greenhouse gases such as methane. Carbon dioxide (CO₂) is naturally present in the Earth's **atmosphere** and is an important greenhouse gas, but the overproduction of greenhouse gases is contributing towards the **greenhouse effect** and **global warming**.



Pollution

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals.

EXERCISE: To determine the best way to reduce your waste you will need to know what type (bottles, plastic, tin cans, paper, etc.) and amount of waste (in kilograms) is generated. Do a daily audit for seven days and keep track of the waste generated.

At the end of the audit period, present the data you have collected in graphical format (one graph for each day, plus a graph to illustrate your overall 'waste profile'). Discuss trends with recommendations on how the waste can be reduced, re-used or recycled.

Waste at Home: You can carry out the same waste audit at home. Consider how your home 'waste profile' differs from your school 'waste profile' and what you need to do to address this.

Some practical ways to reduce, re-use and recycle your waste

Start a **recycling** project at your home or school.

Re-use paper that has been printed on one side only.

Store your lunch in reusable rather than disposable containers.

Create a **compost** bin or worm farm for your food waste.



EXPLORE: Have you noticed the recycle signs on the bottom of plastic containers? What do the different numbers mean? What can be made from the different types of plastics? Find out more about poly-logos and their purpose in the recycling process.

Consider what else you can do at your school or home to reduce waste before it is generated. How can you avoid it in the first place? Explore the concept and principles of 'eco procurement' and discuss how this relates to waste.



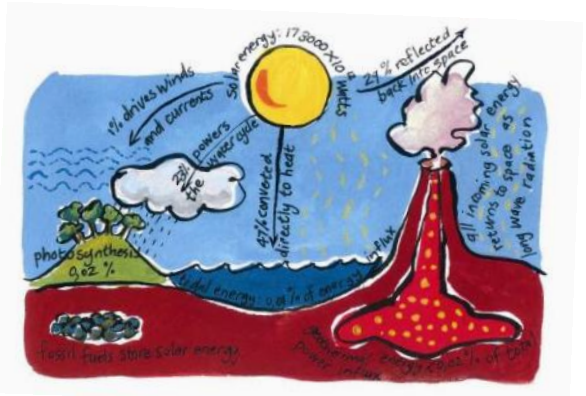
Information on the City of Cape Town's waste minimisation and awareness programmes can be found on www.capetown.gov.za/solidwaste, click on campaigns/programmes then select Waterwise: Introduction.

ENERGY

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. Energy is measured in units called joules, while power is the rate at which energy is used and is measured in watts (W) (volts X amps = watts). An 'old' incandescent light bulb uses approximately 60W to 100W; while an energy efficient Compact Fluorescent Light bulb (CFL) uses only 18W for the same result, or a Light Emitting Diode (LED) uses even less.

The energy cycle

An energy source that can be naturally replenished (such as wind or sun) is regarded as being '**renewable**'. Fuels such as oil and coal, are considered '**non-renewable**' energy sources because they have limited reserves as they take millions of years to be produced under special circumstances.



How is global change and energy consumption connected?

The greenhouse effect helps to regulate the temperature of our planet. It is essential for life on Earth and is one of the planet's natural processes. Simply put, the sun heats the Earth and some of this heat, rather than escaping back to space, is trapped in the atmosphere by clouds and greenhouse gases, such as water vapour and carbon dioxide.

Without the natural greenhouse effect, the temperature of the Earth would be about $-18\text{ }^{\circ}\text{C}$ instead of its present $14\text{ }^{\circ}\text{C}$. The main concern is that human activities are leading to an enhancement of the greenhouse effect by the emission of greenhouse gases through **fossil fuel** combustion and **deforestation**.

Fossil fuels are made up of hydrogen and carbon. When fossil fuels are burned, the carbon combines with oxygen to yield carbon dioxide. The

amount of carbon dioxide produced depends on the carbon content of the fuel; for example, for each unit of energy produced, natural gas emits about half and petroleum fuels about three-quarters of the carbon dioxide produced by coal.

EXERCISE: Determine the cost of an 'old' incandescent light bulb (100W) and that of an energy efficient CFL (18W). Find out what the electricity tariff rate is in Rand per kilo watt hour (R/kWh) for your school (or home). Count the number of lights in the classroom (or home) and then determine what the **pay-back period** would be for changing the 'old' lights with energy efficient lights.

Quick ways to save energy in the classroom

- Consider if you can use natural light rather than switching on one of the electric lights. Switch the lights off when everybody is leaving the classroom – even during a break.
- Do not heat your classroom to more than 20 °C and encourage everyone to dress according to the weather.
- Close the doors during winter to keep the warm air inside.
- Take out unnecessary light bulbs! Sometimes there are more light bulbs than you actually need.
- Open the window completely for a short period of time rather than opening the window a little bit for a long time while you are heating your classroom. That way you can avoid 'heating the environment' instead of your classroom.

DISCUSS: Is nuclear energy renewable energy? What are the pros and cons of using nuclear energy versus alternative sources?

What is renewable energy?

Renewable energy is derived from an energy source that is rapidly replaced, or renewed, by a natural process, for example wind, sun, hydropower, biological and geothermal processes. Did you realise that you are applying renewable energy when drying your washing on the clothesline in the wind and sun? Other applications of renewable energy include solar panels, fuels made from agricultural crops (bio-fuels) and hydropower schemes.

Let's look at energy usage in your home (you can apply this same exercise to your school).



Household energy audit for electricity

This exercise will help you understand where you use electricity in your home and where savings could be made. An energy audit sheet as well as a list of the typical electricity consumption of household appliances is provided on page 10.

Step 1: Collecting the data

- In Column 1 of the Table, list the appliances you have in your home.
- In Column 2 note the electricity power (W) of each appliance. Appliance power is usually given on the appliance itself. However, this often indicates maximum power use, which can be much higher than average power use. Refer to the 'Typical Home Appliance Electricity Consumption' table in the Energy chapter of the Smart Living Handbook which provides estimates for common appliances.
- In Column 3 record (in hours) how long each appliance is used per day (consider differences in weekday and weekend use and summer and winter use and work out an average for yourself). **Note:** *Some appliances switch on intermittently, such as fridges and hot water cylinders. Again, in these instances the table 'Typical Home Appliance Electricity Consumption' may be used to estimate the consumption.*
- If you have more than one of any appliance, such as lights, write this in Column 4.

Step 2: Doing the calculations

- To find out your daily electricity consumption by using this simple formula:

$$\text{(Watts x hours used per day x no. of appliances)/1000 = daily consumption}$$

What you are doing here is multiplying Column 2 by Column 3 and then by Column 4 (for more than one appliance). This final figure is then divided by 1 000 in order to convert from watt hours to kilowatt hours (*1 kilowatt = 1 000 watt*). Insert the total in Column 5.

- To get your monthly consumption figure multiply your total daily figure by 30 days and indicate this in Column 6.
- Add up your total kWh usage for all appliances to reach your grand total electricity consumption.

Step 3: Identify priority action areas and potential for savings

- Examine your results. Which areas of the home use the most electricity? Identifying this and taking simple, effective and cost-saving actions will help you to reduce your electricity consumption.



Household Electric Appliance Audit Sheet

1	2	3	4	5	6
Appliance	Power use (Watt)	Usage per day (hours)	Number of appliances	Average kWh per day (watt x hours x no/1000)	Average kWh per month
light bulb Incandescent	60W	4 hours	7 lights	$60 \times 4 \times 7 = 1680 / 1000 = 1,68$ kWh per day	$\times 30 = 50,4$ kWh/month
Light bulb CFL	18W	4 hours	7 lights	$18 \times 4 \times 7 = 504 / 1000 = 0,5$ kWh per day	$\times 30 = 15,12$ kWh/month
Microwave	1000W	0,5 hours	1	$1000 \times 0,5 \times 1 / 1000 = 0,5$ kWh per day	$\times 30 = 15,12$ kWh/month
Stove	3000W				
Geyser	2500W				
Kettle	2500W				
Electricity consumption total					

DISCUSS: As a result of this energy audit at your home, consider where the most energy is spent. Discuss with your audit team ways in which you can save energy based on the audit.

WATER

Water is a natural resource; all living matter depends on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in the future.

The water cycle

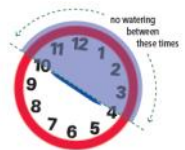
The water cycle is closed - the same water moves about the Earth all the time. This is all the water there is. The demand for water in Cape Town today is increasing at four percent per annum. At this rate, we will be running out of surface water by 2016! Saving water should be a way of life.



A small drip from a leaky tap can waste more than 180 litres of water a day; that is a lot of water to waste – enough to flush the toilet eight times! Report leaky taps at your school or at home to help save water.

DISCUSS: Which are the different areas at home and at school where water is needed? Which area will require the most amount of water? How you can reduce water consumption at home and school? How do you motivate other people to help you save water?

Did you know? Watering your garden in the early morning or late afternoon is not only living smart, but also a legal requirement. Nobody may water a garden with potable (drinking) water between 10:00 and 16:00. You are not allowed to use a hose on paved areas and the hose has to have a self closing device.



Conduct a mini audit of water use in your home to determine:

How much water is being used? Where is the most water used? Are there areas where you could make water savings?

Water audit at your home

1	2	3	4	5	6
Activity	Average litres of water used per activity (litres)	Number of times activity done each day	Total water used by a person each day (litres)	Number of people in the household	Total household water consumption per day
<i>Example: Wash hands and face</i>	<i>1.5 litres</i>	<i>3 times a day</i>	<i>1.5 litres x 3 times a day = 4.5</i>	<i>4 people</i>	<i>4.5 litres x 4 people = 18</i>
Wash hands and face	1-3				
Bath	80 – 150				
5-minute shower	80				
Teeth cleaning with tap open	4				
Toilet flush	6-21				
Drinking (cup)	0.25				
Washing dishes (hand)	18 single & 36 double basin				
Dishwasher	17 to 45				
Washing machine (one 3 kg load)	80				
Hand washing (1 tub load)	40				
Leaking/dripping tap (1 drop/second /day)	30 to 60				
Food garden (m ² /day)	4				
Cooking (average meal for 5 people)	3				
Using the garden hose for an hour	600				



Step 1: Collecting the data

- In Column 1 of the Table, different activities are indicated, with the estimated water consumption indicated in Column 2.
- In Column 3 write down how often these activities are done by each person living in the house.
- In Column 5 write down the number of people in the household per activity. Some people might generally take a bath, while others shower.

Step 2: Doing the calculations

- To find out the estimated amount of water used for each activity per day you need to multiply the amount of water used per activity (Column 2) by the number of times the activity is done each day (Column 3) and then by the number of people in the household (Column 5). Write down the result in Column 6. If you wish to obtain a monthly figure, then multiply this again by 30 days.

Step 3: Identify priority action areas and potential for savings

Think about where you use the most water every day. Explore the Water chapter in the Smart Living Handbook for helpful advice on better water choices you could be making.

EXERCISE: Often as much as 35 percent to 50 percent of household water is used for non-essential purposes, such as watering gardens and filling pools. Compare your results to utility bills to see if you are on the right track.

DID YOU KNOW?

- To make a small car you require 450 000 litres of water.
- 130 litres of water is needed to make a bicycle.
- About 19 litres of water is needed to make one litre of petrol.
- It takes three litres of water to generate one kWh of electricity.
- Doing the ironing, or cooking a meal in an electrical oven will use roughly three litres of water at the power station.

For a more detailed water audit, do the fun and interactive Household Audit Challenge that can be found on www.capetown.gov.za/water



BIODIVERSITY

What is biodiversity (*biological diversity*)?

The term biodiversity is used to describe the number, variety and variability of living organisms. It is defined in terms of species, **ecosystem** and genetics (genes, and DNA that determines the uniqueness of each individual and species). Biodiversity also incorporates extinction of species and **habitat** loss. Our planet is so rich with life that scientists are not certain how many different kinds of organisms may exist.



The sheer variety of species on Earth, from microscopic bacteria to the blue whale, is impressive, but biodiversity is not just about a list of species, it is rather about a series of relationships in a complex web. Biodiversity is about the Earth's ecosystems such as its savannas, rain forests, oceans, marshes, deserts, and all the other environments where species evolve and live, including where human beings live and exist.

Why is biodiversity important?

All plant and animal species - including humans - are linked together in a complex web of life; we depend upon biodiversity for our survival. Biodiversity is the key to healthy ecosystems and ultimately a healthy planet. It keeps the air and water clean, regulates our climate and provides us with food, shelter, clothing, medicine and other useful products.

Each part within this complex web diminishes a little when one part weakens or disappears. For example, some plants and their natural pollinators have evolved to be dependent upon one another; a long-billed bird pollinates a flower with a long tube while a night-roving moth pollinates a night-blooming cactus. Some insect parasites have evolved to live in only one host, such as a species of wasp that lays its eggs on only one type of orchid flower. If one species becomes extinct, the other could too.



Biodiversity threats



Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. Without this variability in the living world, ecological systems and functions would

break down, with detrimental consequences for all forms of life, including human beings.

What is a biodiversity audit?

Maintaining a biologically diverse environment is the foundation for a healthy planet and human well-being. By examining the habitats, species and areas of your environment, you can determine how biologically diverse your environment is, but more importantly, 'how green your carbon footprint is'.



EXERCISE: In your audit team, investigate and discuss the following issues to see how biodiversity friendly and Earth friendly your home and school environment is.

- Examine the paved parking area; does the paving allow for water to permeate (drain) into the soil below the paving? What improvements can be done to enhance biodiversity?
- Are there indigenous (naturally occurring) plants and animals (including insects) on the school grounds or in your garden? What adjustments should be made? What can you do to encourage more birds and insects and promote biodiversity?
- Is there a lawn area that needs mowing and watering? What type of grass has been planted? At school this could be a rugby or soccer field; at home it is in your garden. This uses a lot of water and is not sustainable. Are there any alternatives?
- Does your school/home have a vegetable patch?
- Are harsh pesticides or herbicides used in the grounds?

The more biologically diverse your environment is; the lower your carbon footprint; the more resilient (tougher) the environment is to recover from stresses like drought, floods, habitat destruction etc.

CARBON FOOTPRINT

Transport

How you get around, and to and from school each day has an impact on the environment through the emission of greenhouse gases into the atmosphere by the burning of fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, making up about 75 percent of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions.



If you can't measure it, you can't manage it

An important aspect of doing an audit is to be able to measure your impact so that you can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits you can also determine what your carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method you travel between your home and school every day. If you walk to school each day, then analyse the journey of one of the members of your audit team who travels to school in a vehicle (bus, taxi or car).

Step 1: Collecting the data

- You will first need to determine the average number of kilometres you travel between home and school every day.
- Secondly calculate the number of times in a week or month you travel to get to school so that you can work out the total distance travelled during a specific time period.
- Consider the number of people in the car, bus or taxi. If there are only two of you, then consider sharing with more people to reduce your carbon footprint.

Step 2: Doing the calculations

- To find out the estimated amount of carbon emissions created per month you need to consider that an average car produces 0.3 kg of carbon emissions per kilometre. Show all calculations (equations and steps) you made to arrive at your answer.

Electricity

Every time you use electricity you create carbon emissions. When you have a hot shower, switch on the light, have a cup of coffee or a cold drink, you need to consider your impact on the environment. The majority of energy in South Africa is generated through burning of fossil fuels (coal) and thus the country has a very high carbon footprint.



Source: Grace Stead

An average middle income home in Cape Town generates approximately 737 kg of carbon emissions per month. This is based on the fact that about one tonne of carbon emission is created for each megawatt hour of electricity generated in South Africa (1MWh = 1000kWh).

In the energy audit you were asked to determine the monthly energy usage for your home and school. Use this figure to determine your carbon footprint for your home and school based on the carbon emissions created for each kWh of energy generated.

DISCUSS IN YOUR AUDIT TEAM: In what ways has the burning of fossil fuels by humans affected the natural greenhouse effect? Is this relevant in South Africa or only developed countries?

Environmental Club

If you want to measure and manage the carbon footprint of the school it is important that it is an ongoing process. If you have an environmental club at your school this would bring together like-minded individuals to share ideas and take action, in making sure that we live smartly and use our resources in a sustainable manner.

Below is a list of websites containing information on how to start an environmental club at your school:

www.peyalliance.com/start_club.html

www.environment.gov.za/Enviro-Info/env/clubs.htm

www.epa.ie/downloads/pubs/other/education/primary/environmentalcare/epa_education_environmental_care_eco_club.pdf



GLOSSARY

Atmosphere: The air surrounding the Earth, described as a series of layers of different characteristics. The atmosphere is composed mainly of nitrogen and oxygen with traces of carbon dioxide, water vapour and other gases that act as a buffer between Earth and the sun.

Audit: An independent review of activities, records, controls, policies and procedures. An audit will also recommend necessary changes and improvements.

Biodegradable: The ability of a substance to be broken down physically and/or chemically by micro organisms.

Climate Change: A change which is attributed directly or indirectly to human activities that alters the composition of the global atmosphere. The build-up of man-made gases in the atmosphere traps the sun's heat, causing changes in weather patterns on a global scale. The effects include changes in rainfall patterns, sea level rise, potential droughts, habitat loss and heat stress.

Compost: Decomposed organic material that is produced when bacteria/earthworms in soil break down garbage and biodegradable trash, making organic fertiliser.

Deforestation: Removal and transformation of forests and woodlands for human uses such as logging purposes and urban uses. Deforestation results in loss in biodiversity, changes in climate and soil erosion.

Ecosystem: A system involving the relationships and interactions between plants, animals and the non-living environment.

Environment: Our surroundings, including living and non-living elements, e.g. land, soil, plants, animals, air, water and humans. The environment also refers to our built, social and economic surroundings, and our effect on the surroundings.

Fossil fuels: Non-reusable and decayed organic material that can be burned or consumed to produce energy e.g. oil, natural gas and coal.

Global warming: The noticeable increase in the average temperature of the Earth's atmosphere and oceans in recent decades and its projected continuation. An increase in global temperatures can in turn cause other changes, including rising sea levels and changes in the



amount and pattern of rainfall. These changes may increase the frequency and intensity of extreme weather events, such as floods, droughts, heat waves, hurricanes and tornados.

Green audit: Also known as an environmental audit or an eco-audit is an audit that specifically considers the environment and related financial costs. The results of the audit help the organisation to improve its environmental policies and management systems.

Greenhouse effect: The gradual increase of the temperature of the Earth, caused by the sun's rays reaching the surface of the Earth and being trapped by air pollution.

Groundwater: Water found underground, typically supplying wells, boreholes and springs.

Habitat: The physical environment that is home to plants and animals in an area, and where they live, feed and reproduce.

Natural resource: Any resource provided by the biophysical environment.

Non-renewable Resources: Raw materials that have limited reserves as they take millions of years to be produced under special circumstances, such as oil and coal.

Recycling: Collecting, cleaning and re-using of waste materials.

Renewable Resources: Raw materials that can be replaced by natural processes.

Sustainable (development): Development that is able to meet the needs of present and future generations by the responsible use of resources.

Refer to the Enviro Dictionary (English, Afrikaans, Xhosa) found at www.capetown.gov.za/environment



REFERENCES and USEFUL SITES

Smart Living Handbook

www.capetown.gov.za/environment, click on Smart Living Handbook.

Waste

What on Earth?

http://gaia.hq.nasa.gov/quiz/quiz_start-template.cfm

Clean Up Australia

www.cleanup.org.au

National Recycling Forum

www.recycling.co.za

Resolution Recycling

www.resolutionrecycling.co.za

UK Environment Agency

www.environment-agency.gov.uk/fun/371307/?version=1&lang=e

The Story of Stuff

www.storyofstuff.com

Energy

Energy Information Administration (US)

www.eia.doe.gov/kids/energyfacts/index.html

Environmental Protection Agency (US)

<http://epa.gov/climatechange/kids/index.html>

The Succulent Karoo

www.climatetalk.org.za/

Sustainable Energy Africa

www.sustainable.org.za/

Eskom

www.eskom.co.za

Water

Water Services (City of Cape Town – your city – water services)

www.capetown.gov.za/water

US Geological Survey (Water Science for Schools)

<http://ga.water.usgs.gov/edu/>

Water – learning and living

www.watercare.net/wll/index.html

Department: Water and Forestry

www.dwaf.gov.za/





Biodiversity

The Scrap Centre – Toward Biodiversity

www.scrapltd.com.au/programs.htm#biodiversity

The Field Museum – Biodiversity and Conservation: The web of life

www.fieldmuseum.org/biodiversity/teach_download.html

The Greens

www.meetthegreens.org

Gamequarium – Ecology Games

www.gamequarium.com/ecology.html

Biodiversity 911: On the web

www.biodiversity911.org/FunandGames/funandgames.html

Carbon Footprint

US Environmental Protection Agency

www.epa.gov/climatechange/kids/index.html

Atmosphere, Climate and Environment Information Programme

www.ace.mmu.ac.uk/kids/information.html

What's my carbon footprint?

www.whatsmycarbonfootprint.com/

UK Environment Agency

www.environment-agency.gov.uk/fun/?lang=e

Global Footprint Network

www.footprintnetwork.org/

BP online carbon calculator for home

www.bp.com

Atmosfair online carbon calculator for flights

www.atmosfair.de

Food and Trees for Africa (SA carbon calculator)

www.trees.co.za

Environmental Audits, Carbon Calculators and General Information

Eco Management and Audit Scheme

www.emas.org.uk

WWF - World Wide Fund for Nature

www.panda.org

50 ways to help the planet

www.50waystohelp.com

Environmental info for South Africa

www.environment.gov.za/Enviro-Info/intro.htm

Enviropaedia

www.enviropaedia.com

Solid waste management (City of Cape Town)

www.capetown.gov.za/solidwaste





NOTES





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