e-Kapa

Cape Town's Lowlands - *A Global Treasure*

EDUCATORS' GUIDE

CAPE ACTION FOR PEOPLE AND THE ENVIRONMENT
C·A·P·E

BOTANICAL SOCIETY OF SOUTH AFRICA
BOTANIESE VERENIGING VAN SUID-AFRIKA

cape flats nature

CITY OF CAPE TOWN | ISIXEKO SASEKAPA | STAD KAAPSTAD

THIS CITY WORKS FOR YOU

CONTENTS

e-Kapa: Cape Town's lowlands – a global treasure is the first example of electronic environmental education Learning and Teaching Resource Materials (LTRMs) produced for schools by the City of Cape Town, in collaboration with the Botanical Society of South Africa and the Khanya Project of the Western Cape Education Department. It aims to put up-to-date information about the natural environment of Cape Town into the hands of educators and learners, and to promote learning and action for sustainable living.

In 2001, the **Botanical Society of South Africa** and the **City of Cape Town** published **Cape Flats Floral Treasures: A teacher's guide to active learning in Cape Town schools**. The original guide introduced teachers to the diverse but threatened ecosystems of the Cape Flats and published a number of learning activities developed by educators from local schools and environmental education centres. The original guide is now out of print but lowland environments in the City continue to provide numerous opportunities for learning. In 2006, in response to requests from educators, the Botanical Society and City of Cape Town decided to revise and republish this guide.

We are grateful to **Ms Fadiah Abbas**, a Grade 7 teacher at Levana Primary School, who suggested that the revised guide be published electronically rather than in book form. This resulted in our making contact with the **Western Cape Education Department's Khanya Project**. They have guided and encouraged us through the process of developing what we hope will be the first in the **e-Kapa series**: an electronic LTSM supporting environmental education in the City of Cape Town.

The City of Cape Town is committed to making this information available in all three official languages of the Western Cape. Once the English version has been piloted in schools, it will be translated and made available in both Afrikaans and isiXhosa.

This resource includes

1 A printable **educators' guide**, which includes:
- Information on how to use this resource
- An introduction to environmental education in the curriculum
- Curriculum-based lesson plans
- Answers to computer-supported word puzzles
- A resource list (e.g. references, websites)

2 An **interactive learning web** that can be loaded onto the computers at your school, education centre or home and browsed offline, without requiring access to the Internet. This web includes a homepage, a section covering South Africa's biomes and ten modules covering various aspects of the history and ecology of Cape Town's lowlands.

Module	Title
1	Nature on your doorstep
2	Four lowland ecosystems
3	A brief human history
4	Urban nature under pressure
5	Rare, threatened and extinct
6	Conserving nature in the City
7	Nature and culture
8	Adapting to the environment
9	Local ecology
10	Planting indigenous

The modules provide
- Detailed information about the topics
- Pop-up definitions of terms and difficult words
- Illustrations, including colour photographs, printable line drawings, diagrams and animations
- Maps and satellite images
- Computer-based activities (to be completed on the computer) and computer-supported activities (to be printed and completed using information from the web), e.g. multiple choice, word puzzles, matching pairs. These activities encourage learners to read with comprehension, and enable educators to assess knowledge and understanding
- Questions for debate, discussion or answering in workbooks
- Spreadsheets, e.g. species lists, contact lists.

3 WHO IS THE RESOURCE FOR?

This resource has been developed with **Senior Phase** teachers and learners in mind and the detailed lesson plans focus on this phase. However, the information can be used and adapted to support learning in a much wider range of grades.

Similarly, although the information focuses on the **lowlands of the City of Cape Town**, the resource may be used and adapted by educators anywhere. You can focus on Cape Town as a case study or adapt the information and activities to suit your own city, town or region.

We hope that the information and activities in this guide will enhance teaching and learning in your school, and enable you to participate in action projects to conserve and restore urban nature.

e-Kapa: supporting learning

- **Arts and Culture** can use information on environmental issues and pictures of landscapes and species as inspiration for arts and drama projects, e.g. designing posters for an environmental campaign or dramatising a TV documentary.
- **Information Technology** teachers can use the materials to promote computer literacy skills, e.g. using search functions, solving WebQuests, developing PowerPoint presentations and designing websites.
- **Language** teachers can use text for reading and comprehension exercises, and as topics for orals, debates and letter-writing. Learners can create their own environmental dictionary using the pop-up definitions throughout the text.
- **Natural and Social Science** teachers can use specific information on the lowlands of Cape Town to supplement more general information in textbooks. Natural Science teachers can use the line drawings to illustrate class notes and worksheets and Social Science teachers will find the maps useful.
- **Learners** from both the General and Further Education and Training bands can use the information and images for project work in a variety of Learning Areas.
- **Schools** can use the contact details of environmental organisations and City of Cape Town nature reserves to plan field trips, environmental action projects (e.g. developing indigenous water-wise gardens) and community service projects (e.g. volunteering for a local environmental organisation).
- **Environmental education centres** can use and adapt the information, illustrations and activities in the development of their own educational programmes and materials.

Not just for Senior Phase!

Karen Hamman teaches at St Mary's Primary School in Retreat. She used information on indigenous healing plants (see Module Seven: Nature and Culture) to develop a **Grade Six History** lesson based on the Knowledge Focus: History of Medicine.

Karen divided the class into small groups. She gave each group a page of information on a medicinal plant. (A useful resource to support this activity is the handbook **Indigenous healing plants of the Herb and Fragrance Gardens** by Alex Dyson, which is available from Kirstenbosch National Botanical Garden. You could also use the information in Module Seven and search the Internet for information on healing plants.)

Karen asked each group to read their page of information and find out:

- What is the name of the plant?
- What does the plant look like? (draw it)
- How did the indigenous people of the Cape originally use the plant?
- Do people still use the plant today?

Each group produced a poster on their plant and shared their findings with the rest of the class.

The class then brainstormed a list of questions they wanted to ask about healing plants. They recorded these questions in their note books. For homework, they found someone at home or in the community to interview about healing plants.

Learners found out that herbs can be used to treat a very wide range of illnesses but that they can also be dangerous if they are taken incorrectly. They realised that, just like modern medicines, traditional medicines should be taken under supervision of an experienced healer.

This lesson addresses Learning Outcomes 1 & 2 in Social Sciences (History). It could be integrated with Home Language (LO 2, 3 & 4) and Arts & Culture (LO 1, 3 & 4).

4 HOW CAN WE USE THIS RESOURCE?

Educators and learners can use this resource in a number of ways:

Planning lessons:

This LTSM provides information and ideas for lesson development in various learning areas.
To help you use this information, we have included a number of lesson plans. Some of these lessons are based on work done by local educators.

Lesson plans are included for four learning areas:

- Arts and Culture
- Language
- Natural Sciences
- Social Sciences

Lesson plans include curriculum links, step-by-step instructions, worksheets and assessment guidelines. They can be used as they are or, better still, adapted to suit your particular circumstances.

In addition to these formal lesson plans, each module has links to **computer-based or computer-supported activities** that can be completed in the computer laboratory or adapted as classroom activities.

Question boxes in the text highlight issues for debate and discussion or lesson ideas that educators could develop further.

Presenting lessons

Teachers who have access to digital projectors or interactive white boards will be able to draw on the information and illustrations in this resource to develop computer-based presentations (e.g. PowerPoint) in a variety of learning areas.

In the original version of **Cape Flats Floral Treasures**, a poster illustrating plant and animal species accompanied the teachers' guide. In this version, the poster is available in electronic format, with interactive links to photographs and information on the species illustrated. This may be projected or used on desktop computers in the computer laboratory.

Developing language skills

Educators can use the text to develop a variety of language activities, from reading and comprehension, to summarising and translation, and as stimulus for debates, discussions, letter writing and compositions:

- In the text you will find questions to stimulate debate, discussion and written work.
- Many of the computer-based and computer-supported activities can be used as comprehension tests.
- Three of the detailed lesson plans focus on Language learning outcomes.

Setting projects

All Learning Areas require learners to do projects, and the curriculum encourages learners to investigate their own surroundings. However, it is often difficult to find information on the local environment. Most information in school libraries is of a general nature, and often out of date. The expense of Internet access in South Africa limits the number of learners who can access the worldwide web, where they would find more current information.

This web provides locally relevant, up-to-date information on Cape Town's lowland ecosystems. Teachers can set research projects on various aspects of this topic, knowing that learners will be able to find information in this resource as well as in the books and websites listed.

To make this information accessible to learners, teachers may schedule research sessions in the computer lab or print out relevant sections of the information to enable learners to do research in class or for homework.

To foster cooperative learning, the educator can use the information in this web to make up resource packs focusing on different aspects of the overall topic, which different groups of learners can work on.

Developing computer literacy

Thanks to projects like Khanya, most schools in the Western Cape now have at least one computer laboratory. Educators in all learning areas should be integrating the use of information and communications technology (ICT), especially computers, into their lessons.

This resource provides information, illustrations and computer-based activities that will support the development of a variety of computer skills. These include searching for information, cutting and pasting information, and using information and illustrations to write stories and design posters, brochures, presentations or websites.

The resource is designed as a web so, whether or not your school has a dedicated Internet connection, learners working with this resource will become familiar with web-based formats and conventions. If you are linked to the Internet, you can develop WebQuests for the learners using the websites mentioned in the text. WebQuests are problem-solving activities that require learners to find information on the Internet. Visit www.webquest.org for more information.

Developing learning support materials

Educators wishing to develop their own learning support materials, like class notes, worksheets or identification sheets for field trips, are welcome to use the information and illustrations in this resource. Where possible, line drawings of the plants and animals have been included as jpeg files so that these can be imported into learning support materials that will be printed out.

Planning field trips

The Natural and Social Sciences require learners to undertake fieldwork investigations. There are many venues in Cape Town, from nature reserves, aquariums and botanical gardens to coastal areas and urban open spaces, where you can take learners on educational excursions. This resource provides information on most of the City of Cape Town's nature reserves to help you plan your own field trips. It also provides contact details of other organisations and centres that offer guided field trips.

For tips on planning field trips see the section on **Environmental Education in the Curriculum**.

Getting help

Lists of contact details for **environmental organisations** and the **City of Cape Town's nature reserves** are included in Module Six. You are welcome to contact these organisations for further information, help with environmental projects and assistance with fieldwork. Throughout the resource there are links to websites where you can find out more about organisations and projects mentioned.

5 ENVIRONMENTAL EDUCATION IN THE CURRICULUM

The National Curriculum contains many references to the environment:

- In the **Principles** of the curriculum we find reference to "a healthy environment" and its relationship to social justice, human rights and inclusivity.
- In the **Critical Outcomes**, we read that learners must show responsibility to the environment by using science and technology critically. They must also come to understand the world as a set of related systems.
- Every Learning Area has **Learning Outcomes**, and some specify **Core Knowledge** focusing on understanding and caring for the environment.

Environmental education is therefore not an "extra" on top of the formal curriculum – it is very much an integral part of the curriculum. This resource aims to help you address these environmental imperatives in the curriculum by providing information and lesson ideas on one particular aspect of the environment of Cape Town.

Integrating knowledge, skills and attitudes:
The National Curriculum is based on the principles of **outcomes-based education**. Learners are expected to demonstrate that they have gained knowledge and that they understand what they have learned. They also need to demonstrate a range of skills, positive values and attitudes.

Integration through environmental learning

Focusing on the local environment creates opportunities to integrate the aspects of learning mentioned above. For example, if we want to understand the importance of biodiversity in our local environment, we need to become familiar with concepts and principles (knowledge) relating to biodiversity, and use skills of observation, interviewing, recording and analysing data to investigate this issue locally. During our investigations we may find that people have different views (attitudes) about the importance of biodiversity, which may reflect the values they hold. If we find that biodiversity is important, this might have implications for our own values and attitudes, and in turn influence our decisions about how we live.

Learning to live more sustainably
Environmental education encourages us to go further than simply knowing about our environment, being able to demonstrate certain skills, and even discussing our attitudes towards the environment. A simple definition of environmental education is "education in, about and for the environment". It suggests that what we learn should have an impact on how we live. It is not enough to know about our environment or even to say that we care. As we become more conscious that we are an integral part of our social and ecological environment, we are challenged to live in ways that honour and sustain life on Earth.

Methods and approaches in environmental education

Many educational methods can help us to become more environmentally literate, conscious and competent:

- In **Arts and Culture** our natural, built and social environments inspire creativity. The environment is a source of colour, pattern, texture and sound, as well as phenomena and issues to represent and interpret.
- In **Languages** we can research and critically analyse environmental issues; we can also develop the communication skills needed to become environmentally informed and active citizens.
- In **Life Orientation** we can clarify the values that underlie our environmental attitudes and actions, investigate the impacts of different sets of values and orientations on people and nature, and offer our time in the service of environmental and social causes.
- In the **Natural and Social Sciences** we can research our environment in books, magazines and on the Internet. We can also investigate our environment through practical fieldwork and interviews.
- People view, understand and address environmental phenomena and issues from multiple perspectives. Each subject or learning area provides particular lenses and tools that enable us to investigate, interpret and respond to the environment. Environmental projects and campaigns therefore present educators with ideal opportunities for **integration** within and across learning areas.
- Projects like Eco-Schools are ideal **whole-school development** opportunities. Not only teachers and learners, but the entire school community can participate in developing school environmental policies, enabling environmental learning in the curriculum and managing the resources of the school sustainably.

The rest of this section provides more information on four methods and approaches commonly used in environmental education:

1 **Fieldwork**
2 **Integrated learning**
3 **Newspapers in education and issue analysis**
4 **Whole school development with Eco-schools**

Fieldwork is an important approach in the curriculum, especially in the Natural and Social Sciences. You can conduct practical fieldwork investigations in your own school grounds, in the neighbourhood around your school, or at sites of special interest - from museums and nature reserves to factories and water purification works.

This section provides some general tips to help you plan and conduct effective field trips to a natural area. We have used Learning Outcomes from the Natural Sciences to provide a curriculum framework for the field trip, but you could just as easily develop a field trip for any other Learning Area.

Field Trips and the Curriculum

Field trips are valuable educational opportunities that should be well planned and integrated into the broader programme of work you are doing at school. They are ideal opportunities for integrated learning. In the Natural Sciences, for example, you can **investigate** (NS LO1) a local sustainability issue (NS LO3), drawing on relevant **knowledge and concepts** (NS LO2) to help you understand, investigate and respond to the issue.

When planning a unit of work that includes a field trip, look carefully at the learning outcomes you wish to cover and schedule learning activities according to the most appropriate venue for each stage of the activity, e.g.:

NS LO1: Scientific Investigations

- **Plan** the investigation in the classroom with the learners before you go on the field trip
- **Conduct** the investigation and collect data while you are on the field trip
- **Evaluate** data and **communicate** findings back in the classroom after the field trip.

NS LO2: Constructing Science Knowledge

- Make sure that learners are familiar with **terms and concepts** before you go on the field trip so that they can recall meaningful information while working on their investigation.
- Practise **cognitive skills** (e.g. categorising and interpreting information) and work with concepts in class or in a familiar fieldwork setting (e.g. school grounds) before applying these skills and concepts in an unfamiliar setting such as a nature reserve or museum.
- While on the field trip, collect data accurately and systematically, so that learners have meaningful data to **categorise / interpret** in the classroom.

NS LO3: Science, Society and the Environment

- Introduce learners to issues relating to their fieldwork excursion before the field trip, so that they can investigate the issues practically during the field trip and respond appropriately after analysing their findings.

Hint

Use the verbs ("doing" words) in the learning outcomes and assessment standards to help you design practical fieldwork-based learning activities.

Planning, conducting and consolidating field trips

Here is a checklist to help you plan your field trip thoroughly:

Stage 1: Plan and prepare at school

1 Before going on your field trip, **plan the logistics** thoroughly:

- ☐ Plan the field trip so that it relates to your work schedule and investigation focus (e.g. Will you have covered the concepts and developed the skills needed before you go on the field trip? Have you taken natural processes like seasons and tides into account when scheduling your field trip?).
- ☐ Obtain permission from the education authorities and complete the necessary application / indemnity forms.
- ☐ Book the fieldwork venue and transport in good time.
- ☐ Ensure far in advance that funding is available (e.g. budget school funds, organise a fundraising drive).
- ☐ Inform all stakeholders about the field trip and request assistance if necessary (e.g. principal, other teachers, parents, learners).
- ☐ Draw up a programme that provides adequate time for travel, orientation, investigations and relaxation.
- ☐ Design the learning activities, or discuss the programme with the education officer at the field trip venue to ensure that their programme suits your needs.
- ☐ Organise equipment and other learning support materials required.
- ☐ Pack a first-aid kit and ensure that there are at least two competent first-aiders on the trip.

2 **Prepare the learners** well at school so that they know:

- ☐ **Why** they are going on a field trip and how this relates to the work they are doing at school;
- ☐ **Where** they are going and what to expect;
- ☐ **When** the field trip is and what the programme for the day will be;
- ☐ **What** to wear and take with them (kit list);
- ☐ **What** they will be doing on the field trip (itinerary, activities);
- ☐ **Who** will be working with whom and who is responsible for what (form groups, assign responsibilities);
- ☐ **How** you expect them to behave and what to do in an emergency.

3 **Plan the investigation** with the learners, encouraging them to share what they already know, pose questions about what they would like to find out, identify what they need to research (read / ask), and decide which aspects of the issue they will investigate practically.

- ☐ Make sure that learners are familiar with terms and concepts they will use on the field trip.
- ☐ Encourage learners to research the issues you will be investigating on the field trip.
- ☐ Provide learners with opportunities to practise fieldwork skills in the school grounds or neighbourhood.

Stage 2: Investigate practically in the field

1 Conduct the investigation and collect data while you are on the field trip.
2 Have a clear focus for the field trip, which relates to your pre-visit preparation and post-visit follow-up.
3 Provide a clear but flexible fieldwork programme, which includes time for orientation, investigation and relaxation.
4 Divide learners into manageable groups and give them clear instructions and the necessary tools to investigate practically and record data. Cooperative learning techniques are helpful in fieldwork situations, with different groups undertaking different aspects of the overall investigation.
5 Provide the necessary equipment, information and record sheets so that learners can collect data accurately and systematically, generating meaningful data to categorise / interpret in the classroom.
6 Share initial observations on site, and enable all groups to observe all the areas / aspects of the investigation covered by the small specialist groups.
7 Prepare a meaningful "Plan B" in case of rain, so that your visit is not wasted.

Stage 3: Analyse and report in the classroom

1 Back in the classroom after the field trip, evaluate your data and communicate your findings.
2 Give each specialist group time to present their data to the class so that each learner can complete his/her own individual record sheets.
3 Analyse the data collected, e.g. by finding averages, drawing graphs, categorising items, identifying trends, producing neat illustrations, interpreting observations, etc.
4 Do additional research to help you answer your investigation question thoroughly.
5 Produce and present a report on your findings, using available technology, e.g. project file, poster, computer presentation.
6 Discuss the implications of your findings for the environment / society, decide on your response and follow a course of action, e.g. publicise your findings in the local newspaper; conduct an awareness programme at school; commit to making more sustainable choices in your own life, etc.

Dealing with large groups of learners

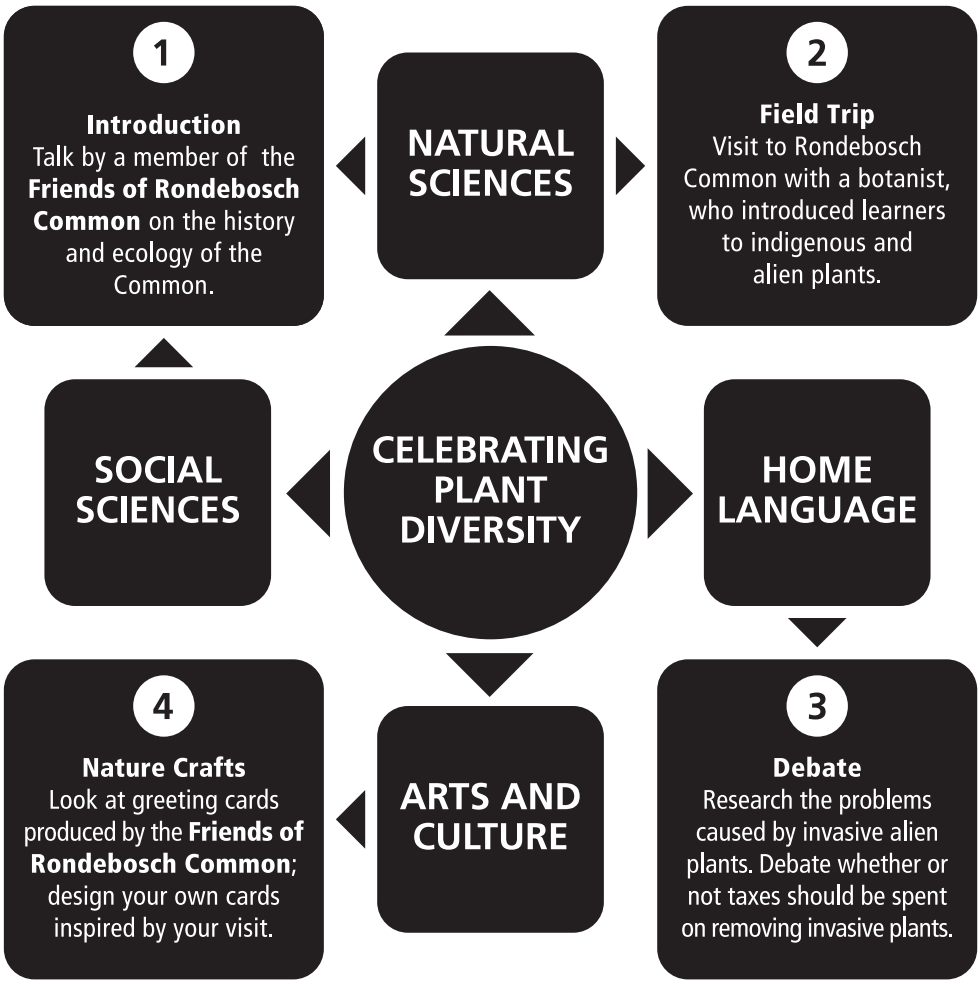
Fieldwork can be difficult with large classes. It is not effective to try to communicate with large groups outdoors – there are too many distractions and it is often difficult to hear the speaker. To overcome this problem, Andreas Groenewald, Education Officer at Helderberg Nature Reserve, uses co-operative learning methods. Before going into the reserve to do a practical investigation, Andreas divides large groups into smaller groups. He provides each group with a pack of information (e.g. brochures, booklets) and about three questions to guide their research into a unique aspect of the overall topic. For example, groups could research the physical (abiotic) conditions of a fynbos ecosystem, and the plants and animals they are likely to observe. He gets each group to develop a poster to share what they have learned with the other groups.

In the reserve, the learners continue to work in small groups on part of an overall investigation. For example, in one lesson, groups describe the physical conditions of their small study site (quadrat) and record the plants and animals found there. By getting groups to investigate areas with different physical conditions (e.g. hot, dry and sunny or cool, moist and shady), it is possible to compare findings and draw conclusions.

Environmental topics and issues lend themselves to being studied in an integrated, cross-curricular manner. Many of the activities in this resource could be adapted to integrate learning across more than one learning area: for example, you could integrate the Natural Sciences activity **Invasive and indigenous** with Mathematics and assess how well the learners apply mathematical skills in a fieldwork setting. You could also integrate the Arts and Culture activity **Nature's publicity company** with Language by getting the learners to present their media product orally.

Integration makes learning more meaningful. Learners can study a topic in depth, investigate many aspects of an issue, and draw on knowledge and skills from a range of learning areas. You can save time by assessing a number of learning outcomes through a single lesson plan. It takes time and commitment to plan integrated programmes, especially when different teachers are responsible for different learning areas – but it is worth the trouble!

In this section we see how **Susan Kogelenberg**, previously of **Groote Schuur Primary School**, developed an integrated lesson on Rondebosch Common that included Language, History, Natural Sciences and Arts and Culture. This lesson was enhanced by the involvement of members of the community who shared their knowledge of the Common with the learners.



Integrated studies at high school

Each year, the **Settlers High School** in Durbanville runs an inter-disciplinary programme at the **Tygerberg Hills Nature Reserve** and **Altydgedacht Farm** for the Grade Nines. During the field trip, learners have an opportunity to cover aspects of local geography, history and biology in a practical way.

On a guided trail through the reserve, they are able to:

- observe soils and soil processes they learned about in Geography,
- investigate invasive and indigenous vegetation
- draw a sketch map and discuss urban development issues from the top of the Tygerberg
- consider the impact of agricultural and urban development on nature.

This excursion helps learners to make sense of many of the things they learn about in class during Grade Nine.

5.3 NEWSPAPERS IN EDUCATION AND ISSUE ANALYSIS

Daily and weekly newspapers are a cheap, widely available and valuable resource for educators. Environmental and development issues are commonly reported on, and you can use these articles for a variety of purposes, including:

- Developing reading and comprehension skills
- Developing environmental literacy and awareness of current affairs
- Providing up-to-date information for research projects
- Teaching issue analysis skills
- Stimulating discussions, debates and role-plays
- Inspiring environmental action projects and campaigns.

We have included scans of five newspaper articles in this section that you could use in various ways in your classroom:

- **Time to start paying for benefits of Cape's natural environment**. Cape Argus, 19 June 2006
- **R150 million boost for a clean Zeekoevlei**. Cape Argus, 13 November 2006
- **Burden of mating can be fatal for the female leopard toad**. Cape Times, 29 August 2005
- **'Extinct' fynbos is pride of Cape Flats**. Cape Argus, 7 August 2006
- **City in new bid to get rid of pesky crows**. Cape Argus, 8 June 2006

We will use the first article to illustrate how you could help learners to analyse an environmental issue.

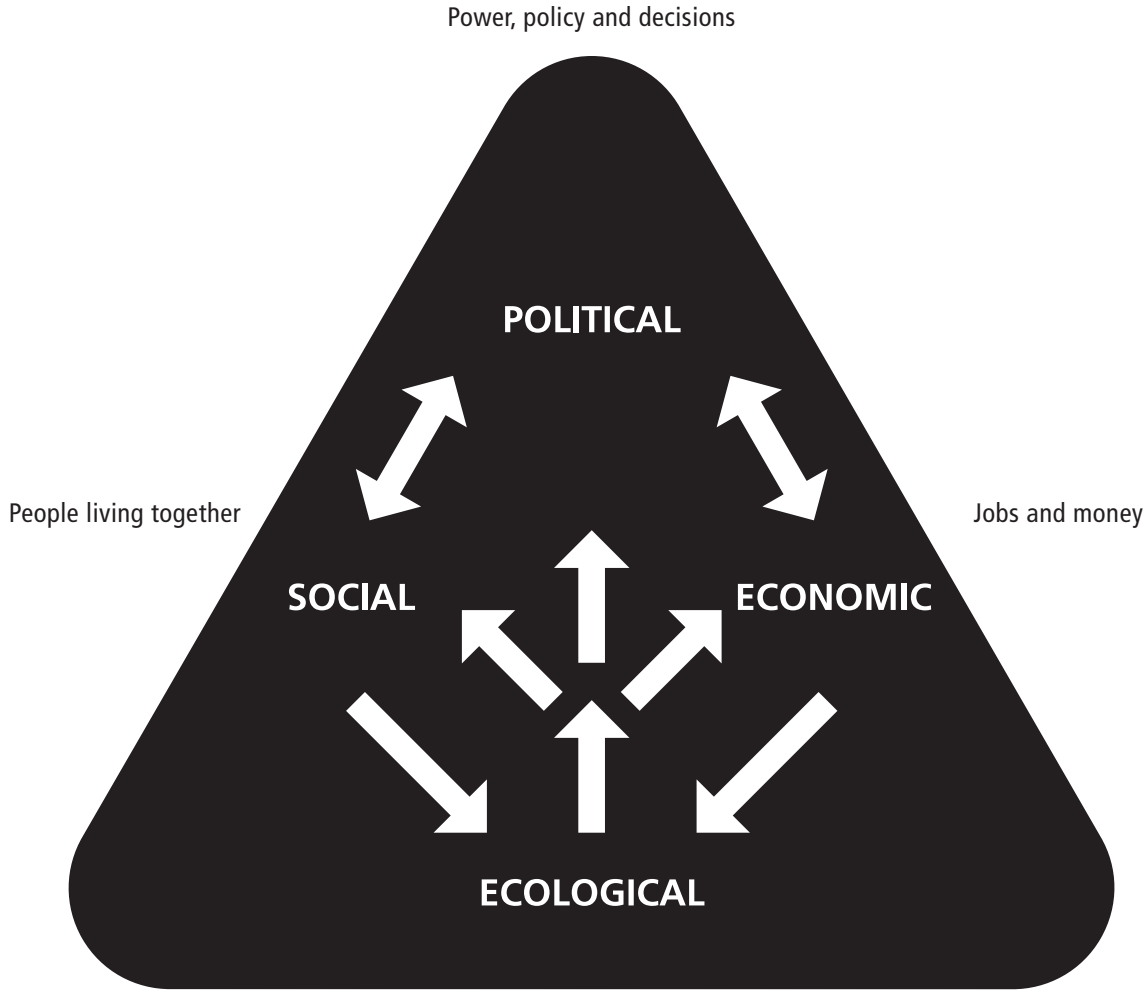
Analysing an environmental issue

We will use a tool called the **Issue Analysis Tree** to analyse the issue of the health effects of polluted wetlands in the first story.

Our environment is very complex: it consists not only of our physical surroundings, but also of our human relationships, ideas and systems – and all the interactions between these parts.

As one of the Critical Outcomes says: the world is a set of related systems, so when we try to solve problems, we cannot look at just one aspect of the environment in isolation; we have to look at the whole.

The following diagram (which we used in the Grade 7 History lesson **Just imagine …**) shows that our environment consists of interacting natural and social systems. People depend on natural ecosystems for survival, and in turn people and our cultural, political and economic systems and practices have an impact on the environment.

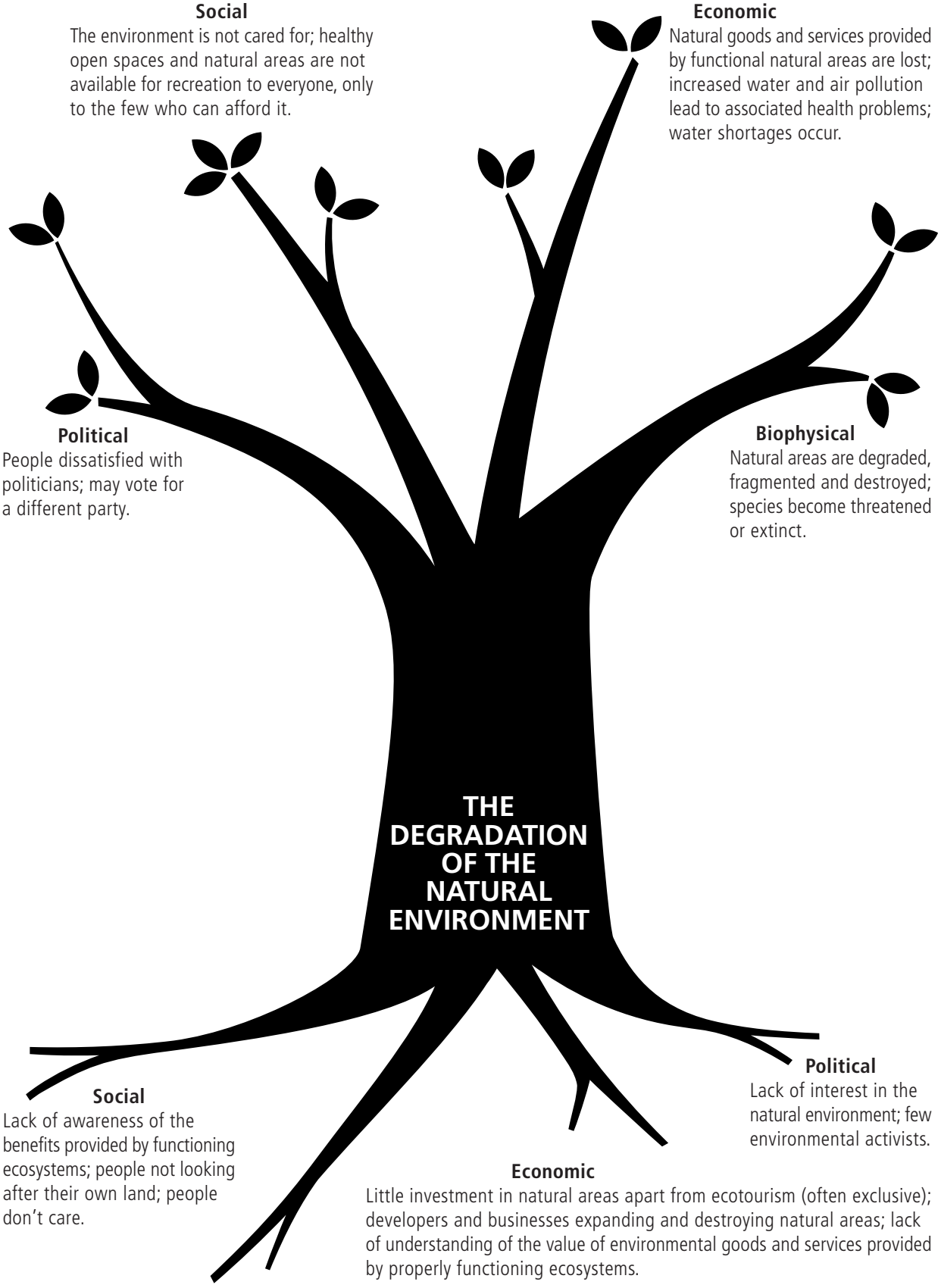


O'Donoghue, R and Janse van Rensburg, E. 1995. **Environments and Methods**. Share-Net, Howick

This model helps us to see that, if we want to understand environmental and development issues, we need to consider them in terms of their ecological, social, political and economic causes and effects. The Issue Analysis Tree helps us to do this.

Instructions

1 Draw a "tree trunk" in the middle of a piece of paper or on the chalk board. Write the title of your issue on the trunk. In this example it is: The degradation of the natural environment.
2 Think about the ecological (biological, physical), social, economic and political causes of the issue. The learners write their ideas on strips of paper, which will become the "roots" of the tree. They may find some of the causes listed in the newspaper article, but may think of other ideas during their discussions.
3 Then think about the biological, physical, social, economic and political effects of this issue. Once again write your ideas on strips of paper. These become the "branches".
4 Once you have analysed the causes and effects of the issue, you will have a much deeper understanding of what it might take to address the issue. Will you take "radical" steps – like pulling the tree out by the roots? Or will you "feed the soil" and help the tree to recover, flourish and bear fruit?


Social
The environment is not cared for; healthy open spaces and natural areas are not available for recreation to everyone, only to the few who can afford it.
Economic
Natural goods and services provided by functional natural areas are lost; increased water and air pollution lead to associated health problems; water shortages occur.
Political
People dissatisfied with politicians; may vote for a different party.
Biophysical
Natural areas are degraded, fragmented and destroyed; species become threatened or extinct.
THE DEGRADATION OF THE NATURAL ENVIRONMENT
Social
Lack of awareness of the benefits provided by functioning ecosystems; people not looking after their own land; people don't care.
Political
Lack of interest in the natural environment; few environmental activists.
Economic
Little investment in natural areas apart from ecotourism (often exclusive); developers and businesses expanding and destroying natural areas; lack of understanding of the value of environmental goods and services provided by properly functioning ecosystems.
Biological and physical
The natural environment provides natural goods and services and performs essential ecosystem functions that are useful and valuable to society. Examples include medicinal plants that provide remedies for diseases and wetlands that act as sponges, reducing flood risks and purifying water. If the environment is degraded, these benefits cannot occur.

Time to start paying for benefits of Cape's natural environment

Former environment minister Valli Moosa says the Western Cape should consider imposing an environmental tax on all businesses, and pass this money on to land owners to protect fynbos on their properties.

Environment Writer John Yeld listened to his argument

THERE are only two certainties in life – death and taxes. And while both are equally undesirable, at least taxes can be used to promote and nourish the living. So perhaps it's not amiss to propose a new environmental tax in the Western Cape that will ensure the future survival of the fynbos ecosystem that is the very bedrock underpinning the region's flourishing economy.

That's the creative suggestion from former national environment minister Valli Moosa, made at the appropriate forum of last week's CAPE conference at Kirstenbosch. CAPE, an acronym for Cape Action for People and the Environment, is a multi-partner programme that promotes the conservation of fynbos and sustainable development of the region through the wise use of its natural resources.

Moosa has proposed a ring-fenced environmental tax on all business activity in the province that will be paid as a cash incentive to fynbos landowners who don't destroy their natural landscapes. He points out that, by keeping such properties intact, these owners help maintain the ecological functioning that in turn provides essential "environmental goods and services" like clean water and clean air that is of benefit to everyone in the region.

Other such goods and services include valuable indigenous products that can be harvested, like buchu and rooibos tea, and landscapes that offer ecotourism opportunities. Sound like a crazy idea? Not at all – there's a very good precedent for it in the central American state of Costa Rica, and another in the process of being finalised in its neighbour, Panama, says Moosa.

Until fairly recently, Costa Rica's rainforest with its unique biodiversity had been continuously shrinking under the axes of peasant farmers, but for minimal returns through marginal farming, he explained. Then the government started asking a serious question: who were the real beneficiaries of this forest?

These beneficiaries included tourists, the users of water derived from the forest and – particularly – motorists, because the forests are "carbon traps" soaking up climate change-inducing emissions from their vehicles and reducing air pollution. So the Costa Rican government imposed a ring-fenced environmental tax on all vehicle users and used this revenue to pay landowners for the "environmental services" provided by their portion of the forest.

"In the past 20 years, Costa Rica is the only country in the world where, instead of deforestation, the forest cover has been expanding at quite a rapid pace," Moosa said. But it had sounded too good to be true, "a bit too fairy tale". "So I spent quite a bit of time in the field, talking to people. One of those I met was a very poor peasant farmer who told me how he had spent day after day for 40 years, fighting the forest with his bare hands, sweating, chopping it back.

"Now, he says, he just can't believe that he sits on the stoep – they don't call it a stoep in Spanish – for most of the day, watching the forest take over his land, and he gets paid for it."

Strolling in the fynbos: guide Warren Beets walks among the blombos . A new environmental tax has been proposed in the Western Cape that will ensure the future survival of the fynbos ecosystem that is the very bedrock underpinning the region's flourishing economy.

Ecological disaster: the proposed new tax will ensure that polluters pay for damaging the environment.

In Panama, the canal authority is finalising a plan to impose an environmental levy on ships that use the canal, the lifeblood of that country's economy. This revenue will be ring-fenced and paid as an incentive to landowners with property in the water catchment area that feeds the lakes in the higher central part of the country. It is these lakes that provide the vast amounts of freshwater required to operate the lock system that is critical to the functioning of the Panama Canal.

"They will pay all landowners in the entire catchment area for not destroying that catchment and providing the environmental service to those ships using the canal that are the beneficiaries of the system. Perhaps this may be something which can serve as an example in certain other situations, and one of those places that we may want to think about, is the fynbos kingdom."

The fynbos region was a unique biodiversity "hotspot", he pointed out. "The truth of the matter is that the economic value of the fynbos is not just going to be realised from ecotourism alone. In fact, it is probably the case that the massive expansion of the Western Cape economy over the past decade has a great deal to do with the natural beauty of this region.

"Let's face it, the rich and powerful of the world do not go and push up land prices in terribly ugly places." The booming property market's contribution to the economy was joined by that of tourism, Moosa said.

Cape Town was the gateway to tourism for the Western Cape, for South Africa, and southern Africa as a whole. "It's listed by almost everyone around the world as one of the places you need to visit before you die."

And the continued relocation of many knowledge industries to the Western Cape was also because of its unique landscapes, he suggested. "Clever people can run their businesses from anywhere in the world and they have the choice to live in place that they love, so they've moved here from all over South Africa and from many parts of the world as well. So, the fynbos and natural beauty of the Western Cape are contributing to economic growth."

It was "a shame" that economists at local academic institutions were not doing serious work to analyse the relationship between the environment – and particularly biodiversity – and the regional economy, Moosa said. "We're getting to a point where those who benefit from the protection of the environment will have to pay for it, and that's not just your hikers and the odd tourist who visits the parks now and then at weekends.

"It is everybody who is engaged in economic activity in the Western Cape. I think that a good case can be made for the imposition of a ring-fenced environmental tax on all business activity in the Western Cape, which can be used to pay those who use their land for its fynbos, rather than for something else."

That message will have gone back to the Western Cape government, as several high-ranking officials were at the conference to hear Moosa's message. And while the imposition of new taxes will always prove highly controversial, his proposal is not significantly at odds with the province's own thinking.

Increasingly, senior politicians have been emphasising the economic importance of the province's natural heritage. In December, premier Ebrahim Rasool sai during the launch of th Provincial Spatial Develo ment Framework that th framework represented raft of interventions tha sent out a single message "Our environment is ou core resource. It cannot b compromised at the altar o short-term returns."

And in an interview with the Cape Argus in February provincial environmen MEC Tasneem Essop said major priority for this yea would be to build awarenes and understanding of th "environment economy' which, she suggested, wa "the new big priority" fo the province.

"I've always argued that i we do not mainstream these things, as critical sectors o the mainstream economy, they will forever not be taken seriously. So we've broadened the concept to that of an 'environment economy', for want of a better term, and the Western Cape can play a leading role as an example to the rest of the country, and indeed to the continent and internationally.

"The 'Big Push', the next wave, is going to be a serious focus on the environment, and we need to be ready for that."

Moosa said the World Conservation Union (IUCN), of which he is president, had been discussing these issues and also believed that general environmental awareness was now so high that new ideas, like environmental taxes, could be accepted.

"Perhaps there is the critical mass now that exists for us to be able to make some kind of stepped change. I'm of the view that we are at a time when we can begin to do something different."

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Cape Argus, 19 June 2006

R150m boost for a clean Zeekoeivlei

By DIANNE HAWKER
Staff Reporter

The city anticipates a R230 million boost for 15 neighbourhood projects, including the rehabilitation of Zeekoevlei and an upgrade to the Mitchell's Plain transport interchange and central business district.

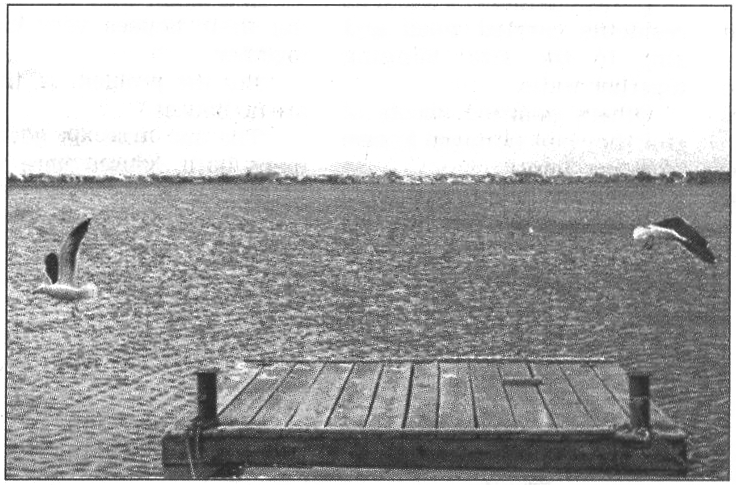
The City Of Cape Town's Planning and Environment division has applied to the national Neighbourhood Development Partnership Grant in a bid to improve a number of areas across the city.

"Until recently, investment in housing estates and townships have largely focused on providing houses and tend to exclude the provision of amenities which can act as economic catalysts," said Marian Niewoudt, mayoral committee member for planning and environment.

The city plans to channel at least R150m – R61.5m of which is expected to come from the grant – into rehabilitating Zeekoevlei.

The project should drastically reduce pollutants, which come from an increased amount of sediment, in the vlei.

Excess sediment will be dredged from the vlei over a number of years, and other pollutants, such as rubbish, will be removed. Sewage that once drained into the vlei from a nearby waste-water treatment plant would be directed into a canal.



FACELIFT: Zeekoeivlei is set to be rehabilitated with a portion of a R230m grant Picture: LEON LESTRADE

Roger Godwin of the Zeekoevlei Environment Forum said the community was thrilled with the initiative.

He said it was important to stop the growth of alien water hyacinth that thrived on nutrients in the sediment but were harmful to other plants.

Niewoudt said: "Ultimately, the riverine systems and the vlei, which form part of the False Bay Ecology Park, must become environmentally sustainable and socially enjoyable areas. The park could potentially generate some R7m per annum in tourist-related income once Zeekoevlei is rehabilitated."

The balance of the funding is expected to come from Table Mountain Fund and the Global Environment Facility.

The department has also earmarked R40m for the Mitchell's Plain public transport interchange and CBD upgrade, and another R29m for the Lentegeur public transport interchange.

She said other key projects include the Proudly Manenberg community upliftment project; Wolfgat Environmental Education Centre; the planning, provision and construction of foot ways, cycle ways and drainage systems to promote non-motorised transport; the dignified places programme; the establishment of a network of liquid petroleum (LP) gas dealerships; and the redevelopment of the Athlone power station

"These 15 projects form part of the first submission from the City of Cape Town and we hope to identify more projects for consideration twice a year," said Niewoudt.

"We aim to deliver community facilities and thus contribute to the creation of integrated, mixed-use neighbourhoods. This will promote private sector investment, help build business networks and promote black SMME development."

The grant was established to deliver community facilities, help build business networks and promote black small medium and micro enterprise development by creating conditions for sustainable private sector investment in marginalised areas.

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Burden of mating can be fatal for the female leopard toad

MELANIE GOSLING
Environment Writer

IT'S a tough life being a leopard toad in the Cape Peninsula. It's no wonder the little creatures have become endangered.

Life for the toads before the colonial conquest must have been a cinch. Winter wetlands all over, fynbos for Africa, crystal clean rivers and streams. No pollution, no aliens, no global warming, no houses and golf courses, no industrial sites, no pesticides, no draining of wetlands or choking of rivers. Above all, no cars.

Today, as wetlands have been replaced with urban development, fynbos with houses, agriculture and industry, and roads criss-cross everywhere, the number of leopard toads has shrunk drastically. No one is quite sure how many of the creatures are left, so a census is under way.

Last week three staff members from the Zandvlei Nature Reserve, and two local volunteers, Terry and Evanne Rothwell, armed with torches and gumboots, spent Friday night counting leopard toads.

"They mate for only about 10 days in August, when you can hear their calls. They appear to have finished mating at Clovelly wetlands and at Silvermine, so we went to Die Oog wetland in Bergvliet.

"We found several large females wandering down the road, trying to get to the wetland and several pairs in amplexus, when the males get onto the females' backs ready to mate," Evanne Rothwell said.

They counted about100 toads.

"The noise was amazing. They live most of the year in the fynbos and come down to the wetlands in August to mate. That's when the cars hit them.

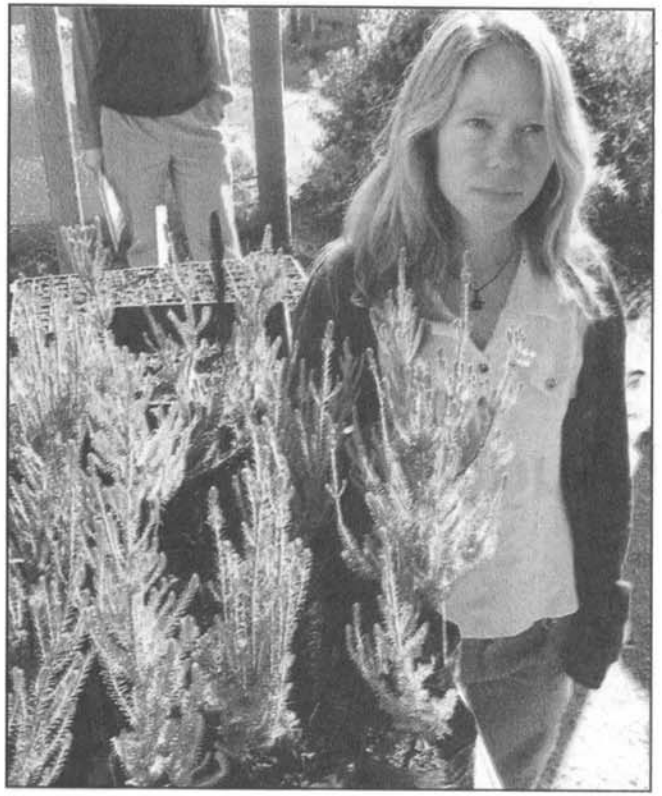
The males call the females, and when the find each other the male gets on her back and she has to walk to the wetland carrying him. So she can't go very fast, and they get killed by cars.

"If they make it to the wetland, the female releases her eggs and the male releases sperm and fertilisation takes place in the water.

"The tadpoles take about two months to develop into frogs, but if the wetland dries up in that time, that's it. If they survive, then they make their way from the wetland to the fynbos, again having to cross roads," she said.

HE AIN'T HEAVY: ... he's my mate. But the male leopard toad does slow the female down as she walks to a wetland to mate, so many of the endangered amphibians are squashed by cars as they cross roads. *Picture: TERRY ROTHWELL*

Cape Times, 29 August 2005



Back from the brink: Working for Wetlands horticulturist Victoria Wilman with some of the *Erica verticillata* seedlings – a Cape Flats species considered extinct – that have been cultivated and planted around Zeekoevlei.

'Extinct' fynbos is pride of the Cape Flats

JOHN YELD
Envronment Writer

THE BOTTOM ROAD sanctuary was launched at the Rondevlei nature reserve on Friday – and a fynbos species thought to be extinct has pride of place.

Bottom Road is the last road in Grassy Park and borders the northern bank of Zeekoevlei.

Fed-up residents had had enough of the dumping of old car tyres and rubbish, and of the noise, violence, and prostitutes who used the banks to ply their trade.

They approached Rondevlei nature reserve manager Dalton Gibbs for help last year. He explained the rich but threatened indigenous natural heritage of the area and residents decided to create a sanctuary.

In partnership with the City of Cape Town's nature conservation officials, the national Working for Wetlands programme, SA National Biodiversity Institute and the WWF-SA-administered Table Mountain Fund, residents bulldozed the soil of tons of rubble and dense strands of alien kikuyu grass.

Working for Wetlands teams planted 10 000 indigenous fynbos plants, including species rescued from development sites outside the area.

One of the initiators of this project was Calvin Cochrane, who admitted that while he'd always loved plants, fynbos had meant nothing to him.

"Then all of a sudden I realised there were these plants that don't need fertiliser but which kept springing up. All they need is love" he said.

Cochrane saw a bigger picture emerging as he watched the sanctuary taking shape and the residents working together.

"I saw a community spirit being built up, it's something we haven't got anymore but I've seen the benefits of this project and I've seen what it's done for this community.

"One guy came to me and said, 'I've got a leopard toad in my garden' – that's the kind of talk going around.

"This (project) has opened a lot of people's eyes, and people are coming and saying, 'They've made us a fynbos garden'. Kirstenbosch is beautiful, but we need to create more gardens like this one.

"This excited me. I thought, 'No, man, we must go further with this. We can change people's attitudes'."

Pride of place in the new sanctuary has been taken by *Erica verticillata*, several of which were planted as part of Friday's event.

The manager of Kirstenbosch nurseries and curator of its threatened plants collection, Anthony Hitchcock, said the last wild specimen of this erica, also called Ruby Lace or Whorled Heath, was collected for a herbarium in 1908 and it was considered extinct by 1950.

A specimen was found growing in Protea Park in Pretoria in 1984 and, in the same year, Kirstenbosch botanists discovered a single plant of the species at Kew Gardens in London.

Another single plant was later discovered in the botanic gardens in Vienna. It was an offspring of a specimen sent from the Cape in the 1790s. It travelled via sailing ship to Holland and up the European river system to Vienna, where it was part of a collection belonging to the Austrian emperors.

This plant survived the Napoleonic wars and two World Wars, including a World War 2 bombing that destroyed the gardens.

Hitchcock said curators had sent their plant collections to different parts of the city for protection, so the erica survived. In all, he said, 10 individual plants of the "extinct" species have been found, including two in Kirstenbosch.

Cuttings were propagated and some were planted at Rondevlei, said Hitchcock. But it was only recently that there was effective cross-pollination and the first seeds were set.

About 300 new plants have been grown from seed since.

Hitchcock calls *Erica verticillata* "a flagship" for the conservation efforts to save other highly endangered indigenous plant species of lowland areas, like the Cape Flats.

"It's the panda bear of the plant world ... It's wonderful, it's a plant that will lift your spirits," he said.

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Cape Argus, 7 August 2006

City in new bid to get rid of pesky crows

JOHN YELD
Environment Writer

A RENEWED operation to rid Cape Town of its unwanted but thriving population of Indian house crows – an invasive alien species that is posing serious ecological and health risks to the city – is about to get under way.

House crows are highly intelligent and can only be eradicated through a carefully planned, time-consuming operation that involves habituating them to feeding at a bait station where eventually a poisoned bait is introduced.

The species was imported to the east coast of Africa during the 19th century and is now a major pest in coastal cities of Kenya, Tanzania, Mozambique and Mauritius.

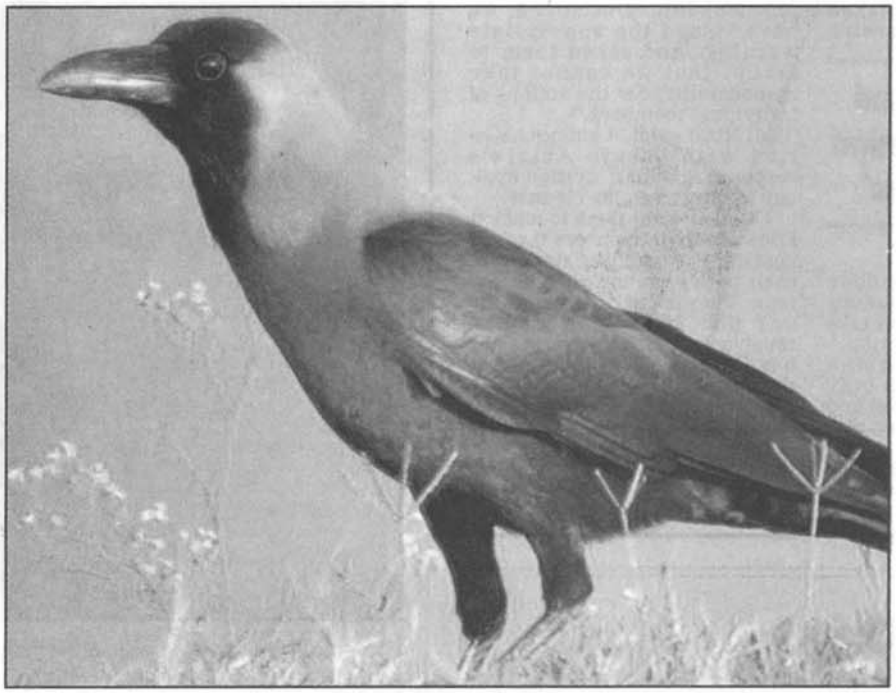
It first reached South Africa in 1972.

In March 2003, a successful initial culling programme was launched in Cape Town and conservationists believed as many as one third of the estimated 2 000 house crows then in the city were killed.

But the programme could not be continued because the conservation authorities would not commit further funds, and the crows have since returned with a vengeance.

The growing house crow population created particular problem areas on the Cape Flats, including the Edith Stevens Wetland Park at Philippi, the fish market at Princess Vlei, and Cape Town International Airport.

The crows have also "attacked" Mitchell's Plain residents while scavenging for food, prompting dozens of complaints to the city's nature conservation authorities.



Stone them: Indian house crows are the target of an extermination programme.

Because of the species' predatory and scavenging habits – it feeds on carrion and stores food in places like the eaves of houses – it carries several diseases, including cholera, salmonella and entero-amoeba.

Other problems caused by this aggressive and clever species – another collective noun for a flock of crows is, appropriately, "a murder" – include predation on indigenous birds and wildlife; attacks on pets and small livestock, particularly poultry; nests made of wire, which poses a short-circuiting threat; and droppings and noise at roosting sites which constitute an environmental health nuisance.

This week, Dave Whitelaw of the Cape Bird Club's conservation committee appealed to local birders to report roosting sites of the house crows where they could be most efficiently targeted.

"You will all no doubt be delighted to hear that, as a result of a national initiative, funds are available to enable us to make a concerted effort to eliminate the house crow from the Cape Peninsula and from KwaZulu-Natal," he said.

Principal funders of the operation are the UN Environment Programme, the national Environment Department and Working for Water in KwaZulu-Natal.

In the Western Cape, it will be run jointly by CapeNature and the City of Cape Town, with BirdLife South Africa, the Cape Bird Club and the SPCA also involved.

The first step in the process of eliminating this pest bird was to define its roost sites, Whitelaw explained.

"Sightings of birds do not necessarily indicate that they have established a roost in an area, as they are capable of flying considerable distances."

The club appealed to birders to monitor whether the crows were actually roosting in their area.

"This would entail watching them until dusk and beyond.

"If they take off at dusk, heading for the Cape Flats, it can be assumed they are returning to one of the established roosts," said Whitelaw.

"But if numbers in the area increase and they show no sign of flying off at dusk, we could have another roost and we need to know about it.

"Anyone who has the time, patience and desire to rid the area of this species and makes observations along these lines is urged to pass this information on and I shall see that the authorities are informed."

On Monday, bird expert Tony Rebelo reported seeing a flock of more than 140 house crows crossing the N2 at the Airport Industria area, heading south over Crossroads.

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Cape Argus, 8 June 2006

5.4 WHOLE SCHOOL DEVELOPMENT WITH ECO-SCHOOLS

Many educators who are concerned about the environment feel like "lone voices" in their schools. They may want to make a difference in the school and community, but without the cooperation of their colleagues and school governance structures, most of their efforts are limited to what they can do in their own classrooms.

Environmental learning and action become far more effective when they are "whole school" processes. For this to happen, all parts of the school community need to be informed and supportive, including the principal, school governing body, teaching and non-teaching staff, learners and members of the community.

One of the programmes encouraging sustainable whole-school development is Eco-Schools. This is an international programme which South Africa joined in 2003.

What Eco-Schools do

Schools set up an environmental committee or working group, and develop an environmental policy and action plan for the school, which they monitor regularly.

The Eco-Schools project:

- Encourages teachers to focus on the environment in the curriculum;
- Supports environmental action projects in the school and community;
- Ensures that the environment features in school policies and management plans.

How to become an Eco-School

- Your school first registers with Eco-Schools <www.wildlifesociety.org.za/eduecoschools.htm>.
- During the course of the year, you compile a portfolio of evidence showing how your school is making a difference in terms of environmental governance, management and learning.
- Your portfolio will be assessed at the end of the year. If it meets the criteria, your school will be awarded the green Eco-Schools flag, which you may fly for the following year.
- To retain Eco-Schools status, schools are required to register each year and continue showing evidence of improvement.

An Eco-School story

In Module Ten you can read about **Levana Primary School**, the only school in the Western Cape to have achieved Eco-Schools status every year since the programme was piloted in 2003.

In this section we read how another Cape Town Eco-School, **Crestway High School**, has been trying to conserve a wetland next to their school.

School and community action with Eco-Schools

Much of the Cape Flats used to be covered by seasonal wetlands, which were flooded in winter but dried up in summer. Older residents of Retreat fondly remember a wetland called Blouvlei, but most people thought it had been completely destroyed by housing developments. Two educational institutions in Retreat were named after Blouvlei, but it seemed as if this was all that remained of the wetland.

Then, in 1999, teachers at Crestway High School realised that the marshy area next to their school, which they regularly monitored with their learners, was actually the remnants of Blouvlei. Since then the school has been working with the local community and municipality to try to conserve Blouvlei.

The school recognises the value of Blouvlei as a natural heritage site in the heart of the community. It is a place where residents can relax and enjoy nature, and where local schools can undertake fieldwork.

Crestway High School has an environmental project team coordinated by an enthusiastic and committed educator, Ms Evangeline (Vangi) Watkins. In collaboration with the municipality, local stakeholders and volunteers, the team has developed an action plan to protect Blouvlei. Working with the community has been critical to Crestway starting to realise their vision for Blouvlei. Recently the school convinced the local library to withdraw an application to use the land for a car park; they are now a partner in the conservation project.

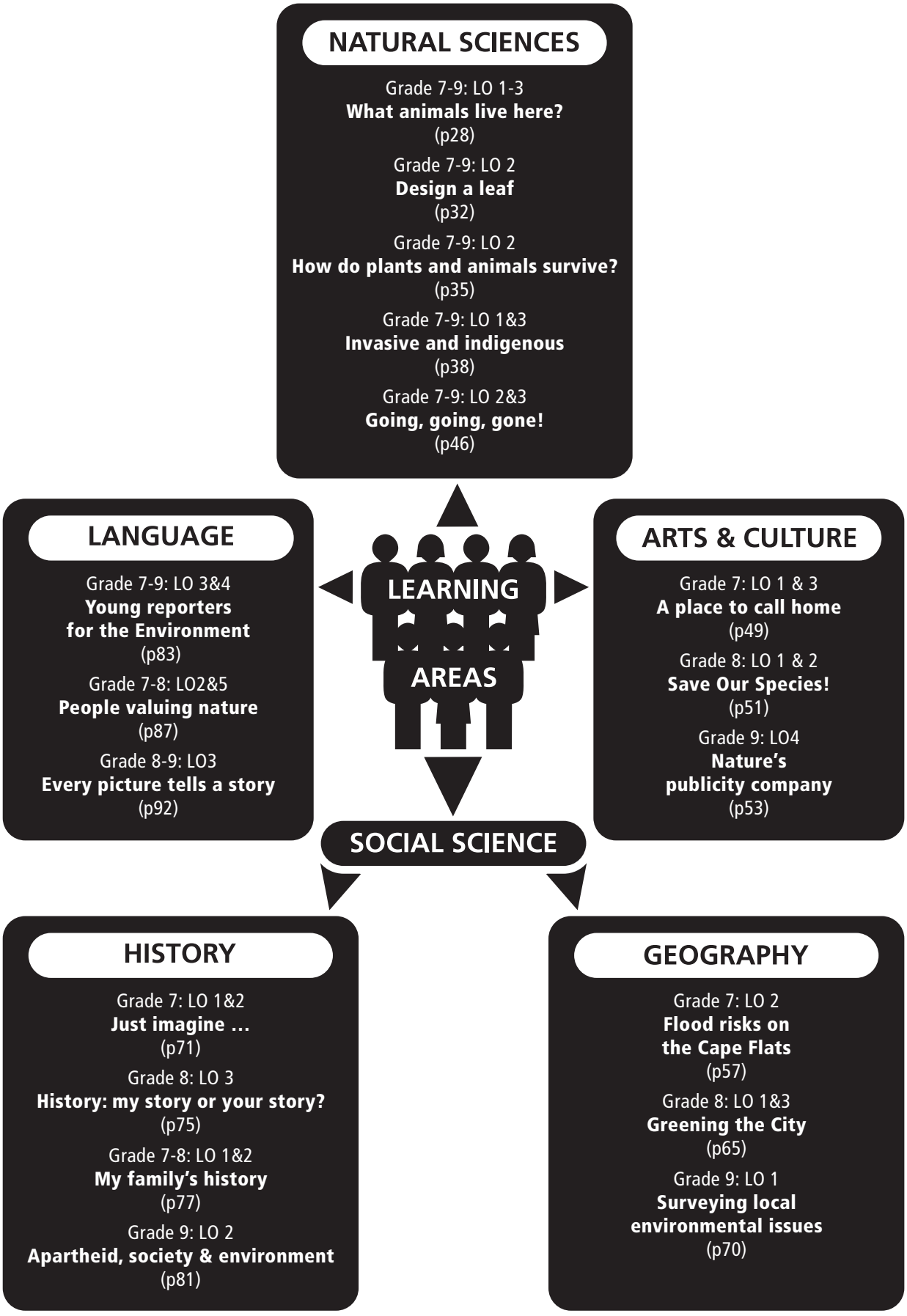
Like many open spaces in Cape Town, Blouvlei has become overgrown with alien bushes which attract people involved in anti-social behaviour. Crestway High School has been consulting with stakeholders to get the area fenced, remove the alien vegetation and build a timber walkway which will improve the conservation and amenity value of the wetland.

Says teacher Vangi Watkins, "A golden thread [running through] our project is our advocacy of the awareness of the importance of our natural environment to the people of our community. We are convinced that our project will play an enormous educative role in sensitising our community to the interplay between their needs as living human beings and the needs of their natural environment."

Reflection: What features of the Eco-Schools project does this story illustrate?

In this section you will find a few lesson plans that you can use or adapt.

The mind map below summarises the Learning Areas and Learning Outcomes that the lessons cover:



NATURAL SCIENCES

Title	Grade(s)	LO	Summary	Activity
What animals live here?	7-9	1 & 2	Tourists love to visit game reserves in the bushveld and see big game but in the City of Cape Town, most wild animals are very small. Some larger animals do survive in the City's nature reserves but they are difficult to observe because they are secretive, nocturnal or live in burrows. In this activity, learners will investigate which animals live in a local nature reserve and classify the animals they observe.	CS CA FW
Design a Leaf	7-9	2	Indigenous plants that grow in a Mediterranean climate are adapted to survive these dry summers. In this lesson learners will build models to show how leaves are adapted to reduce the loss of water from plants.	CA
How do plants and animals survive?	7-9	2	In this fieldwork activity, learners will observe plants and / or animals in their school grounds and a nature reserve. They will decide how these plants / animals are adapted to survive in their particular habitats, and how they interact with other plants / animals.	CS CA FW
Invasive and indigenous	7-9	1	Invasive alien plants cause many environmental problems. In this practical fieldwork activity, the learner will conduct an investigation comparing the variety of plants in two plots of a similar area, one in natural vegetation and the other in an area invaded by alien plants.	CS CA FW
Going, going … gone!	7-9	2	What do terms like rare, endangered and extinct mean? Do these terms apply to any of the plants and animals in the lowlands of the City of Cape Town? In this activity, the learner will define these terms in their own words and find out more about some of Cape Town's special and threatened plant and animal species – and why they need our help.	CB CS CA

Key to learning approaches

CA classroom activities
CB computer based
CS computer supported
FW fieldwork

ARTS & CULTURE

Title	Grade(s)	LO	Summary	Activity
A place to call home	7	1 & 3	We all need a place to call home, but in Cape Town there are many people who don't have adequate housing. In this activity learners will work in groups to develop a short play on the issue of homelessness in the City and their suggested solutions.	CA
Save our species!	8	1 & 2	Today, most wildlife survives in protected natural areas and on large farms. In cities, even very small wild animals, such as small buck, birds, frogs and tortoises, are threatened because their homes are being destroyed. These small animals have no voice and no vote - their lives are in our hands. In this activity the learner will design an artwork to draw attention to the plight of urban wildlife.	CS CB CA
Nature's publicity company	9	4	In many parts of Cape Town, nature is threatened because people have no idea how important wild places, plants and animals are. In this activity learners design and produce a media product to convince people that nature is valuable and should be protected.	CS CB CA

LANGUAGE

Title	Grade(s)	LO	Summary	Activity
Role-play: People valuing nature	7 & 8	2 & 5	We rely on nature for food, clean water, building materials, fuel, clothing and medicine. Many people also enjoy learning about nature and the recreational opportunities nature provides. Should we allow the last remaining natural areas in our city to be destroyed by urban development? Do people who value these areas have a right to insist that they are protected and wisely managed? This role-play explores reasons why people value nature and want to conserve it.	CS CA
Every picture tells a story	8 & 9	3	Stories do not have to be written using words … they can be painted using pictures. When we read stories, we try to understand and interpret the words of the author. Photographs are a form of "visual text" that people use to tell stories and express their feelings. In this activity, the learners will interpret photographs of our environment by looking at them from different perspectives.	CS CA
Young reporters for the environment	7-9	3 & 4	Most print and electronic media have journalists who specialise in reporting on environmental stories. In this activity, learners will read and analyse a variety of print media articles on a range of environmental topics and issues. They will then work together as a class to write local stories for an environmental newsletter.	CA CS CB

SOCIAL SCIENCE (GEOGRAPHY)

Title	Grade(s)	LO	Summary	Activity
Flood risks on the Cape Flats	7	2	In Cape Town, much of the Cape Flats was once covered by seasonal wetlands. Cape Town's population has grown very rapidly since the 1980s and the Cape Flats are now almost completely developed, including areas of seasonal wetlands. In this activity learners will consider the implications of development in these areas of the Cape Flats.	CS CA
Greening the City	8	1 & 3	By comparing maps of natural resources (e.g. soil and vegetation) with maps of urban development, we can find out about the impact of development on the environment. In this activity, learners will compare maps to find out which types of indigenous vegetation are most threatened in the City of Cape Town, and decide on which indigenous plants should be used to restore nature in different parts of the City.	CB CA
Surveying local environmental issues	9	1	This activity describes how to conduct an environmental survey in your neighbourhood in order to compare the quality of the environment in the different areas. Learners choose particular environmental problems to investigate, write a report and publicise their findings and suggestions to address local environmental issues in their communities.	CS CA FW

Key to learning approaches

CA classroom activities
CB computer based
CS computer supported
FW fieldwork

SOCIAL SCIENCE (HISTORY)

Title	Grade(s)	LO	Summary	Activity
Just imagine …	7	1 & 2	History is full of turning points. Particular opportunities and constraints do indeed change the course of history and shape the future. In this activity learners will read about some of the impacts of the establishment of the Dutch East India Company's refreshment station, and later colony, at the Cape in the seventeenth century. They will then imagine what Cape Town might be like today if the Turks had not blocked the overland trade route between Asia and Europe – thus delaying the search for a sea route which European nations dominated for centuries.	CS CA
History – My story or your story?	8	3	Whether an event happened earlier today or three hundred years ago, two people recounting the same event will tell their stories differently. Our personalities, lifestyles, backgrounds and life experiences shape our points of view. It is not surprising, therefore, that people from as diverse backgrounds as South Africans will interpret history differently. In this activity, learners will have a chance to rewrite an aspect of Cape Town's history from two very different points of view.	CS CA
Apartheid, society and environment	9	2	Racial policies of the South African government prior to 1994 had a significant impact on how the City of Cape Town developed. In this activity the learner will read about the development of the City of Cape Town and draw up a time line that summarises how significant events and policies during the 20th Century impacted on development. The learner will discuss how these developments set the scene for current environmental and social problems in the City, and consider whether or not political change has improved social and environmental conditions in the lowlands.	CS CB CA

Key to learning approaches

CA classroom activities
CB computer based
CS computer supported
FW fieldwork

Tourists love to visit game reserves in the bushveld, where they can see the "Big Five" – lion, leopard, rhino, hippo and buffalo. But in the City of Cape Town, most wild animals are very small – insects, spiders, birds, lizards and mongooses. Some larger animals like grysbok, porcupines and mole rats do survive in the City's nature reserves but they are hard to observe because they are secretive, nocturnal or live in burrows. If you plan to visit a nature reserve to observe animals, prepare learners to look for small animals that they are likely to see, and for signs of the animals that they probably won't see. In this activity, learners will investigate which animals live in a local nature reserve and classify the animals they observe.

NATURAL SCIENCES Grade 7-9

Learning Outcome 1:

Scientific Investigations

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standards

- Plans investigations.
- Conducts investigations and collects data.
- Evaluates data and communicates findings.

Learning Outcome 2:

Constructing Science Knowledge

The learner will be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standards

- Recalls meaningful information: distinguishes types of organisms.
- Categorises information: applies classification systems to familiar and unfamiliar organisms.

Learning Outcome 3:

Science, Society and the Environment

The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

- Understands sustainable use of the earth's resources.

Core Knowledge and Concepts

- All organisms have adaptations for survival in their habitats.

This learning activity is based on a field trip developed by Mrs Ivy Kinnear at the Cape Flats Nature Reserve

Pre-visit preparation

Learning Activity 1: Animals all around us

- List the animals that live in your immediate environment (home and school). Categorise these as wild animals or domesticated animals / pets. Survey animals in the school grounds and add to these lists.
- What categories could you use to group these animals (e.g. vertebrates / invertebrates; warm-blooded / cold-blooded; with or without limbs, etc)? In groups, choose different criteria and sort the list of animals.
- Look at the electronic interactive poster of plants and animals of the City's lowlands (Module 1: Nature on your Doorstep) and identify the animals illustrated.
- Most of the City's nature reserves are too small to support many large wild animals. When you visit one of these reserves you might not actually see all the animals that live there because some are secretive, nocturnal or live underground.
- Draw up a list of signs of animals to look for (e.g. feathers, bones, egg shells, burrows, nests, nibbled plants, droppings, footprints, sounds).

Assessment tasks and tools

- Learners draw up a table categorising animals as wild or domesticated.
- Learners sort animals into groups based on their chosen criteria.
- List of animal signs.

Field trip

Learning Activity 2: Observing animals in the wild

- At the nature reserve, divide into small groups, each with an animal identification sheet and two record sheets: one for recording animals 'sighted' or 'seen' and the other for signs of animals.
- On the walk in the reserve, each group will record the animals and signs of animals they observed. Record where you observed each animal (e.g. in a tree, on the ground, in water, etc) and what type of animal you think left the evidence found.
- Each group chooses one of the animals observed in the reserve and prepares and presents a role-play about how that animal survives in the City.

Assessment tasks and tools

- Record sheets showing animals, evidence of animals observed on the field trip.
- Group role-play illustrating understanding of the animal, its lifestyle and the pressures it faces.

Post-visit feedback

Learning Activity 3: Sorting animals into groups

- Back in the classroom, each group presents their findings.
  Record the observation of all the groups on two charts, namely Animals and their Habitats and Signs of Animals.
- Search for information and read about animals of the City's lowlands (Modules 5, 6, 8 & 9). Discuss why you didn't see all the animals that actually live in the reserve (e.g. nocturnal, seasonal, hiding, living underground, etc).
- Using the combined list of animals observed and predicted, work in pairs to categorise the animals as invertebrates and vertebrates, and then into the five classes of vertebrates. Record this in a table.
- In the table, record the main features of each of these categories of animals.

Assessment tasks and tools

- Table categorising animals according to invertebrates / various classes of vertebrate.

Learning Activity 4: Let the animals speak

- Paint a mural on newsprint, showing the habitats observed on your field trip.
- Each learner chooses and draws / paints one of the animals observed and sticks it in the correct position (habitat) on the mural.
- Write a slogan / speech bubble expressing why the animal is important, or why it needs to be conserved.

Assessment tasks and tools

- Picture and caption indicate understanding of animal's place in nature and need for conservation.

Vertebrates and invertebrates in the City

Name(s) _____

1 List the animals seen in the nature reserve and record where you saw them:

Name of animal	Where seen (habitat)

2 List any animal signs (evidence) and suggest which animal was responsible

Evidence	Probable animal

Classifying vertebrates and invertebrates

Name(s) _____

1 List the distinguishing features of the categories of animals in the table below.

2 Record the names of the animals you observed in the correct category:

Category		Distinguishing features	Examples of animals
INVERTEBRATES			
VERTEBRATES	Mammals		
	Birds		
	Reptiles		
	Amphibians		
	Fish		

The climate in the western parts of South Africa is harsh for plants. Rain falls in winter when it is cool, but the summers are dry, hot and windy. Under these conditions plants can lose a lot of water by transpiration through their leaves. If plants lose too much water, they will wilt and may eventually die.

Indigenous plants that grow in this Mediterranean climate are adapted to survive these dry summers. In this lesson, which could form part of a broader study of plant adaptations, we will look specifically at how leaves are adapted to reduce the loss of water from plants.

NATURAL SCIENCES Grade 7-9

Learning Outcome 2:

Constructing Science Knowledge

The learner will be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standard

- Recalls meaningful information: makes and uses models of leaves to explain how leaves are adapted to reduce transpiration.

Core Knowledge and Concepts

- All organisms have adaptations for survival in their habitats (e.g. maintaining water balance).

The stomata activity used in this lesson was developed by Weston Barwise from the Two Oceans Aquarium

Learning Activity 1: What are stomata?

This activity assumes that learners already know that most plants absorb water through their roots and lose water vapour from their leaves by transpiration.

If you have a microscope:

- Paint the upper and lower surfaces of a smooth (not furry) leaf with clear nail varnish. Allow it to dry and carefully peel off the transparent film. This thin, transparent sheet of nail varnish will have an impression of the leaf surface that you will be able to view under the microscope.
- Look at a diagram of stomata so that you know what to look for under the microscope.
- Compare the impressions of the upper and lower surfaces of the leaf under the microscope. Decide which surface of the leaf has more stomata (in most plants, the lower surface of the leaf has more stomata).
- Draw the outline of the epidermal cells and stomata with guard cells that you can see under the microscope.

If you don't have a microscope, draw diagrams of epidermal cells and stomata based on micrographs or scientific diagrams of the epidermis of a leaf.

- Label your diagrams and describe in words the role of stomata (exchange of gases for respiration and photosynthesis, loss of water vapour).

Assessment tasks and tools

- Diagram of leaf epidermis as observed under a microscope labelled with stomata and epidermal cells.
- Learner explanation of the role of stomata.

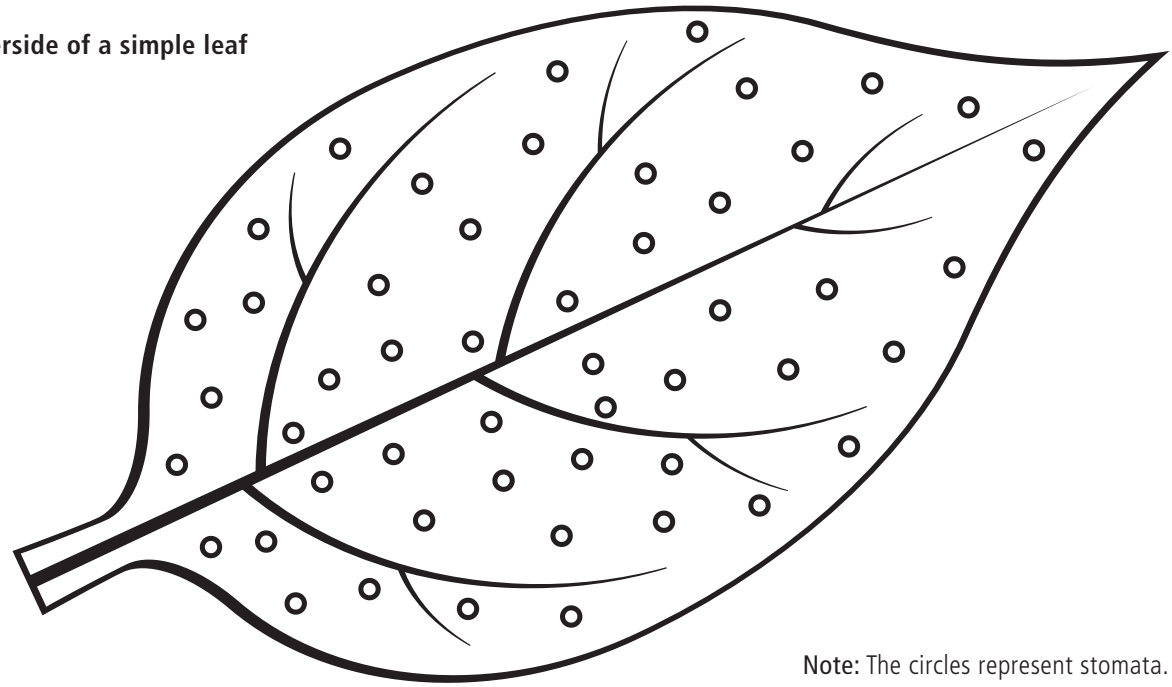
Learning Activity 2: How do leaves regulate water loss?

- Take a copy of the diagram (overleaf) of a typical oval leaf with circles on it representing the stomata. Count the stomata.
- In groups of four or five, use your leaf diagrams to model as many adaptations as possible to reduce water loss through the stomata. You may cut out your leaves, trim them, fold them, combine them with others, colour them in or use other substances to represent these adaptations.
- Each group must demonstrate their leaf models to the rest of the class and explain, in terms of the stomata, how the adaptations they have modelled reduce water loss.
- Once all groups have presented their models, compile an illustrated summary of the ways in which leaves are adapted to regulate water loss.

Assessment tasks and tools

- Educator and peers assess leaf models and oral explanations using a rubric.
- Check individual summaries of class discussions to ensure these are accurate.

Underside of a simple leaf



Note: The circles represent stomata.

Instructions:

1 Count and record the number of stomata on the underside of this leaf.
2 Cut out your leaf. In your group discuss what you can do to your leaf to reduce the amount of water vapour it loses through the stomata.
3 Make models of "leaf adaptations" and explain how they work to the class.

Assessment Rubric

In your group, use the rubric below to assess the models made by another group of learners. When the groups have completed their presentations, give feedback to one another.

Assessors _____

Learners assessed _____

Number of models developed _____

Criteria	**1**	**2**	**3**	**4**
The group developed a number of different models	0-1	2-3	4	>4
The models correctly represented adaptations to reduce water loss				
Learners used scientific terms correctly in their presentations				
The learners explained clearly how the models work				
Their explanations were scientifically correct				
Overall assessment				

1 unsatisfactory, **2** satisfactory, **3** good, **4** excellent

General Comments:

_____

_____

_____

_____

_____

Field trips can help learners to apply in practice what they have learnt about in the classroom. In this fieldwork activity, learners will observe plants and animals both in their school grounds and in a nature reserve. They will decide how they are adapted to survive physical conditions such as the climate, and how they are adapted to interact with other plants and animals in their habitat. Most of the City of Cape Town's nature reserves are too small for large mammals, and it is hard to find the small mammals such as buck, porcupines and mole rats that do occur there because they are often secretive, nocturnal or live in burrows. Prepare learners to look for small animals that they are likely to see, such as birds, reptiles and invertebrates.

NATURAL SCIENCES Grade 7-9

Learning Outcome 2:

Constructing Science Knowledge

The learner will be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standards

- Recalls meaningful information: distinguishes types of organisms.
- Categorises information: uses a simple classification system.
- Interprets information.

Core Knowledge and Concepts

- All organisms have adaptations for survival in their habitats.

Pre-visit preparation:

Learning Activity 1: Where are we going?

- Working in pairs, look at the map of protected areas in the City of Cape Town (Module 6: Conserving nature in the City) and find the site you will be visiting.
- What habitat type will you be observing? (See map of habitat types in Module 2: Four unique ecosystems). Describe the physical conditions in this habitat type (e.g. soil, climate).
- On the interactive electronic poster in Module 1: Nature on your doorstep, find the section that represents this habitat.
- Read about the site in Module 6. Find the names of three indigenous plants and three indigenous animals you could expect to find at the nature reserve.

Assessment tasks and tools

- Correctly identify and record the nature reserve, vegetation type, physical conditions, three plants and three animals.

Learning Activity 2: Are you well adapted?

- In your school grounds, work in pairs to observe one plant. Draw and label a diagram of this plant, showing details like leaves, flowers and fruit.
- Decide whether or not you think the plant is adapted to survive in a Mediterranean climate (hot, dry summers). List ways in which it is well or poorly adapted to this environment.
- Look for evidence of how the plant reproduces (pollination / seed dispersal / vegetative reproduction). How are flowers, fruits and seeds adapted to enable the plant to reproduce effectively? Are any animals involved in reproduction?

Assessment tasks and tools

- Drawing of plant; list of features that make it well or poorly adapted to our climate; list of adaptations for reproduction.

- Find one animal (vertebrate or invertebrate) on or near your plant. Draw it and try to identify what kind of animal it is. Observe the animal and describe how it is adapted to feed, reproduce and protect itself from enemies.
- Participate in a class discussion led by your teacher. Share what the different pairs found out about how plants and animals in your school grounds are adapted to survive.

Assessment tasks and tools

- Drawing of animal; list of adaptations to feeding, reproduction and protection.

Field trip

Learning Activity 3: Orientation walk

Assessment tasks and tools

- Completed checklist (to be provided by the nature reserve)

- When you arrive at the nature reserve, go on a brief walk to get to know the area.
- Observe and describe the soils and climate. Discuss the challenges / opportunities these physical conditions pose for plants, animals and people.
- Look for plants and animals illustrated on the identification sheet provided by the reserve. Tick each picture as you observe the plant or animal and share anything interesting you may know or observe.

Learning Activity 4: Adapted to their environment

Assessment tasks and tools

- Partially completed worksheet on plant / animal adaptations.
- Brief presentation on each group's organism.

- Your educator will clearly outline the study area where you will observe plant and/or animal adaptations. Discuss how you should behave in the nature reserve.
- Divide into groups of five. Take a picture (photo or drawing) of a plant or animal. Identify your plant / animal and investigate how it is adapted to survive and reproduce in this habitat.

In each group

- One learner draws and labels an accurate drawing of the plant / animal
- Two learners measure / estimate its size, and describe the plant / animal on their worksheet (e.g. type of plant / animal; height; shape, size, colour and texture; adaptations to habitat; etc).
- Two learners look for any interactions with other plants / animals, and record what they are and what they are doing.
- Complete as much of the record sheet as you can through observation.
- Present your observations briefly to the rest of your class on a final interpretative walk around the study area.

Post-visit feedback:

Learning Activity 5:

Assessment tasks and tools

- Completed worksheet on plant / animal adaptations.
- Illustrated fact sheet.

- Back at school, conduct research on your particular plant or animal and its adaptations using the e-Kapa website and other sources of information (e.g. books, websites). Add information to the worksheet you started on the field trip.
- In your group, draw up an illustrated fact sheet either on the computer or by hand. The fact sheet should include:
  - the scientific and common names of your organism;
  - full-colour, labelled illustrations;
  - information on its habitat and how it is adapted to survive in this habitat;
  - information on its reproduction / life cycle and how it is adapted to reproduce effectively.
- Make a copy of the class's fact sheets and send them to the nature reserve where they can be used by learners from other schools.

Adaptations to the environment

Name(s) _____

1 **Name of plant or animal.** _____

2 **Describe the physical environment (soil type, rainfall, temperature, wind, fire, etc).**

_____

_____

_____

3 **On a separate page, draw and label an accurate diagram of your plant or animal.**
In the case of plants, draw separate pictures of the leaf, flower, fruit and seed (if available).

4 **Measure or estimate the size of the plant or animal and show this on the diagram.**

5 **Describe in words what the plant or animal looks like (e.g. form, colour, texture, pattern).**

6 **How is the plant or animal adapted to survive in its environment?**
Think about its structure, life cycle and behaviour.

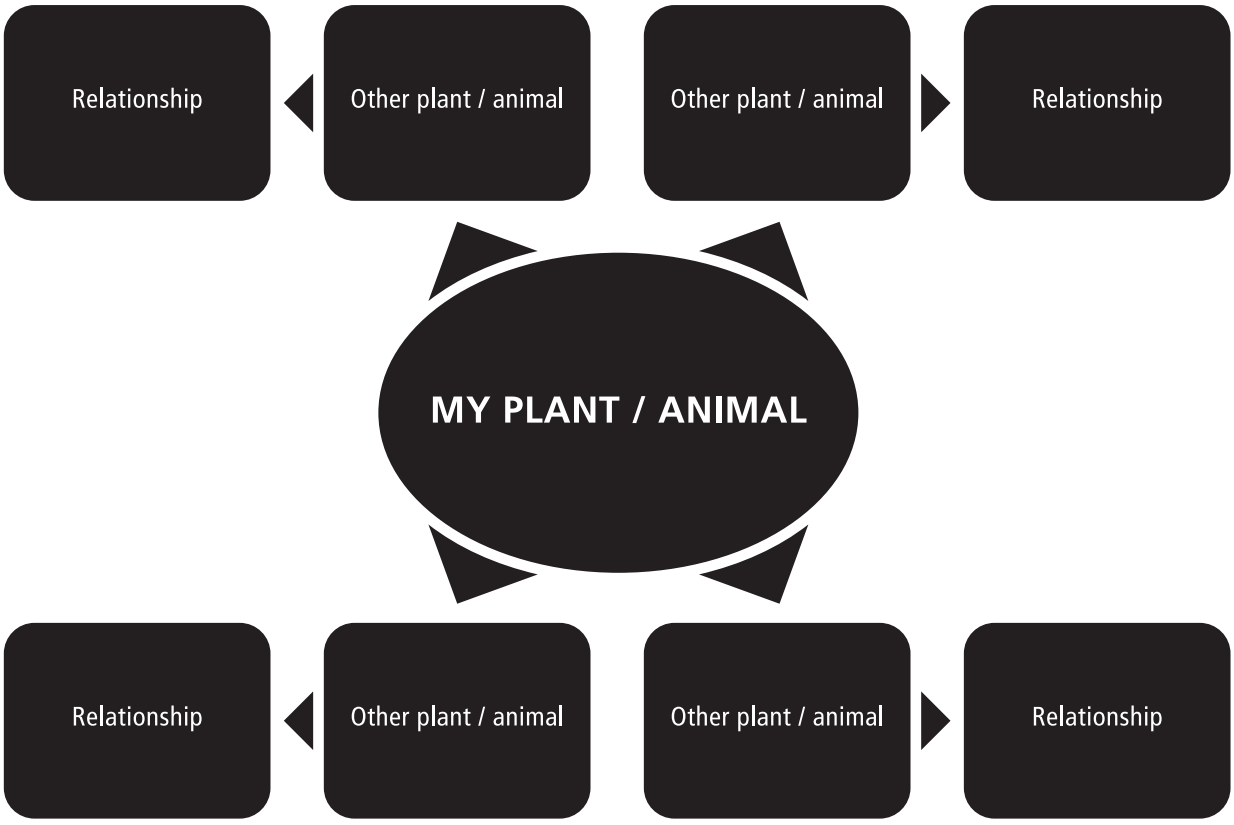
_____

_____

_____

_____

7 **Draw a spider diagram with your plant or animal in the centre. Name any other plants or animals associated with yours. Describe what they are doing / the relationship between the organisms**
(e.g. pollination, seed dispersal, food, predator, parasite).



Woody invasive alien plants such as black wattle, Port Jackson and rooikrans cause many problems. They are very thirsty plants and take more water from the soil than indigenous plants. They grow very densely so fires in invasive alien vegetation are often hotter and more destructive than in indigenous vegetation. Invasive alien plants also threaten nature because they grow so quickly and densely that they take over natural habitats and prevent local plants from growing. Because indigenous animals need indigenous plants for food and shelter, invasive alien plants threaten whole ecosystems.

In this practical fieldwork activity, you will conduct an investigation, comparing the variety (diversity) of plants in two plots of a similar area, one in natural vegetation and the other in an area invaded by alien plants.

NATURAL SCIENCES Grade 7-9

Learning Outcome 1:

Scientific Investigations

The learner will be able to act confidently on curiosity about natural phenomena, and to investigate relationships and solve problems in scientific, technological and environmental contexts.

Assessment Standards

- Plans investigations.
- Conducts investigations and collects data.
- Evaluates data and communicates findings.

Learning Outcome 3:

Science, society and the environment

The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

- Understands sustainable use of the earth's resources.

Core Knowledge and Concepts

- All organisms have adaptations for survival in their habitats.

This learning activity is based on an approach to planning investigations developed by the Primary Science Project

Pre-visit preparation:

Learning Activity 1: Alien, invasive, indigenous and endemic species

Assessment tasks and tools

- Definitions of five terms in own words

- At school, before you go on your field trip, search through Module 1: Nature on your doorstep and Module 4: Threatened nature in the City to find the following terms: alien, endemic, indigenous, invasive, species.
- Write definitions of these five terms in your own words.

Learning Activity 2: What do we know – and want to know?

Assessment tasks and tools

- Two mind maps summarising what learners know about alien and indigenous plants.
- List of questions to stimulate research and investigations.

- On the board, write the terms: indigenous plants and invasive alien plants. Write a brief definition below each term.
- Divide into groups of five. Each group takes three strips of white paper and three strips of coloured paper. On the pieces of white paper write three things you know about indigenous plants (one idea per page). On the coloured paper write three things you know about alien plants.
- Place all the groups' ideas around the relevant term and cluster the ideas into logical groups (e.g. where they come from, how people use them, their role in the environment, examples, etc).
- Turn your clusters of ideas into two class mind maps reflecting what you know about invasive alien and indigenous plants. Record the mind maps in your note book.
- Think about what you already know about indigenous and invasive alien plants. In your small groups come up with one question you would like to ask about indigenous and/or invasive alien plants. Write your question on the board.
- Decide which questions you could research by reading and which you would need to investigate. Use these questions to help you design your investigation. Decide what methods and tools you will use in your investigation.
- For information on invasive aliens, see www.gisp.org; www.issg.org.

As an example, the rest of this learning activity is based on the question:

What impact do invasive alien plants have on indigenous plants and animals (biodiversity)?

Field Trip:

Learning Activity 3: Comparing communities

Assessment tasks and tools

- Completed record sheet for each observer group.
- Individual worksheet with results from all groups filled in.

- Select a fieldwork site where you can easily compare an area of indigenous vegetation with an area invaded by alien plants.
- Divide into an equal number of small groups (3-5 per group). Half the groups will survey plant and animal populations in invasive alien vegetation; the other half will survey an area of indigenous vegetation.
- Each group gets a piece of string four metres long, joined end to end with a knot. This is your group's quadrat frame (a tool for observing, recording and comparing what lives in a given area).
- Taking care not to trample on plants or animals, lay out your group's quadrat frame as a 1 m^2 quadrat in an area of indigenous or invasive alien vegetation.
- Observe and count the number of different plant species in your quadrat. Record this on your group's Fieldwork Record Sheet (below). If you have a permit to collect plant material, carefully collect a small sample of leaves or flowers from

each type of plant and stick them on your record sheet. If you do not have a permit, do a drawing of leaves / flowers to represent each of the species you observed.

- Observe and count the number of **different animal species** observed in your quadrat. Record this on your group's **Fieldwork Record Sheet**. Also record any animal species not found within your quadrat, but observed within your habitat type (invasive alien or indigenous vegetation).
- Combine all the data from the different groups onto a class chart and copy this information onto your individual worksheet (**Analysis of Fieldwork Observations:** Questions 1, 4, 5 & 8).

Learning Activity 4: Promote Biodiversity!

- Do your bit for biodiversity!
  Before you leave the field work site, divide into teams and have a competition to see who can weed or chop down the largest pile of invasive alien plants in a given time.
- Groups that remove or trample indigenous plants will be disqualified, so make sure you can identify the invasive alien plants.

Assessment tasks and tools

- Have a prize ready for the group that removes the largest pile of invasive alien plants.

Fieldwork Record Sheet

Group number ☐

Group members _____

_____

_____

1 What type of vegetation did your group investigate?

Indigenous ☐ Invasive alien ☐

2 Record the different **plant species** found in your 1 m^2 quadrat (draw or stick a small sample of each plant in the space provided):

Name of plant*	Drawing / sample	Interesting observations

* make up a name that describes the plant if you can't identify the plant

3 Total number of **different plant species** found in our quadrat _____

4 Names of different types of animals found in our quadrat

_____

_____

5 Total number of **different animal species** found in our quadrat _____

6 Other animal species found in this type of vegetation

_____

_____

Analysis of Fieldwork Observations

Group number ☐

Name _____

1 Record the number of **different plant species** found in each group's 1m^2 quadrat:

In Indigenous Vegetation

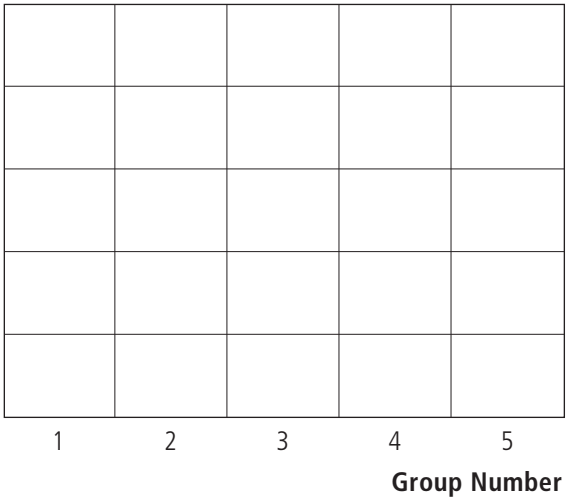
Group No.	Number of plant species
1	
2	
3	
4	
5	

In Invasive Alien Vegetation

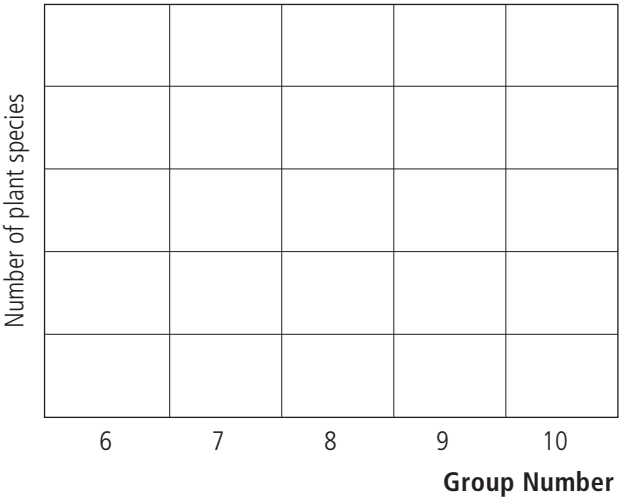
Group No.	Number of plant species
6	
7	
8	
9	
10	

2 Make up a scale for the Y-axis and complete the two bar graphs showing the **number of different plant species** found in each 1m^2 quadrat:

In Indigenous Vegetation



In Invasive Alien Vegetation



3 Work out the **average number of plant species** found in 1m^2 in each vegetation type:

In Indigenous Vegetation

Average	

In Invasive Alien Vegetation

Average	

4 Compare the record sheets from each group and work out the **total number of different plant species** recorded by all the groups that surveyed indigenous or alien vegetation:

In Indigenous Vegetation

Total	

In Invasive Alien Vegetation

Total	

Note: Be careful not to count a species more than once.

5 Record the number of **different animal species** found in each group's 1m^2 quadrat:

In Indigenous Vegetation

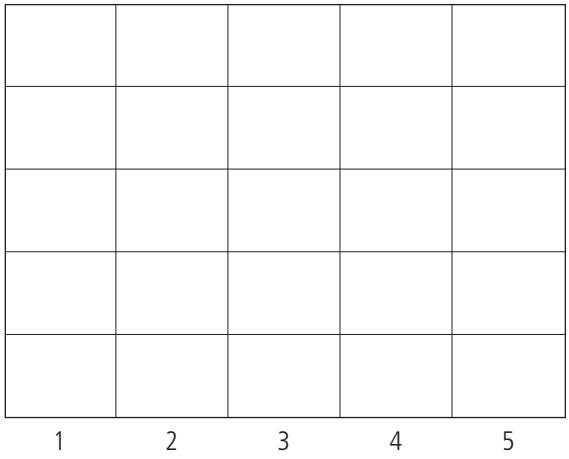
Group No.	Number of plant species
1	
2	
3	
4	
5	

In Invasive Alien Vegetation

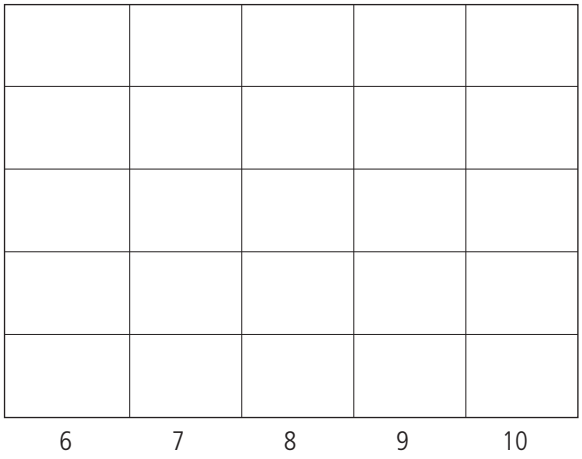
Group No.	Number of plant species
6	
7	
8	
9	
10	

6 Make up a scale for the Y-axis and complete the two bar graphs showing the **number of different animal species** found in each 1m^2 quadrat:

In Indigenous Vegetation



In Invasive Alien Vegetation



7 Work out the **average number of animal species** found in 1m^2 in each vegetation type:

In Indigenous Vegetation

Average	

In Invasive Alien Vegetation

Average	

8 Compare the record sheets from each group and work out the **total number of different animal species** recorded by all the groups that surveyed indigenous or alien vegetation:

Animals species observed in Indigenous Vegetation

Total	

Animals species observed in In Invasive Alien Vegetation

Total	

Note: Be careful not to count a species more than once.
Include animals found outside the quadrats but within each vegetation type.

Post-visit feedback:

Learning Activity 5: Feedback on findings

- In the classroom after the field trip, analyse the data as outlined in the individual worksheet (above). Complete Analysis of Field Work Observations: Questions 2-3 and 6-7.
- Draw graphs by hand or use a computer program like MS Excel.
- Discuss your findings and answer the questions in the worksheet Threats to Biodiversity (below). For additional information, read Module 4: Urban nature under pressure.
- Share your answers to the investigation question in a small group or class discussion (Question 3).

Assessment tasks and tools

- Completed individual worksheets: Analysis of Fieldwork Observations and Threats to Biodiversity.

Taking it further …

Find out more about specific invasive alien and indigenous species by doing projects such as:

Finding out about invasive aliens:

- Research two invasive alien species, giving their scientific and common names.
- Explain why they were imported into South Africa and where they originally came from.
- Explain how they have impacted on the environment in South Africa.
- Describe the methods used to control these species.

Finding out about useful indigenous plants:

- Research two useful indigenous plant species, giving their scientific and common names.
- Find out what part(s) of the plant is used and what it is used for.
- Find out whether or not plants are being cultivated or harvested in a sustainable way so that they are not threatened by over-harvesting.

You can complete this project on the computer, using information and illustrations in this resource and related websites. Type and illustrate your projects using MS Word or PowerPoint.

These project outlines were developed by Mrs Lesley Watson of Bergvliet High School

Threats to biodiversity

Name _____

1 In which type of vegetation did you find more **plant species** (tick the correct box)?

Indigenous ☐ Invasive Alien ☐

2 In which type of vegetation did you find more **animal species** (tick the correct box)?

Indigenous ☐ Invasive Alien ☐

3 In your own words, provide an answer to the investigation question

What impact do invasive alien plants have on indigenous plants and animals (biodiversity) in the Fynbos Biome

_____

_____

_____

_____

_____

4 Explain why invasive alien plants grow better than indigenous plants.

_____

_____

5 Explain how invasive alien vegetation threatens indigenous **animal** populations.

_____

_____

6 Name another **two threats** to lowland vegetation in Cape Town (not including invasive aliens):

(a) _____

(b) _____

7 Do you think it is worth conserving small patches of natural vegetation in Cape Town that are not part of formal nature reserves?

Yes ☐ No ☐

Explain your answer:

_____

_____

8 What can you do to help conserve biodiversity in the City of Cape Town?

_____

_____

_____

Rare, threatened, extinct … scientists use these and other terms to describe the status of plant and animal populations in nature. What do the terms mean, and are any of the plants and animals in the lowlands of the City of Cape Town rare, threatened or extinct? In this activity, you will define these terms in your own words and find out more about some of Cape Town's special and threatened plant and animal species – and why they need our help.

NATURAL SCIENCES Grade 7-9

Learning Outcome 2:

Constructing Science Knowledge

The learner will know and be able to interpret and apply scientific, technological and environmental knowledge.

Assessment Standards

- Recalls meaningful information.
- Categorises information.
- Interprets information.

Learning Outcome 3:

Science, Society and the Environment

The learner will be able to demonstrate an understanding of the interrelationships between science and technology, society and the environment.

Assessment Standard

- Understands sustainable use of the earth's resources.

Learning Activity 1: What does it mean?

- Read or search Module 1: Nature on your doorstep and Module 5: Rare, threatened and extinct and find the following terms: critically endangered, endangered, endemic, extinct, extinct in the wild, indigenous, rare, Red List (Red Data Book), species, vulnerable.
- Use your dictionary, information and definitions in the e-Kapa website, and any other sources to work out a definition of each of these terms **in your own words**.
- Write your list of terms and definitions in your own handwriting and hand it in for assessment.

Assessment tasks and tools

- List of terms with definitions in own words.

Learning Activity 2: Matching meanings

- After compiling and handing in your list of definitions, check your knowledge by completing the Computer-based Activity Conservation Definitions in Module 5.

Assessment tasks and tools

- Terms and definitions matched correctly.

Learning Activity 3: Threatened species categories

- Go to the spreadsheet of plants and animals on the lowlands poster / picture (Module 1: Nature on your doorstep). Find all the plant and animal species that are threatened with extinction (these are classified as vulnerable, endangered, critically endangered or extinct in the wild).
- Using the common names of plants and animals, draw up a table with four columns (categories of threatened species) and two rows (plants or animals) that shows which species are vulnerable, endangered, critically endangered or extinct in the wild. Give the table a relevant heading.

Assessment tasks and tools

- Table listing threatened species of plants and animals in the lowlands of the City of Cape Town.

Learning Activity 4: Our special species

- Go to the list of plants and animals on the lowlands poster / picture (Module 1: Nature on your doorstep). In pairs or small groups select one plant or animal species that is listed as either vulnerable, endangered, critically endangered or extinct in the wild.
- Do research on your plant or animal species:
  - First click on the picture of your species on the interactive poster to find information on that species (in the related spreadsheet).
  - Look for more information in books or on websites, e.g. www.plantzafrica.com, or by talking to knowledgeable people in your community.
- Answer the questions in the worksheet below.
- When you have answered all the questions, design and produce an information sheet on your endangered or extinct species. You can do this by hand or on the computer, using a programme like MS Word or PowerPoint.
  - Give your information sheet a clear heading (scientific name of the species)
  - Copy or draw a line drawing of the species and colour it in correctly, using photographs of the species or information from the poster.
  - Summarise your findings under the following headings: common name(s); conservation status (e.g. endangered, vulnerable, etc); description; natural distribution (where it is found); importance in nature; importance to people; threats to survival; efforts to conserve the species
  - Make sure that your information sheet is effectively designed and neatly produced.
- Share your information sheet with the class and participate in a discussion, guided by your teacher, on how we can help to conserve threatened species in our city.

Assessment tasks and tools

- Well designed, illustrated information sheet covering the categories of information listed in the activity outline and worksheet.

Threatened species in the City of Cape Town

Group members:

1 What is the scientific name (**binomial**) of your plant or animal?

2 Write down any common names you can find for your species. Which languages are used?

Language: _____ Name(s): _____

3 Tick the block that describes the conservation status of your plant or animal:

Vulnerable ☐ Endangered ☐ Critically Endangered ☐ Extinct in the Wild ☐

4 Describe in words what your plant or animal looks like (size, shape, colour, pattern, etc.)

5 Where is your plant or animal found (habitat type, geographical area)?

6 Make notes on the importance of your plant or animal in nature (ecology):

8 Why is your plant or animal threatened?

9 What are people doing to help your plant or animal to survive?

10 What could YOU do to help conserve threatened plants and animals in your city?

We all need a place to call home, but in Cape Town there are many people who don't have adequate housing. In this activity learners will work in groups to develop a short play on the issue of homelessness in the City and their suggested solutions.

ARTS AND CULTURE Grade 7

Learning Outcome 1:

Creating, Interpreting and Presenting

The learner will be able to create, interpret and present work in each of the art forms.

Assessment Standards

Uses exploration of human rights issues in South Africa as a basis for group improvisations that:

- Show understanding of basic dramatic structure (who, what, where, when);
- Show characters drawn from observation, imitation and imagination;
- Incorporate some dramatic elements (e.g. grouping, shape and climax) to communicate meaning and feeling.

Learning Outcome 3:

Participating and Collaborating

The learner will be able to demonstrate personal and interpersonal skills through individual and group participation in Arts and Culture activities.

Assessment Standards

Work sensitively in a group to explore and develop scenes around personal and social issues, experimenting with alternative solutions to problems.

Learning Activity 1: Researching the issue

- Collect newspaper or magazine articles about housing backlogs, homelessness and/or street children in Cape Town. You can also find information in the section on post-Apartheid challenges in the City from Module 3: A Brief Human History.
- Divide into small groups of about four learners each. Choose one article per group to read aloud. Make brief notes about important points.
- Re-form the groups so that the new groups consist of learners who have read different articles. Share what you read about in the first group and how you feel.

Assessment tasks and tools

- Walk around the class, listen to reading, observe group dynamics and check summaries.
  Give verbal feedback.

Learning Activity 2: Planning the presentation

- Based on the articles you have read, let each new group choose an aspect of the issue of homelessness they would like to dramatise.
- Spend time in class developing a short one-act play that illustrates the problem and shows how it could be addressed.
- Brainstorm ideas relating to the basic structure of the story (who, what, where and when; problem statement and suggested solution). Select the ideas your group favours to build the story.
- Decide on the characters in the story. Develop a character profile for each one (e.g. draw and label a picture of each character to describe that person's physical and emotional characteristics).
- Use dramatic elements (e.g. grouping, shape and climax) to communicate meaning and feeling.
- Plan the narrative and decide who will play each role. Write the script of the play.
- Rehearse your play and, if necessary, find costumes and props.

Assessment tasks and tools

- Observe learners and assist with planning and group dynamics as necessary.
- Educator assesses written script, focusing on characters, narrative and dramatic elements.

Learning Activity 3: Presenting the plays

- Each group presents their play to the rest of the class.
- Use the assessment rubrics provided to evaluate one another's plays.

Assessment tasks and tools

- Educator and learners assess plays using a rubric.

Learning Activity 4: Valuing others

- Having watched the plays, discuss the different solutions to the problem of homelessness (e.g. are they just, democratic, feasible, creative?).
- Hold a class discussion on the attitudes expressed in the plays towards homeless people.
- Share how you would like to be treated if you were in that position. Summarise and display these statements in the classroom.
- Relate this discussion to the Bill of Rights in South Africa's Constitution.
- You could extend this discussion to consider whether or not animals and plants in the City also have rights to their natural homes.

Assessment tasks and tools

- Class summary of statements on attitudes and actions towards others.

Assessment Rubric

Watch the one-act plays presented by your peers. Evaluate the plays and share your feelings during a feedback session.

Title of Play: _____

Actors: _____

Assessor(s): _____

Criteria	**1**	**2**	**3**	**4**
The play represents the problem of homelessness in a sensitive way				
The play suggests a solution to the problem of homelessness				
The play is well structured (clear plot; well paced; has a climax; resolution)				
The actors represent their characters well				
The play speaks to our emotions				
Overall assessment				

1 unsatisfactory, **2** satisfactory, **3** good, **4** excellent

General comments

Most of the large wild animals that once roamed South Africa were killed by hunters between the 17th and 19th Centuries. Today, wildlife survives mainly in nature reserves and on large farms. In our city, even very small wild animals, such as small buck, birds, frogs and tortoises, are now threatened because their homes are being destroyed. These small animals have no voice and no vote. They cannot campaign for their own survival. Their lives are in our hands. In this activity, you will design an art work to help draw attention to the plight of urban wildlife.

ARTS AND CULTURE — Grade 8

Learning Outcome 1:

Creating, Interpreting and Presenting (Visual Arts)

The learner will be able to create, interpret and present work in each of the art forms.

Assessment Standard

- Creates art / craft / design works which demonstrate differentiation between the organic and inorganic aspects of the built and natural environment in design, observational drawing and two- and three-dimensional work.

Learning Outcome 2:

Reflecting (Composite)

The learner will be able to reflect critically and creatively on artistic and cultural processes, products and styles in past and present contexts.

Assessment Standard

- Uses the Arts to demonstrate an awareness of environmental concerns.

Learning Activity 1: What's the issue?

- In small groups, go to the library or surf the Internet looking for information on animals that have become extinct or endangered because of human activities (e.g. the dodo, passenger pigeon, bloubok, quagga, bontebok). In this resource, read about threatened animals in Module 5: Rare, Threatened and Extinct.
- List ways in which people's activities threaten wildlife. Share your findings with the rest of the class and draw up a class list of ways in which people threaten the survival of wildlife.

Assessment tasks and tools

- Class list summarising threats to the survival of wildlife in an urban context.

Learning Activity 2: Putting wildlife in the picture

- Individually, choose an animal that still survives in the wild in the City of Cape Town (e.g. Micro Frog, Leopard Toad, Cape Grysbok, Fish Eagle, etc).
- Think about the issues that threaten the survival of this particular species.
- Create a design / art work, using the computer and/or mixed-media, that contrasts your animal in its natural world with the pressures of the urban jungle.
- Include a slogan in your design, which would enable you to use the design / art work as part of a campaign to help save your animal and its habitat.

Assessment tasks and tools

- Educator and groups of learners to assess art work and provide feedback using a rubric.

Assessment Rubric

Divide into groups of about five learners. In your group, use the rubric below to assess the work of another five learners. Complete one rubric per learner as an exercise in peer assessment.

Learner: _____

Assessor(s): _____

Criteria	**1**	**2**	**3**	**4**
The animal(s) can be easily identified				
The threat(s) to the animal are clearly shown				
The artist has demonstrated a clear understanding of the environmental issue (causes and effects)				
The design contrasts the natural and built environments effectively				
The slogan is consistent with the message of the art work				
The art work as a whole is convincing				
Overall assessment				

1 unsatisfactory, **2** satisfactory, **3** good, **4** excellent

General comments

Nature struggles to survive in cities. The City of Cape Town is looking for a publicity company to help them convince the public to value and protect urban nature.

Can you convince the City to employ your "public relations company" to do the job? In this activity, your group will design and produce a visual media product (e.g. a TV or magazine advertisement, billboard or poster campaign, series of branded goods, etc) to raise awareness about the importance of conserving nature in the City of Cape Town.

ARTS AND CULTURE: VISUAL ARTS Grade 9

Learning Outcome 1:

Creating, Interpreting and Presenting

The learner will be able to create, interpret and present work in each of the art forms.

Assessment Standard

- Create art, craft or design works that:
  - translate ideas or concepts into a visual form;
  - demonstrate the confident use of elements and principles of design.

Learning Outcome 4:

Expressing and Communicating

The learner will be able to analyse and use multiple forms of communication and expression in Arts and Culture.

Assessment Standard

- Apply skills of media production, while considering the target group, purpose and design elements.

Learning Activity 1: Finding a focus

- Divide into small groups, each representing a public relations company. Decide on a name for your company.
- Look at the mind map (below) to see some of the reasons why people value nature. Your group will choose one of these reasons to focus on.
- Read up about the particular aspect of nature that your group is focusing on. Make notes on your worksheet (Question 3).
  See, for example, Module 1: Nature on your Doorstep.
- What type of people will be interested in this particular aspect of nature (e.g. age range, socio-economic group, interests)? Decide on a "target group" and explain on your worksheet why you think this group will be interested in this aspect of nature (Question 5).
- Look at your notes and decide on the key message that you want to get across to your target group.
- Decide on which visual medium will be most effective to get your message across to your target group (e.g. TV advert, branded goods, magazine advert, billboard or poster campaign, etc).

Assessment tasks and tools

- Complete the worksheet

Nature is important to people

There are many reasons why people value nature and believe that we should conserve it.

Choose one of the following reasons and develop a **message** and a visual **media product** that will be relevant to a particular **target market** of your choice.

Promoting the value of nature

Name _____

Group members _____

1 Our company's name _____

2 Our group's value focus _____

3 Notes on the value of nature _____

4 Our target market is _____

5 We chose this target market because _____

6 The main idea / concept / message we want to get across is _____

7 Our media product is _____

8 We chose this product to publicise the value of nature to our target market because _____

Learning Activity 2: Developing the media product

- Based on the decisions made regarding your target market, message and medium (Activity 1), work together to develop a **visual media product** to promote the value of nature.
- Depending on the technology available to you, you may develop your product in hard copy, electronic or video format. If you lack video technology but choose video as your medium, you may develop your product as a hard-copy or electronic "story board", or as a drama presentation.
- Present your media product in a role-play situation, where your group (company) presents your product proposal to the class (your client).
- The class will assess the various products and presentations using rubrics, and participate in a discussion to decide on which company should be awarded the "contract".

Assessment tasks and tools

- Assess the final group presentations. Groups must justify their choice of target group and media product(s).
- Assess the final media products. Products must fulfil criteria of effective design.
- Give each group the two assessment rubrics (below) and get pairs of learners to assess either the relevance or design of the products.

Assessment Rubrics

Company name _____

Group members _____

Relevance of the media product:

Criteria	**1**	**2**	**3**	**4**
The focus is relevant to the **target group** chosen				
The **purpose** of the media product is clear				
The **message** is effective (accurate, easy to understand, clever, convincing)				
The type of **media product** is relevant to the target group and message				
The message and product are **sensitive** to the context				

1 unsatisfactory, **2** satisfactory, **3** good, **4** excellent

General comments on relevance of the media product: _____

_____

Design and production of the media product:

Criteria	**1**	**2**	**3**	**4**
The message is clearly communicated in a visual medium				
Information is brief, accurate and logically organised				
Design elements are used effectively (e.g. images, colour, line, texture, tone, shape, space)				
The overall design / composition is creative, clever and visually pleasing				
The product looks professional (accurate, neat, effective use of technology)				
The product has the desired effect on the audience				

1 unsatisfactory, **2** satisfactory, **3** good, **4** excellent

General comments on relevance of the media product: _____

_____

Overall assessment symbol:	**1**	**2**	**3**	**4**

In Cape Town, much of the Cape Flats was once covered by seasonal wetlands. Very few people lived in these areas in the past, because the wet conditions in winter were unpleasant and unhealthy. Cape Town's population has grown very rapidly since the 1980s and the Cape Flats are now almost completely developed, including areas of seasonal wetlands. In this activity learners will consider the implications of development in these areas of the Cape Flats.

SOCIAL SCIENCES (GEOGRAPHY) GRADE 7

Learning Outcome 2:

Geographical Knowledge and Understanding

The learner will be able to demonstrate geographical and environmental knowledge and understanding.

Assessment Standards

- Describes and explains how natural hazards (e.g. flooding) occur, and their impact on human lives and socio-economic activities [people and places].
- Investigates and explains why some people face a higher risk than others with respect to natural hazards [people and resources].
- Identifies how risks and hazards can be managed [people and the environment].

Knowledge Focus

- Natural hazards (e.g. floods): simple explanations of how natural hazards occur; the impact of hazards on people's lives; why some people are at greater risk than others; who is at risk; management of risks and risk reduction.
- Population growth and change: factors and processes affecting population growth and change.
- Mapwork: extracting information from maps and photos.

Learning Activity 1: Wetlands on the Cape Flats

- In Module 3: A brief human history, find the maps showing when different parts of Cape Town developed. Which areas were inhabited first? When did people start living on the Cape Flats?
- Discuss why it took people so long to start living on the Cape Flats (Note to the teacher: driftsands, little grazing, many wetlands in winter).
- Read the section on Wetlands in Module 2: Four lowland ecosystems. Find information in your text book about how wetlands form. Explain in your own words how seasonal wetlands form on the Cape Flats.
- Label the following wetlands on a printed copy of the map of Cape Town's ecosystems: Princess Vlei, Rietvlei, Rondevlei, Zandvlei, Zeekoevlei, Zoarvlei. These are now permanent water bodies due to urban development.

Assessment tasks and tools

- Educator assesses individual explanations of how seasonal wetlands form.
- Check that learners have labelled the wetlands on their map correctly.

Learning Activity 2: Understanding flooding on the Cape Flats

- Read the City of Cape Town's media release on winter floods. If your school has Internet access, learners can download it from the following address: www.capetown.gov.za/press/Newpress.asp?itemcode=1654. We have provided a text version in this lesson plan, for those without Internet access.
- With the help of the teacher, discuss how urban development in Cape Town has changed the nature of rivers and wetlands, increased the risk of flooding, impacted on the natural environment and increased health risks among people living on the Cape Flats (e.g. TB, diarrhoea)

Assessment tasks and tools

- Assess individual written explanations of how urban development can increase the risk of flooding.

- In your own words, explain three ways in which poorly managed urban development can increase the risk of flooding.
  (Note to the educator: This may include the fact that more paved surfaces decrease infiltration and increase volume and rate of run-off; importing water from other catchments increases the volume of waste water and sewage; building in seasonal wetlands increases flood risk in winter; poor maintenance of stormwater drains and sewerage systems increases risk of flooding due to blockages; frequent fires on the mountain increase the risk of flooding due to mudslides.)

Learning Activity 3: Managing the flood risk

- Every year, people come to Cape Town looking for work. Most arrive in summer when the seasonal wetlands are dry and build their shacks in informal settlements on the Cape Flats, thinking that all is well. Unfortunately, these areas often become flooded in winter, forcing people to vacate their homes, causing health problems and damage to property.
- During winter, collect newspaper articles on flooding on the Cape Flats. Also read the section on Post-Apartheid developments and challenges in Module 3: A brief human history; and the City of Cape Town's media release on winter floods: www.capetown.gov.za/press/Newpress.asp?itemcode=1654.
- Answer the questions on the risks and impacts of flooding in the worksheet provided.

Assessment tasks and tools

- Individual learners complete the worksheet provided.

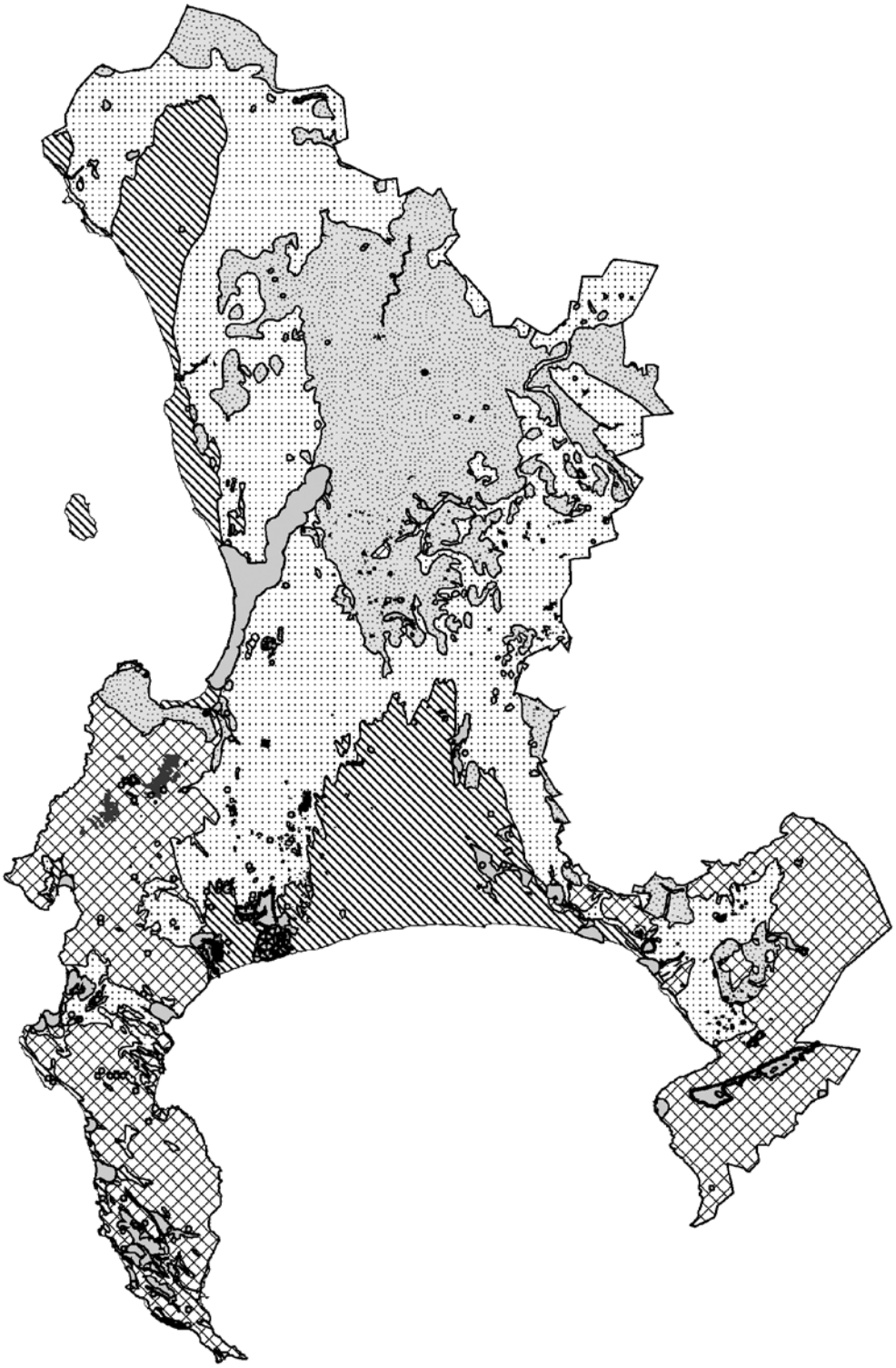
Learning Activity 4: Educating the community

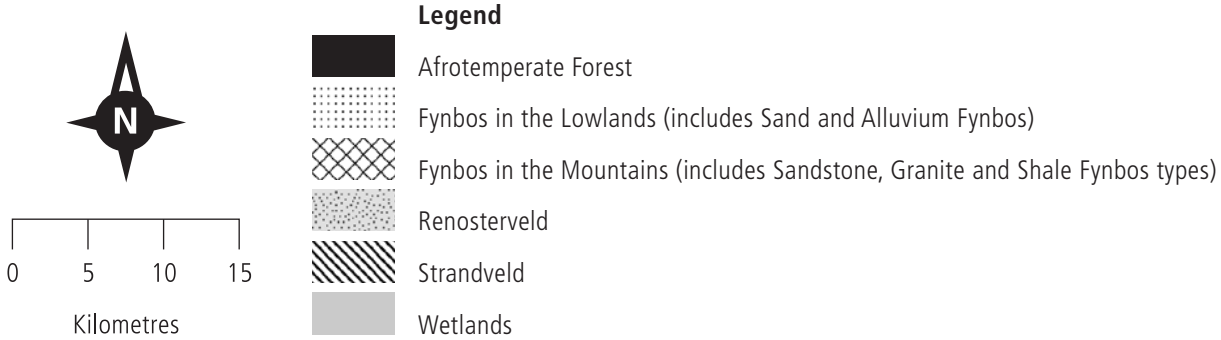
- Divide into groups of about four learners. Imagine that you are a team of community educators from the Disaster Risk Management Centre at the City of Cape Town. Design an education campaign to help people in Cape Flats informal settlements avoid risks associated with winter storms and flooding.
  www.capetown.gov.za/press/Newpress.asp?itemcode=1654.
  - List at least five practical things people can do to reduce risks of flooding and storm damage in winter.
  - State how you would inform people in informal settlements.

Assessment tasks and tools

- Groups of learners present their ideas for a risk management education
- Educator assesses content of presentations.

ECOSYSTEMS OF THE CITY OF CAPE TOWN (PRE-COLONIAL VEGETATION)





14 June 2006
CITY'S DISASTER RISK MANAGEMENT TEAM READY FOR WINTER STORMS

MEDIA RELEASE
NO. 198/2006
14 JUNE 2006

CITY'S DISASTER RISK MANAGEMENT TEAM READY FOR WINTER STORMS

The City's disaster risk management team has initiated an action plan to deal with any winter storm floods which usually hit informal settlements during this time of the year.

The team is a joint effort between the City of Cape Town, Provincial Government and Non-Governmental Organisations (NGOs).

The Major Flooding and Storms Plan includes the unblocking of stormwater drains, the upgrading of stormwater systems, regular inspections of retention ponds, a public education programme and an emergency plan to handle possible disasters. The City has also signed an agreement with the Trauma Centre to assist victims of storms or floods with psychological assessment and support.

"The City has proactively identified and mapped high flood risk areas. We have introduced special flood risk reduction measures, such as improved drainage and preventative maintenance of existing stormwater systems by Roads and Stormwater teams," says Councillor Dumisani Ximbi, Mayoral Committee Member for Safety and Security.

"Our ongoing public education programme in partnership with environmental training provides residents with practical tips on how to raise floor levels, channel flood waters, as well as reduce health hazards associated with standing water," he says.

The City's emergency plan is co-ordinated at a Joint Operations Centre (JOC) where a multi-disciplinary rapid response team manages and executes contingency plans. It also acts as a central information point to inform the public on the situation at hand through fast and effective communication during emergencies.

"Once the SA Weather Service issues a severe weather warning, the City will immediately communicate the news directly to the areas at risk.

"We have also identified various emergency shelters to help minimise disruption of lives and community activities. People will be encouraged to first try and find alternative accommodation with neighbours, friends or family before being housed in community facilities.

"Community halls do not offer privacy and the already traumatised flood victims' dignity may suffer. This will therefore be a last resort," Councillor Ximbi says.

The City's emergency plan provides for the response team to, together with identified NGOs, disseminate blankets, food and basic necessities to alleviate the trauma usually experienced by flood victims and to provide for the immediate, basic needs of affected communities. It also provides specific information with regard to health issues, the registration of victims and emergency shelters.

After the devastating summer fires on various parts of Table Mountain, the City has also implemented precautionary measures to address possible mudslides, in partnership with South African National Parks.

Experts have examined and evaluated the high risk slopes and have proposed various measures, such as special rock filled gabion weirs and silt curtains in certain areas to intercept debris and minimise run-off down the slopes.

"Despite the City's preparedness, we would like to point out that flooding and mudslides may still occur due to the variable climatic conditions," he says.

Due to the very nature of flooding, it cannot be completely prevented as rainfall often exceeds the design capacity of the stormwater system.
To report flooding or blocked drains please phone the all hours Roads and Stormwater number at 086-010-3054. In the event of a life- or property-threatening emergency, contact 107 from a Telkom phone or 021 480 7700 from a cellphone.

Which are the high risk flood areas in the Cape metropole?

The severity and spread of the winter storms will ultimately determine which areas are most at risk.
The following areas are most likely to experience flooding:

- Informal settlements on the Cape Flats
- Areas within or adjacent to stormwater ponds
- Areas adjacent to rivers, canals and wetlands
- Areas below mountain slopes denuded by fires
- Trapped low-lying areas without adequate overland water flow routes

Based on past experience, the City estimates that some 5 000 informal dwellings could be affected should Cape Town experience average winter conditions during 2006. This number could rise in the event of high intensity storms.
What is the City doing to minimise flood risk?

FIRE AFFECTED MOUNTAIN AREAS

- Ensuring that the City's stormwater drainage close to burnt out areas are cleaned and kept clean. This includes stream intakes, gullies, catch pits, open ditches and piping. A first round of cleaning of all the affected areas has already been completed and a second round is underway. Further, after each rainstorm inspections are done and blocked and even partially blocked facilities are cleared.
- The Roads and Stormwater depots and three cleaning contractors are on 24 hour alert to react immediately to flooding and mudslides. The Table Mountain National Park will also supply emergency crews once alerted.

FORMAL AND INFORMAL AREAS

- Proactive maintenance (mainly cleaning) of stormwater facilities by means of contracted services
- Reactive maintenance work, such as response to flood incidents, is generally undertaken by the Roads and Stormwater Department's maintenance depots
- Informal settlements - current maintenance interventions underway to mitigate potential flood impacts. Maintenance efforts focus on the formal drainage systems either surrounding or within the various settlements
- Primarily focus on improving stormwater maintenance practice and to ensure equity in the distribution of resources
- Additional contractor teams have been established to assist with inspecting and clearing out critical stormwater systems, i.e. - trash screens, in & outlets, intakes before or after a rainfall event.

COMMUNICATION AND AWARENESS CAMPAIGN

Communication campaign consisting of:

- News releases
- Workshops with stakeholders
- Letters to residents of potential flood risk areas
- Information notices to organisations
- Personal visits
- A trilingual brochure called "Protect Yourself from Floods" has been distributed to residents within high-flood risk areas, as well as fire and flooding preparedness education sessions with many of the communities.

In consultation with local community structures every effort is being made to warn all high-risk flood-prone settlements of their status and to encourage them to relocate elsewhere.

What can residents [informal and formal settlements] do to minimise risks?

General:

- Waterproof your roof
- Secure your roof and remove any loose material on your property in case of gale force winds
- Check that stormwater systems around your home and in your neighbourhood are clean and working well. Report blocked or damaged stormwater systems to the City.

Informal areas:

- Ensure that water can drain away from your house
- Move to higher ground if you are staying in a flood-prone area.

Formal areas:

- Check that gutters, downpipes, drains and furrows on your property will allow free flow of stormwater
- Remove dead or damaged branches from trees
- Secure garden furniture that can be blown over or damaged by the wind.

Where can blocked sewers and drains be reported?

Flooding or blocked drains:
Please phone the all-hours Roads and Stormwater number at 086 010 3054
Life- or property threatening emergencies:
Please call 107 from a Telkom phone or 021 480 7700 from a cellphone.

What steps are implemented when disaster strikes?

- Victims are registered according to a standard procedure whereby City officials, the Ward Councillor, Subcouncil Manager, community leaders and representatives of the affected people work as an area disaster team.
- This team then determines the short term needs such as shelter and social relief.
- Suitable shelter is then arranged at community halls if required.
- Depending on the nature of the incident, the City may implement engineering works to stabilise the situation, reduce flooding and fire risk, and to facilitate reconstruction.
- Human Settlement Services can provide basic building materials to informal settlement residents where structural damage occurs.

How are people registered for assistance?

- The area disaster team oversees the registration process
- The name of the head of each affected family will be linked to a plot or dwelling
- The number of people per family is then recorded
- Each family receives a unique number to control the allocation of shelter, blankets, food, etc.

What type of assistance does the City offer to residents?

- Donations are used when available
- The City provides community facilities for temporary shelter
- The City co-ordinates the dissemination of blankets, clothes and food with registered NGOs, with financial assistance from provincial government
- Depending on the damage caused, the City may provide basic building or waterproofing materials
- The City will provide filler material where filling of depressions can alleviate flooding, or where the raising of floor levels will reduce the ponding of water inside homes.

How and where can people apply for assistance?

The multi-disciplinary team dealing with flooding will assess every situation upon receiving information via the emergency call centre or the City’s flooding reporting number. Contact will be made with communities in this process.

Risks and impacts of flooding

Name _____

1 List any three ways in which the City's Major Flooding and Storms Plan hopes to reduce the risk of flooding in winter:

_____

2 List any three areas in Cape Town that are likely to experience flooding in winter:

_____

3 What role does the South African Weather Service play in the City's emergency plan?

_____

4 In the event of a serious flood, list any five things (materials or services) that the City's emergency response team provides for the victims:

_____

_____

5 Who should you phone to report a blocked stormwater drain?

Department: _____ Number: _____

6 How many informal homes are affected by flooding in an average year in Cape Town?

50 ☐ 500 ☐ 5 000 ☐ 50 000 ☐

7 Explain in your own words how keeping storm-water drains clean can help to reduce the risk of flooding:

_____

_____

8 When disaster strikes, list five steps that the area disaster team takes to assist victims:

_____

_____

_____

9 In addition to possible flood damage, what other risks do people who live in seasonal wetlands face:

_____

_____

10 How can conserving and restoring wetlands help to reduce the risk of flooding?

_____

_____

_____

By comparing maps of natural resources (e.g. soil and vegetation) with maps of urban development, we can find out about the impact of development on the environment. In this activity, learners will compare maps to find out where different types of indigenous vegetation occur in the City of Cape Town, which are most threatened and why. They will then decide on which types of indigenous plants could be used to restore nature in different parts of the City.

SOCIAL SCIENCES (GEOGRAPHY) GRADE 8

Learning Outcome 1:

Geographical Enquiry

The learner will be able to use enquiry skills to investigate geographical and environmental concepts and processes.

Assessment Standard

- Identify and select a variety of geographical and environmental sources relevant to an enquiry
- Interpret maps
- Identify some physical and constructed features from aerial / orthophoto maps of local areas
- Observe and record information in the field
- Present an original idea as part of an answer to questions posed in the enquiry
- Report on knowledge gained by constructing an argument based on sources of information; use maps, diagrams, graphics and computers in the presentation

Learning Outcome 3:

Exploring Issues

The learner will be able to make informed decisions about social and environmental issues and problems.

Assessment Standard

- Make suggestions to guide sustainable living practices in a particular context.

Core knowledge and Concepts

- Settlement: factors affecting settlement patterns
- Natural resources: why conservation is necessary; new opportunities to conserve resources
- Mapwork: extracting information; identifying features

Learning Activity 1: What grows where?

- On the computer, find the following maps:
  - Soil types in the City of Cape Town
  - Original distribution of vegetation types in the City of Cape Town
- Use the maps and Module 2: Four unique ecosystems as sources of information to help you answer Questions 1-5 on the worksheet provided.

Assessment tasks and tools

- Complete Questions 1-5 on your worksheet.
- Check your answers using the memorandum.

Learning Activity 2: The impact of development

- On the computer, find the following maps:
  - Urban development in Cape Town: 1800-2005
  - Distribution of vegetation types in the City of Cape Town 2005
  - Protected areas in the City of Cape Town 2005
- Use the maps as a source of information to help you answer the questions on the worksheet provided.

Assessment tasks and tools

- Complete Questions 6-10 on your worksheet.

Name _____

What grows where? Soil and vegetation in the City of Cape Town

1 **Name the five different types of soils shown on the map of Cape Town's soil types:**

1 _____ 2 _____ 3 _____

4 _____ 5 _____

2 **Which type of soil would you find:**

2.1 On top of Table Mountain and the Cape Peninsula mountain chain? _____

2.2 In the valleys of the Kuils, Lourens, Disa, Sand and Eerste Rivers? _____

2.3 Along the northern shore of False Bay and the West Coast north of Milnerton? _____

2.4 In the grape growing areas of Constantia, Durbanville Hills and Somerset West? _____

2.5 In many of the lowland suburbs of Cape Town, e.g. Grassy Park, Wynberg, Athlone, Parow and Bothasig?

_____

3 **Which type of soil:**

3.1 Is best for crops such as wheat, grapes and deciduous fruit trees? _____

3.2 Was formed from sandstone, and has an acidic pH (pH less than 7)? _____

3.3 Was originally beach sand and contains tiny bits of sea shells? _____

3.4 Has an alkaline pH (pH greater than 7)? _____

3.5 Formed from the weathering of granite and shale rocks? _____

4 **Which type of vegetation:**

4.1 Grows mainly on mountains in shallow rocky soil? _____

4.2 Is also known as Dune Thicket, and grows in calcareous sand? _____

4.3 Grows on the Cape Flats but looks similar to the vegetation on the Cape Peninsula mountain chain (i.e. includes proteas, ericas and restios)? _____

4.4 Was destroyed mainly by agricultural development, because it grows in rich soil? _____

4.5 Is the most threatened of all vegetation types in the City of Cape Town (97% destroyed)? _____

5 **Which type of vegetation originally grew:**

5.1 in the area where you live? _____

5.2 in the area where you go to school? _____

5.3 in most of Khayelitsha and Atlantis? _____

5.4 in most of the lowland parts of Somerset West? _____

5.5 on Signal Hill, Tygerberg, Durbanville Hills, Blaauwberg, Klein Dassenberg and Joostenberg Hill?

_____

Memorandum – Activity 1, Questions 1-5

1 Acid sands, Alluvial soils, Calcareous sands, Shale and granite clays and loams, Shallow rocky soils

2.1 Shallow rocky soils; **2.2** Alluvial soils; **2.3** Calcareous sands; **2.4** Shale and granite clays and loams; **2.5** Acid sands

3.1 Shale and granite clays and loams; **3.2** Acid sands; **3.3** Calcareous sands; **3.4** Calcareous sands; **3.5** Shale and granite clays and loams

4.1 Mountain fynbos; **4.2** Strandveld; **4.3** Sand plain fynbos; **4.4** Renosterveld; **4.5** Renosterveld

5.1 and **5.2** Depend on your context; **5.3** Strandveld; **5.4** Sand plain fynbos; **5.5** Renosterveld

The impact of development - shrinking natural areas in the City of Cape Town

6 **In which suburb of Cape Town do you live?** _____

Tick the correct boxes in each of the following three sections:

7 **During which period did your area become urbanised (see grey areas on maps)**:

- ☐ Before 1800
- ☐ Between 1800 and 1930
- ☐ Between 1930 and 1975
- ☐ Between 1975 and 1995
- ☐ Since 1995?

8 **Why did people settle in your area originally?**

- ☐ Farming / fishing / forestry
- ☐ Commerce / administration / leisure
- ☐ Manufacturing / transport / industry
- ☐ Group Areas Act / forced resettlement
- ☐ Escaping hardship / conflict in other parts of the country or the world

9 **Which of the following can you find within half an hour's walk of your school?**

- ☐ An unpolluted stream, river, wetland or estuary
- ☐ Natural vegetation that originally grew in your area
- ☐ Indigenous mammals (e.g. mongoose, porcupine, grysbok, dune mole rat)
- ☐ Indigenous birds of prey (e.g. kite, kestrel, goshawk, buzzard, eagle, owl)
- ☐ Indigenous plants used for food or medicine?

10 **Protecting nature:**

Locate your school on the map of protected natural areas. Use the scale bar and draw a circle with a ten kilometre radius centred on your school. Are there any protected natural areas within ten kilometres of your school?

10.1 List these protected natural areas in the table below.

10.2 Use the information in Module 6: Conserving Nature in the City to find out who manages the nature reserve(s) and which habitat(s) each reserve conserves.

Nature reserve	Management agency*	Habitat(s) conserved**

* SANParks, CapeNature, City of Cape Town, Friends groups, private landowners, etc.

** River / wetland; Mountain fynbos; Afromontane forest; Sand plain fynbos; Strandveld; Renosterveld; Marine environment

Learning Activity 3: Restoring urban nature

- Imagine that the City of Cape Town has decided to undertake a Greening the City programme to try to restore natural habitats in the City. They have circulated a document (below) asking landscaping companies to tender for greening contracts in particular suburbs.
- Form small groups, each representing a landscaping company that wishes to apply for a contract to green one of the suburbs in the City.
- Select a suburb and do research on the computer to find the information required by the tender document (below).
  - For information on soils and vegetation types, see Module 2: Four unique ecosystems.
  - For information on indigenous greening and selecting plants, see Module 10: Planting indigenous.
  - For information on urban nature conservation, see Module 6: Conserving Nature in the City.
- Make a computer folder where you can save information, maps and pictures needed for your project.
- Prepare a PowerPoint presentation of no more than eight slides, or a verbal presentation plus a written report of no more than five pages.
- Present your report to the class, who will help with assessment.

Assessment tasks and tools

- Educator to assess written proposal or PowerPoint presentation, based on requirements of the "tender document".
- Educator and learners to assess verbal or PowerPoint presentation and provide feedback, based on a rubric.

Tender Document

Restoring nature in the City of Cape Town through indigenous greening

The City of Cape Town is offering contracts to landscaping companies that specialise in indigenous greening. Each company will develop a plan to green one of the suburbs of Cape Town with indigenous plants that grow well in that particular area.

Companies wishing to tender for this contract must produce a brief **written proposal** and give a **verbal presentation** to a selection committee from the Environmental Resource Management Department of the City of Cape Town.

The report and presentation must:

- Name and show on a map the suburb where the company wishes to work
- State which soils and vegetation types occur in the suburb
- List the areas in the suburb where the company plans to plant indigenous plants (e.g. parks, road verges, schools, etc)
- List / show examples of water-wise, indigenous plants that your company will plant in the suburb, selecting species (types) that grow well in local soils. Include at least one tree species, two shrubs and three ground covers.
- Explain how indigenous greening can promote sustainable living / sustainable development in the City of Cape Town (give at least three reasons).

CITY OF CAPE TOWN | ISIXEKO SASEKAPA | STAD KAAPSTAD

THIS CITY WORKS FOR YOU

Assessment Rubrics

Group members _____

Criteria	**1**	**2**	**3**	**4**
Presentation fulfils all requirements of the tender document thoroughly				
Ideas for restoring urban nature are original				
Learners use and interpret relevant maps effectively				
Learners select relevant information / plants for their suburb				
Arguments for the value of indigenous greening are convincing				
Learners use computers competently for sourcing and / or presenting information (including text, maps and graphics)				
Overall symbol:				

1 unsatisfactory, **2** satisfactory, **3** good, **4** excellent

General comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Taking it further

You can reintroduce indigenous plants to your own school grounds, and in that way help to restore urban nature in your suburb. Find out what the soil type is at your school, and what type of vegetation originally grew there. Next time you have a greening event at school (e.g. Arbor Day), select water-wise indigenous plants suitable for your particular soil type from the list in Module 10: Planting indigenous.

Grade 9 learners at Wynberg Girls' High conducted an environmental survey in the areas where they live. They compared their findings and evaluated the quality of the environment in the different communities where they come from. Pairs of learners chose particular environmental problems to investigate. They found out more about their issue, wrote a report and publicised their findings and suggestions to address local environmental issues in their communities.

SOCIAL SCIENCES (GEOGRAPHY) Grade 9

Learning Outcome 1:

Geographical Enquiry

The learner will be able to use enquiry skills to investigate geographical and environmental concepts and processes.

Assessment Standards

- Carries out independent enquiries about aspects of the interrelationships between people, places and the environment.
- Analyses and reaches conclusions about information from sources (e.g. photos, maps, statistics).
- Observes and records information in the field.
- Uses the above to justify the answer / decision / solution relating to the enquiry.
- Reports on knowledge gained by constructing and interpretation and argument based on sources of information; where possible uses computers in the presentation.

This learning activity was developed by Mrs Meg Wilding of Wynberg Girls' High School

Learning Activity 1: Conducting an environmental survey

- In class, discuss issues that negatively affect the environment in residential areas. Remember that environmental issues are not just about plants and animals – they include social and economic problems too.
- Choose the top ten issues you identified.
  (Note to the educator: These could include air pollution, broken paving, garbage removal, graffiti, homelessness, lack of open space, litter, street parking, untidy yards, vandalism, etc.)
- Draw up a table with space for your top ten issues and a 1-5 rating scale.
  This will enable you to work out an environmental quality score for your environment out of a total of 50 (see table outline on page 71).
- In pairs, use this table to conduct an environmental survey in your neighbourhood. Rate each aspect of the environment and work out an overall score.
  A low score indicates poor environmental quality, while a total above 35 indicates a pleasant environment.
- Compare your findings with those of your classmates who live in other areas.
  What can you say about the environmental quality in different suburbs?

Assessment tasks and tools

- Completed environmental survey form

Environmental issue survey

Issue	Score					Comment
	1	2	3	4	5	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
TOTAL						

Key to environmental quality: **1** very bad; **2** bad; **3** fair; **4** good; **5** excellent

Learning Activity 2: Investigating an environmental issue

- Working in pairs, choose one of the environmental issues you identified in your community and investigate it in more detail.
- Here is a question to help you focus your enquiry: **Describe an environmental issue in your community. What are the causes of the issue, how does it affect people and the environment, and what can be done to address the issue?**
- Investigate the issue by gathering information to help you answer your enquiry question. For example, you can do fieldwork, take photographs, conduct interviews and consult maps, articles and the Internet.
- Analyse the information you have gathered. Describe the issue, its causes and how it affects people and the environment.
- Discuss what could be done to address the issue and suggest solutions.

Assessment tasks and tools

- Each pair describes orally in class the issue they have chosen to address and the types of information they intend gathering.

Learning Activity 3: Reporting on your findings

- Write a report or design a PowerPoint presentation that describes your issue, its causes and effects. Illustrate with photographs, maps, graphs and/or charts. (Maximum two A4 pages or five slides.)
- Write a formal letter to the local community newspaper. Describe the issue you have researched and suggest possible solutions to the problem. (One A4 page.)
- If you produce a hard copy report, design in addition an educational poster (A3 size) to raise awareness about the issue and to encourage people to participate in solving it.
- Draw up a bibliography of resources used in compiling your report.

Assessment tasks and tools

- Project file comprising a 2-page report, letter to the editor and A3 poster.

  OR

- A 5-slide PowerPoint presentation and letter to the editor.

History is full of turning points. Particular opportunities and constraints do indeed change the course of history and shape the future. In this activity, learners will read about some of the impacts of the establishment of the Dutch East India Company's refreshment station, and later colony, at the Cape in the seventeenth century. They will then imagine what Cape Town might be like today if the Turks had not blocked the overland trade route between Asia and Europe – thus delaying the search for a sea route which European nations dominated for centuries.

SOCIAL SCIENCES (HISTORY) Grade 7

Learning Outcome 1:

Historical Enquiry

The learner will be able to use enquiry skills to investigate the past and present.

Assessment Standards

- Compiles and organises information from a number of sources to obtain evidence about aspects of the past [works with sources].
- Uses the information from sources to present well-thought-out answers to questions [answers the question].
- Communicates knowledge and understanding by formulating arguments based on evidence from the sources; uses information technology where available and appropriate [communicates the answer].

Learning Outcome 2: Historical Knowledge and Understanding

The learner will be able to demonstrate historical knowledge and understanding.

- Describes and makes links between reasons for and results of key events and changes (cause and effect).

Core Knowledge and Concepts

- Early trading systems: European trading systems (14th-16th centuries); Dutch settlement, the Indian Ocean slave trade and slavery at the Cape (17th and 18th centuries).

Learning Activity 1: People making their mark

- In Module 3: A brief human history read the sections Early people of the Cape and Permanent settlement and expansion. As you read, find out how the hunter gatherers, nomadic herders, early colonists and slaves lived (up to the end of the 18th Century).
- Think about what impact these groups had on the natural environment of Cape Town? What impact did they have on the built environment?
  How did they help to shape culture, politics and economics in Cape Town?
- Get into groups of about four learners and answer the questions on the worksheet provided. Use additional sources of information as necessary (e.g. your text book, history books and websites, etc).

Assessment tasks and tools

- Completed worksheet.

People making their mark - the impact of people in the past on Cape Town today

Group members _____

1 Which of the following groups owned land in 17th Century Cape Town?

San ☐ Khoekhoen ☐ Slaves ☐ European settlers ☐

2 Compare the ways in which the San and Khoekhoen used land.
Which do you think had a greater impact on the natural environment, and why?

The San: _____

The Khoekhoen: _____

The _____ had a greater impact on the environment because _____

_____

3 Compare the ways in which the Khoekhoen and European settlers used land. Which do you think had a greater impact on the natural environment, and why?

The Khoekhoen _____

The European settlers _____

The _____ had a greater impact on the environment because _____

_____

4 What impact did the following groups have on the **built** environment of Cape Town?

The KhoiSan _____

The Slaves _____

The European settlers _____

5 What did the following groups contribute to the **cultural** environment of Cape Town?

The KhoiSan _____

The Slaves _____

The European settlers _____

6 How did the following groups influence the **political and economic** environment of Cape Town?

The KhoiSan _____

The Slaves _____

The European settlers _____

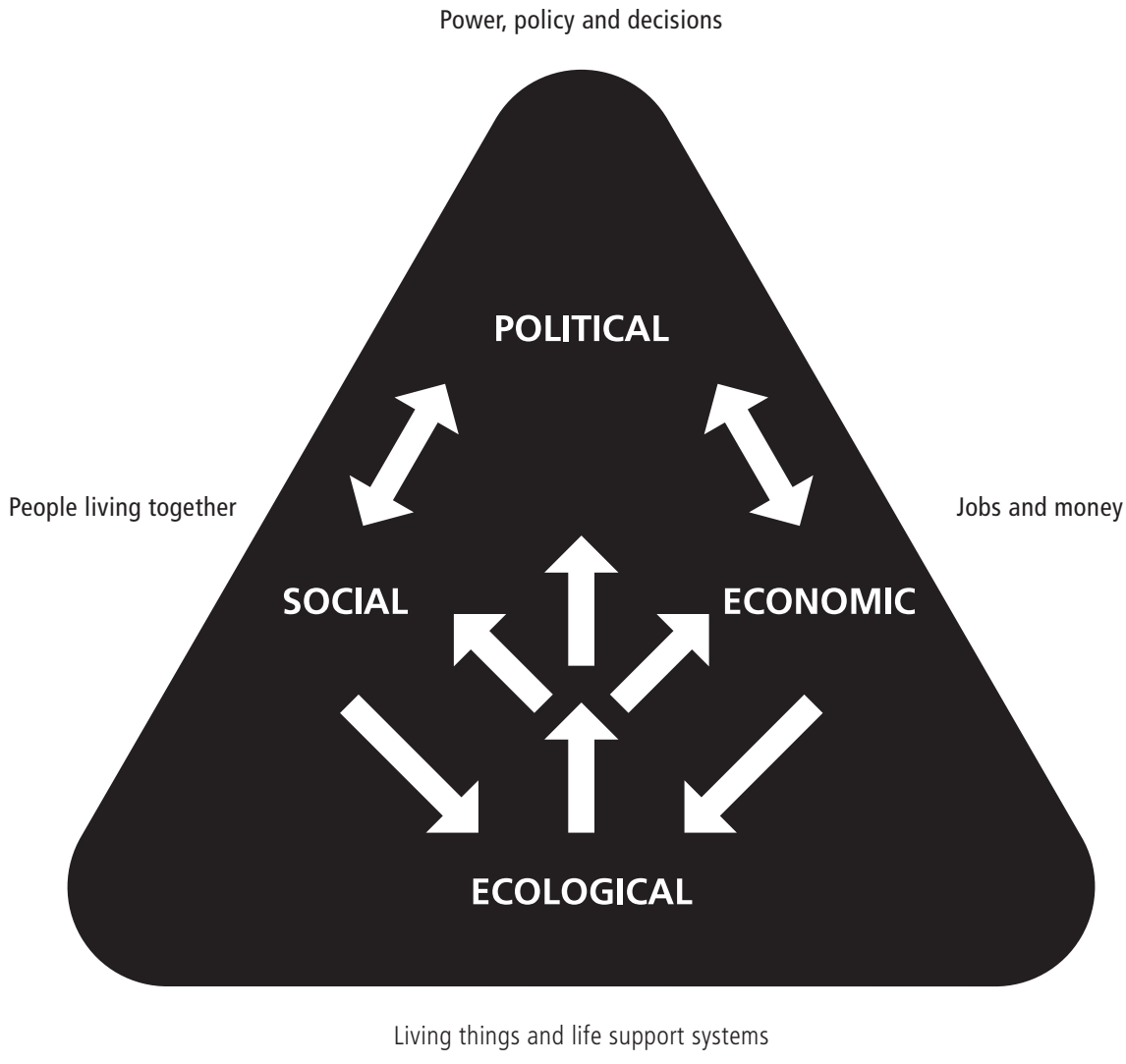
Learning Activity 2: Another past, another present

- The sea route between Europe and Asia was developed because the Turks blocked the traditional overland trade route. Imagine that the overland route had remained open, and that the Dutch East India Company (DEIC) had not had a reason to colonise the Cape in the 17th and 18th centuries.
- Which people would not have settled in Cape Town if the DEIC had not established a colony here? Which parts of Cape Town's culture would not have developed? What type of economic system do you think would have developed? Would the original people have survived and prospered, or would another nation have colonised the region?
- In your groups, think about the following question and imagine an alternative history for this region: **What might the place we now call Cape Town have looked like today if the Dutch had not colonised the Cape in the 17th Century?**
- Share responsibility for brainstorming, researching and preparing an illustrated talk. Think about the different aspects of our environment shown in the model below.
- You may use posters, chalkboard, flip chart or PowerPoint to present your ideas.

Assessment tasks and tools

- The educator assesses presentations in terms of learners' understanding of cause and effect.

Our environment consists of interacting natural and social systems



O'Donoghue, R and Janse van Rensburg, E. 1995. **Environments and Methods**. Share-Net, Howick

Whether an event happened earlier today or three hundred years ago, two people recounting the same event will tell their stories differently. Our personalities, lifestyles, backgrounds and life experiences shape our points of view. It is not surprising, therefore, that people from as diverse backgrounds as South Africans will interpret history differently. In this activity, learners will have a chance to rewrite an aspect of Cape Town's history from two very different points of view.

SOCIAL SCIENCES (HISTORY) Grade 8

Learning Outcome 3:

Historical Interpretation

The learner will be able to interpret aspects of history.

Assessment Standards

- Identifies and gives reasons for the different ways that the past is represented and interpreted [source interpretation].
- Explains why history is not objective or neutral.
- Recognises that a sense of identity may influence the way events in the past are interpreted [influence on interpretation].
- Explains the importance of conserving our natural and cultural heritage [representation of the past].
- Explains how and why people's memories of the past might differ [representation of the past].

Core Knowledge and Concepts

- The experience of colonialism in the nineteenth century

Learning Activity 1: Letters from the past

- In the section Permanent settlement and expansion in Module 3: A brief human history read the sections A British Colony and Cape Town expands. Select **one** of these two sections to write about.
- You will write a personal letter from each of two different people, about the same event mentioned in your chosen section:
  - If you choose the section A British Colony, write a letter from one freed slave to another, and from a German missionary to the Moravian Missionary Society in Germany.
  - If you choose the section Cape Town expands, write a letter from a migrant labourer to his family in the Transkei, and a British engineer employed by the Colonial Service to his brother in England.
- Get into small groups of four or five learners and share your letters with one another.

Assessment tasks and tools

- Two letters showing different interpretations of the same historical event.

Learning Activity 2: Subjective memories

- Answer the questions about historical interpretation in the worksheet provided.
- Discuss whether or not heritage conservation is necessary.

Assessment tasks and tools

- Completed worksheet on historical interpretation.

Why people interpret history differently

Name _____

1 Which section of text did you choose?

A British Colony ☐ Cape Town expands ☐

2 Record the names of your two letter writers (historical sources) and briefly describe their lifestyles and attitudes:

_____ : _____

_____

_____

_____ : _____

_____

_____

3 Briefly explain why the two letter writers represented the same event differently:

_____

_____

_____

4 Do you think history is neutral and objective? Explain your answer.

Yes ☐ No ☐

_____

_____

5 What factors influence **your** memories of people, places and events?

_____

_____

_____

6 What do you think about the following statement? **History is in the past! We should forget it and focus on the future. It's a waste of time and money to conserve natural and cultural resources such as nature reserves, old buildings, historical objects, pictures and documents.**

_____

_____

_____

Record you own thoughts and then discuss this statement with others in class.

Do you know when your family (or your parents' families) first came to Cape Town? Where did your ancestors come from? Were they first peoples (San), or did they come from other parts of South Africa or the African continent? Do you have European or Asian roots, or did your ancestors arrive from the Americas, Madagascar or Australia? In this activity, learners will do historical research on their own families, using sources of evidence available to them. This lesson could relate to any section of the History curriculum that deals with people living or settling at the Cape.

SOCIAL SCIENCES (HISTORY) Grade 7 and 8

Learning Outcome 1:

Historical Enquiry

The learner will be able to use enquiry skills to investigate the past and present.

Assessment Standards

- Identifies and selects a variety of historical sources relevant to an enquiry [finds sources].
- Compiles and organises information from a number of sources to obtain evidence about aspects of the past [works with sources].
- Evaluates the sources used [works with sources].
- Uses the information from sources to present well-thought-out answers to questions [answers the question].
- Communicates knowledge and understanding by constructing own interpretation and argument based on the historical sources; uses information technology where available and appropriate [communicates the answer].

Learning Outcome 2:

Historical Knowledge and Understanding

The learner will be able to demonstrate historical knowledge and understanding.

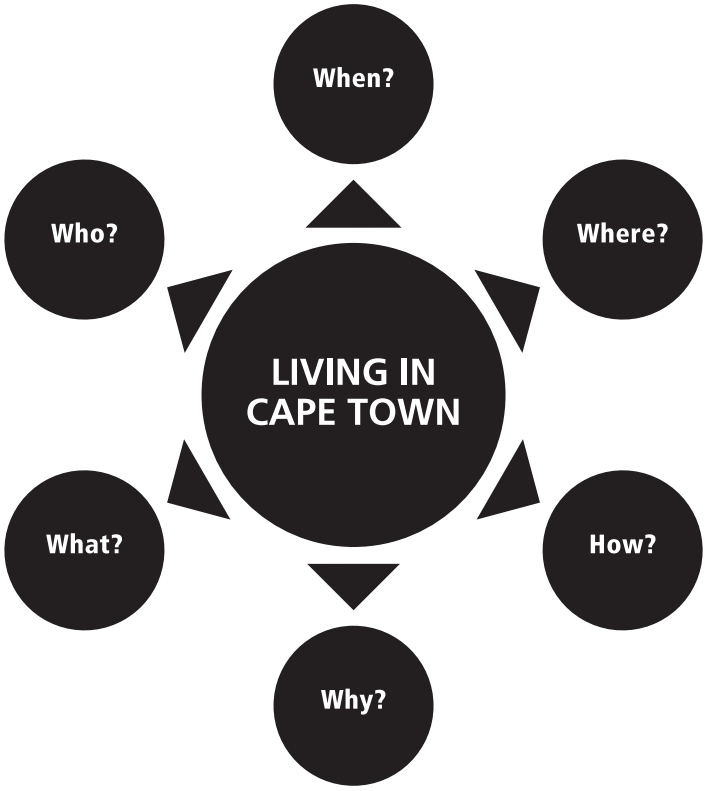
- Describes and makes links between reasons for and results of key events and changes [cause and effect].
- Explains changes in a wider historical and environmental context (change and continuity).

Learning Activity 1: Where is the evidence?

- In class, share a few interesting stories about your ancestors or older relatives.
- Discuss what types of evidence of family history you have in your home (e.g. oral traditions, anecdotal stories, old photographs, family trees, official documents, letters, memoirs, etc.).
- You will do research to find out how you came to be living in Cape Town. Discuss what aspects of family history you will research (e.g. find out when your family first settled in Cape Town and why they came here.
  What factors (natural resources, social, political, economic) made them settle here or leave their previous home?
- Draw up a list of questions to guide your research.
  You could use the mind-map (below) to help you generate questions in class. Otherwise, use the worksheet provided.
- For homework, draw up a list of sources of evidence available to you. Indicate which source(s) of evidence you will use and why.

Assessment tasks and tools

- Educator checks learners' research questions and gives feedback.
- Educator assesses the list of sources of evidence chosen to make sure that they are appropriate, reliable and sufficient.



Learning Activity 2: Sharing our family's story

- Where possible, find answers to the research questions you compiled (or complete the worksheet).
- Use this information to develop a written or verbal presentation on how your family came to be living in Cape Town.
- Show in your presentation that you understand the circumstances that brought your family to Cape Town (e.g. political, economic, social or environmental factors at particular stages in history).
- If possible, use computer technology to develop your presentation (e.g. type your report; prepare a PowerPoint presentation or a website).
- Draw up a list of sources used and indicate, on a scale of 1 to 5, how you would rate the reliability of the different sources (**1** unreliable; **5** very reliable).

Assessment tasks and tools

- Written notes based on the questions developed by the learners.

  OR

- Completed worksheet.

- List of sources rated in terms of reliability.

Learning Activity 3: Mapping our origins

- Give your presentations, either to the whole class or in small groups.
- Mark on a map of the world all the places of origin mentioned by the class.
- As a class, summarise the reasons why people left their previous homes, and the reasons why they settled in Cape Town. Which historical events and processes had the greatest influence on the families represented in your class?
- Discuss how Cape Town has changed over the years, according to your families.
- As part of the class discussion, reflect on the variety of sources used by the class. Discuss which were most / least reliable. What can you do to improve the reliability of your sources?

Assessment tasks and tools

- Educator and/or peers assess presentations using a rubric.

- Gauge general understanding from class discussion.

How we came to live in Cape Town

Names _____

1 **When did your parents' or guardians' family (-ies) first settle in Cape Town?**

Mother / Female guardian's family: _____

Father / Male guardian's family: _____

2 **Where did they come from?**

Mother / Female guardian's family: _____

Father / Male guardian's family: _____

3 **Why did they leave their previous home?**
(e.g. by choice or by force; political, social, economic or environmental reasons)

Mother / Female guardian's family: _____

_____

_____

Father / Male guardian's family: _____

_____

_____

4 **Why did they come to Cape Town?**

Mother / Female guardian's family: _____

_____

_____

Father / Male guardian's family: _____

_____

_____

5 **Do you think the natural resources of Cape Town influenced your family's decisions to settle here?**

Explain _____

_____

6 **How has Cape Town changed since your family arrived?**

_____

_____

7 **List the sources you used to develop the presentation about your family.**

_____

_____

_____

Assessment Rubric

Name _____

Assessor(s) _____

Criteria	1	2	3	4
The presenter used a variety of relevant sources of evidence				
The presenter was able to distinguish between reliable and unreliable sources of evidence				
The presenter used evidence to answer questions (e.g. who, where, when, why) regarding his/her family convincingly				
The presenter related his/her family's movements to relevant historical events or processes (e.g. political, social, economic, environmental)				
The presenter used available technology effectively during the presentation (e.g. chalk board, posters, PowerPoint)				
Overall symbol				

1 unsatisfactory, 2 satisfactory, 3 good, 4 excellent

General comments

Racial policies of South African governments during the twentieth century, such as various Group Areas Acts and Influx Control, had a significant impact on how the City of Cape Town developed. In this activity, you will read an account of the development of the City of Cape Town and draw up a time line that summarises significant events and policies that impacted on development in the City. You will discuss how these developments set the scene for current environmental and social problems in the City, and consider whether or not political change has improved social and environmental conditions in the lowlands.

SOCIAL SCIENCES (HISTORY) Grade 9

Learning Outcome 2:

Historical Knowledge and Understanding

The learner will be able to demonstrate historical knowledge and understanding.

Assessment Standards

- Places events, people and changes in the periods of history studied within a chronological framework.
- Identifies categories of causes and effects (immediate and long term, direct and indirect).
- Explains and analyses the reasons for and results of events in history.
- Recognises that change and development does not always mean progress.

Core Knowledge and Concepts

- Apartheid in South Africa

Learning Activity 1: A Cape Town time line

- In Module 3: A brief human history read the sections Urbanisation and Apartheid and Post-Apartheid developments and challenges. As you read, look for dates and events that had an impact on population growth, the movement and settlement of people, and urban development in the City.
- Look at the maps showing stages of urban development in Cape Town to see when different areas developed.
- Complete the Computer-based Activity on building a time line in Module 3.
- Draw up your own time line, either in your notebook or on the computer, showing significant dates and events in the development of Cape Town. Use the Computer-based Activity as a guideline, but add other relevant dates and events. Consult other sources of historical information if necessary (e.g. www.sahistory.org.za),
- Write notes on how these events or policies affected the development of Cape Town.

Assessment tasks and tools

- Time line showing significant dates, events and developments.

Here is an example of a few segments of a time line. You can copy and expand this if you wish

Date	Event / Policy	Effect on development in Cape Town
1902	Location Act	Black people in urban areas were restricted to living in townships
1926	Langa township developed	Township development expanded beyond Ndabeni
1994	First democratic elections	The Apartheid era was officially ended

Learning Activity 2: Social and environmental impacts

- In small groups, share your time lines and discuss:
  - Why previous South African governments introduced policies that determined where certain people could and could not live and work;
  - Any positive effects the policies and events listed in your time lines have had on people and the environment in Cape Town;
    Any negative impacts these policies and events have had on people and the environment in Cape Town;
  - Whether or not social and environmental conditions have improved in Cape Town since 1994.
- In your group, write point-form notes (by hand or on the computer) summarising the positive and negative impacts of the policies and events you discussed on the people and environment of Cape Town. Share your ideas with another group or your educator.
- Individually, write or type a paragraph in which you express and justify your personal opinion as to whether political changes in South Africa since 1994 have improved the lives of people and the quality of the environment in Cape Town.

Assessment tasks and tools

- Written notes based on the Group list summarising positive and negative impacts of policies and events on people and the environment.

- Individual paragraph on the impact of political changes on social and environmental quality. Opinion must be backed up by evidence.

Most print and electronic media have journalists who specialise in reporting on environmental stories. In this activity, learners will read and analyse a variety of print media articles on a range of environmental topics and issues. They will then work together as a class to write local stories for an environmental newsletter.

HOME LANGUAGE Grade 7-9

Learning Outcome 3:

Reading and Viewing

The learner will be able to read and view for information and enjoyment, and respond critically to the aesthetic, cultural and emotional values in texts.

Assessment Standards

- Discuss the purpose, audience and context of a text.
- Show understanding of information text.
- Explains how key features and the organisation of different types of texts contribute to the way in which the text functions.
- Analyses techniques used to create particular effects in visual texts (e.g. language used, design).
- Respond critically to texts.
- Discuss socio-cultural, environmental and ethical issues contained in texts.

Learning Outcome 4:

Writing

The learner will be able to write different kinds of factual and imaginative texts for a wide range of purposes.

Assessment Standards

- Produces a range of factual written and multimodal texts for various purposes.
- Uses the writing process collaboratively and independently to generate texts.

Learning Activity 1: Reviewing environmental texts

- Collect a wide range of texts from various print media that cover a range of environmental topics and issues. Sources may include community and regional newspapers, tourist brochures, travel magazines, nature magazines, newsletters of environmental organisations, The Enviropaedia, etc. Issues may relate to the natural, built and social environments.
- Hand out different newspapers, magazines, newsletters or single articles to pairs of learners. Select and read an article, complete a questionnaire and write a brief, point-form summary of the main points.
- Discuss the articles read, the issues they covered, and what techniques the authors and designers used in the various texts. Draw up a class summary of these techniques.

Assessment tasks and tools

- Complete the worksheet and summary.
- Draw up a class summary of writing and design techniques.

Understanding environmental texts

Name _____

Article reference _____

1 Write one sentence that summarises what the article is about

_____

2 Write a point-form summary of the main points made in the article (maximum 10 points)

_____

_____

_____

_____

_____

_____

_____

_____

3 Who do you think this article was written for (audience)? _____

_____

4 What do you think the author thinks / feels about this environmental topic or issue? _____

_____

5 What do you think the author wanted to achieve by writing this article? _____

_____

6 Identify techniques the author / illustrator / designer used to achieve their aims (e.g. how did s/he or they use language, structure, images, design?) _____

_____

_____

7 Did the article have an impact on you? If so, please explain what you learned / how it made you feel / what you decided to do as a result of reading it _____

_____

_____

Any other comments _____

_____

Learning Activity 2: Producing an environmental story

- Contact organisations like C.A.P.E., the Botanical Society, WESSA and Friends Groups for copies of environmental newsletters.
  Many of these are available electronically as well as in hard copy.
- Combine pairs of learners into groups of four. Each group takes one newsletter to analyse. In class, draw up a list of components of environmental newsletters (e.g. title, contact details, editorial, articles, personality profiles, advertisements, etc).
- Conduct a brainstorm in the class and list environmental projects, issues and personalities in the school and community.
- Each small group of "environmental reporters" identifies one story they would like to report on in the newsletter. Spend two weeks, including time in class, on the following tasks:
  - Research the story (e.g. read up about the topic, carry out investigations and interviews, take photographs);
  - Draft the story (write or type);
  - Review and comment on another group's story;
  - Edit and finalise the story and produce it as a one-page typed document (including a title, text, photos and captions).

Assessment tasks and tools

- Learners draw up a class list of components of environmental newsletters.
- Learners review and give feedback on draft stories written by peers using assessment checklist.
- Educator assesses final stories produced by "teams" of reporters.

Peer Assessment Checklist

Article Title _____

Group members _____

_____

Did this group	☺	😐	☹	**Comments**
… write logically and clearly?				
… use correct spelling and grammar?				
… use appropriate language and style?				
… avoid bias?				
… present a convincing argument?				

Comments

_____

_____

_____

_____

_____

Please write comments on the draft of your peers' work in pencil, to show them which parts of their story you like and where you think they could improve their story or writing style.

Educator Assessment Rubric

Article Title _____

Group members _____

_____

Aspect	1	2	3	4	Comments
Well researched and factually correct					
Convincing argument					
Well structured					
Correct spelling and grammar					
Appropriate language and style					
Argument is stated fairly					

Comments

_____

_____

_____

_____

Taking it further …

Work with the Information and Communications Technology (ICT) teacher to design a newsletter that uses a selection of the stories written by the learners. Each learner or group of learners should select a few articles, decide on a name for their newsletter and decide on other aspects to include, e.g. contact details, contents, advertisements. Use a programme like MS Publisher or equivalent to lay out the articles and images.

Did you know?

Young Reporters for the Environment is the name of an international programme coordinated by the organisation called the Foundation for Environmental Education (FEE). FEE also runs the **Eco-Schools** programme and **Blue Flag Beaches**, which operate in South Africa.

We rely on nature for everything from food and clean water to building materials, fuel, clothing and medicine. Many people also enjoy observing and learning about nature, as well as the recreational opportunities nature provides. Urban development often destroys natural areas and the plants and animals that live there. Should we allow the last remaining natural areas in our city to be destroyed? Do people who value these areas have a right to insist that they are protected and wisely managed? This role-play explores some of the reasons why people value nature and want to conserve it.

HOME LANGUAGE Grade 7 and 8

Learning Outcome 3:

Speaking

The learner will be able to communicate confidently and effectively in spoken language in a wide range of situations.

Assessment Standards

- Communicates ideas and feelings expressively with confidence, using selected oral text types.
- Communicates ideas, facts and opinions clearly and with some accuracy and coherence, using a range of factual oral text types.
- Demonstrates basic interaction skills by participating actively in group discussions and debates.

Learning Outcome 4:

Thinking and Reasoning

The learner will be able to use language to think and reason, as well as to access, process and use information for learning.

Assessment Standard

- Uses language to think and reason.
- Explains cause and effect.
- Weighs options by deciding which of two alternatives is the better choice.
- Expresses and develops a clear personal viewpoint.
- Supports an argument with various kinds of evidence.

Learning Activity 1: Values of nature

- In pairs, look at the poster picture of the natural environment in Cape Town on the e-Kapa website (Module 1: Nature on your doorstep). Discuss the following statement with your partner: **"Nature has no right to survive in our City".** Do you agree or disagree? Why?
- Share your opinions during a guided class discussion.
- Draw up a list of reasons for and against the statement.

Assessment tasks and tools

- Compile a class list of reasons why people do and do not value nature.
- The educator uses this opportunity to gauge learners' reasoning and communication skills.

Learning Activity 2: My role, my opinion

- Consider the issue of the development of the shopping centre (see Role-play Situation box). This development will destroy a natural area similar to the one on the poster picture you looked at in Activity 1.
- Each pair of learners researches one of the roles on the Role-Play cards. Each card describes one of the community members who will speak about the value of nature at the awareness day.
- Read about your character (on a card or on the screen) and imagine why nature is special to him or her. How will the development of the shopping centre affect your character?
- Read the e-Kapa module referred to on the card to find more information on why each character values nature.
- Discuss and write down at least three arguments each character could use to try to convince the community to conserve nature rather than build a shopping centre.
- Meet with all other learners who researched the same character as you and share what you discussed in pairs. Develop a reasoned argument for conserving this natural area that their character could present at the awareness day.
- Select one person from each group to present these arguments in the role play.

Assessment tasks and tools

- Each pair writes up and hands in the list of reasons for conserving nature that they came up with.

Role-Play Situation
Citizens speak up for nature

A developer is planning to build a shopping centre on the last remaining patch of natural veld in your community. Many members of the community want the development to go ahead because it will centralise shopping and make it more convenient. It may create jobs and they think it will upgrade the suburb and raise the value of their properties.

However, some people are concerned because they appreciate the value of this natural area and don't want to see it destroyed. They decide to organise an Awareness Day and ask five members of the community to explain the value of the area to others.

Copy and cut out the role cards below, and give one to each pair of learners …

Role Card 1: **ELDERLY PERSON WHO KNOWS AND USES PLANTS**

You are an elderly person from the community who knows the uses of many indigenous plants that grow in the area. You collect some for food and others for medicine, and remember how your uncle used to make a living from repairing thatched roofs with local reeds. You believe that nature is an important part of your culture. You are afraid that people will lose a lot of their indigenous knowledge when the last natural area in your neighbourhood is destroyed. You want your grandchildren and their friends to know about the plants you grew up with and what they are used for, and to feel proud about the knowledge of their ancestors.

For more information, go to:

Module 7: Nature and culture

Role Card 2: **CHAIRPERSON OF THE LOCAL NATURALIST SOCIETY**

You are a keen nature lover who runs the local naturalists' society. You organise outings to the area to show children and adults from the community and other parts of Cape Town some of the plants and animals that live here.
Even though the Table Mountain National Park conserves a very large area of nature in the City, some plants and animals live only in the lowlands and not on the mountain. As natural areas in the lowlands are developed, it becomes more and more difficult for these species to survive. You have identified two rare and endangered plants on the site which are not found anywhere else. If this site is developed, these species will be extinct in the wild. You are also concerned that, if this piece of veld is destroyed, it will also make it more difficult for even the common plants and animals to survive, as this is the last piece of natural habitat in your area.

For more information, go to:

Module 9: Local ecology

Module 5: Rare, threatened and extinct

Role Card 3: **LOCAL SCIENCE TEACHER**

You are a science teacher from a local school. The natural area is within walking distance of the school and you take all your classes on field trips to this area. The learners have been keeping records of the plants and animals that live in the area. They also regularly conduct clean-up campaigns and have worked with the local council to build and maintain paths through the area. Since the school "adopted" this natural area, it frequently wins environmental competitions. It recently became an Eco-School and now flies its green flag with pride.

For more information, go to:

Module 8: Adapting to the environment

Educators' Guide: Environmental education in the Curriculum

Role Card 4: LOCAL RESIDENT WHO LOVES THE OUTDOORS

You are a parent who lives close to the natural area. You grew up on a farm and love the outdoors. When you came to live in the City, you were very happy to find a natural area near your home where you can walk after work with your family and two dogs. You enjoy keeping fit but prefer walking to going to the gym. Your children also enjoy nature and you prefer that they spend time exploring nature and observing the flowers, butterflies and birds, than watching the television and playing computer games. Your whole family loves this peaceful place where they can explore and exercise.

For more information, go to:

Module 1: Nature on your doorstep

Role Card 5: RESEARCHER FROM A LOCAL UNIVERSITY

You are a natural sciences lecturer at a local university. You are studying the effect of "fragmentation" of nature. Fragmentation happens when nature is destroyed by agricultural or urban development, leaving only small, isolated patches of natural habitat. It is difficult for plants and animals to survive in these small and isolated patches. You believe that it is important to protect small patches of nature in the city as they act as "stepping stones" between larger natural areas (like nature reserves). Animals such as birds and insects can use these "stepping stones" to move between natural areas for breeding, feeding, pollination and seed dispersal. Your research shows that this particular area is an essential "stepping stone" in the city's nature network, and is needed to ensure the survival of certain rare plants and animals.

For more information, go to:

Module 4: Urban nature under pressure

Learning Activity 3: Awareness Day role-play

- Organise an Awareness Day role-play.
- The teacher or a learner acts as the Coordinator, and tells the class (community members) that some residents are concerned about the impact that the proposed development of the shopping centre will have on nature.
- Introduce each of the five representatives in turn and give them a chance to present their group's arguments for conservation of the natural area rather than development of the shopping centre.
- Use the checklist to guide your listening; write comments on the presentations by the five groups.
- Discuss which arguments were the most logical and convincing, and why. Do you think your arguments would convince the rest of the community to oppose this development?
- As a class, draw up a list of characteristics of sound, convincing arguments.

Assessment tasks and tools

- Educator and learners complete a checklist and comment on the quality of arguments. Discuss feedback in class.
- Educator uses class feedback to assign a group assessment.
- Educator reflects and comments on the class list of characteristics of sound arguments.
- Learners record useful guidelines based on this activity.

Peer Assessment Checklist

Character _____

Group members _____

_____

Did the group explain clearly	☺	😐	☹	Comments
… why they personally value this natural area?				
… how development will affect nature?				
… why they think conservation is a wiser choice than development in this case?				

Did the group base their argument mainly on				Comments
Evidence		Emotion		
Personal interest		Community interest		
Short term interests		Long term interests		

Did this group's argument convince you that the natural area should be conserved?

Yes ☐ No ☐

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Taking it further …

Instead of designing this activity as an Awareness Day role-play, you could turn it into a debate. Develop role cards for members of the community who support the development of the shopping centre, and let both groups present their arguments for and against the development. Encourage the learners to look for a "win-win" solution that satisfies the needs for both conservation and development.

Stories do not have to be written using words … they can be painted using pictures. When we read stories and poetry, we try to understand and interpret the words of the author or poet. Photographs, paintings and films are different forms of "visual text" that artists, photographers and film makers use to tell stories, express feelings and influence others. In this activity, we will interpret photographs of our environment by looking at them from different perspectives.

HOME LANGUAGE Grade 8 and 9

Learning Outcome 3:

Reading and Viewing

The learner will be able to read and view for information and enjoyment, and respond critically to the aesthetic, cultural and emotional values in texts.

Assessment Standards

- Discuss the purpose, audience and context of a text.
- Show understanding of information text.
- Analyses techniques used to create particular effects in visual texts (e.g. design, camera techniques).
- Respond critically to texts.
- Discuss socio-cultural, environmental and ethical issues contained in texts.

This learning activity is based on an activity published in:
Du Toit, D & T Sguazzin. 1999.

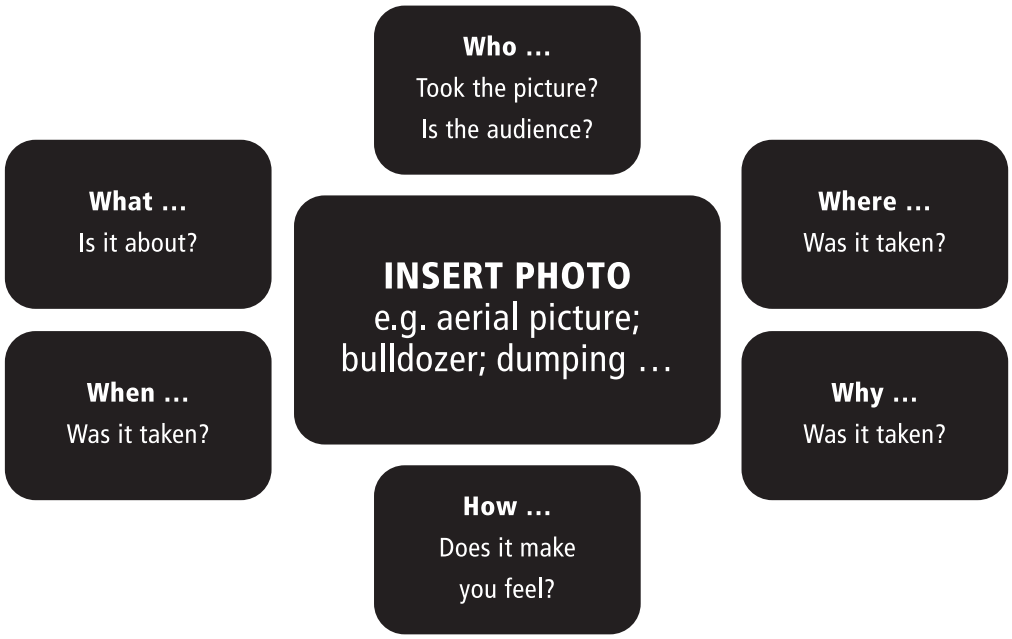
Camera and context: Using camera to explore environment and curriculum development.
Johannesburg. Learning for Sustainability Project.

Learning Activity 1: Five Ws and an H

- Select photographs representing various aspects of the lowlands of the City of Cape Town (e.g. species, landscapes, people, development, issues).
- Divide into groups of four. Each group chooses a photograph to analyse.
- Brainstorm answers to the questions in the mind map below.
- Record your answers to Questions 1 and 2 on your worksheet.

Assessment tasks and tools

- Complete Questions 1 and 2 on your worksheet.



Learning Activity 2: Making an impact

- Discuss whether or not the photograph made an impact on you.
- What techniques do you think the photographer used to attract your attention and get a message across?
- How could the photographer have increased the impact of the picture?

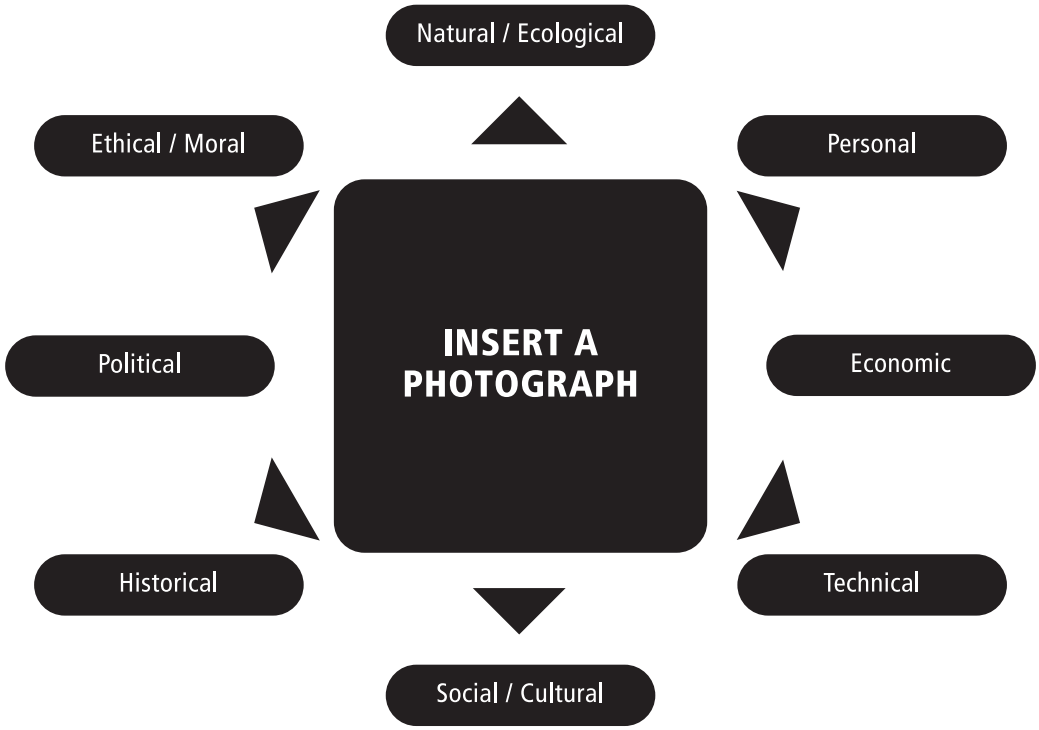
Assessment tasks and tools

- Complete Question 3 on your worksheet.
- Complete Questions 4 and 5 on your worksheet.

Learning Activity 3: Many different points of view

- You can analyse a picture or story from many different points of view or perspectives. Some of these are shown in the second mind map (below).
- Form four discussion groups to discuss a photograph chosen by the class.
- In each discussion group, analyse the photograph from one or two different perspectives. Ensure that the groups cover different points of view.
- Make notes of your group's discussions.
- Select one person to present the group's ideas to the class.
- Record your answers to Questions 4 and 5 on the worksheet provided.

Points of view from which to analyse a photograph



Taking it further …

Now that you have analysed a photograph taken by someone else, get hold of a camera and start taking your own photographs of your environment. Analyse your photographs and think about what messages you are trying to convey and how **your** perspectives influence the photographs you take.

Analysing photographs

Name _____

Group members _____

Description of photograph _____

1 Why do you think the photographer took this photograph? _____

2 How does the photograph make you feel? _____

3 What techniques did the photographer use to create visual / emotional impact? _____

4 What does the photograph tell you about

- People living together (our society and culture) _____
- People and nature (our environment and ecology) _____
- People and money (our economy) _____
- People and power (our political system) _____

5 Has this activity challenged any of your points of view?

Explain _____

Analysing photographs

1 **Why do you think the photographer took this photograph?**
It is unlikely that you will know who took the photograph or why it was taken, but this exercise requires the learners to analyse images in order to identify what they think the photographer is trying to say through this visual medium.

2 **How does the photograph make you feel?**
If learners find it hard to put their feelings into words, try giving them a sheet of expressive faces labelled with a range of emotions (e.g. angry, indignant, dismayed, peaceful, overjoyed, etc) to give them some ideas.
Encourage learners to describe as well as identify their feelings.

3 **What techniques did the photographer use to create visual / emotional impact?**
The choice of subject, design (e.g. colour, proximity, contrast, composition) and camera techniques (e.g. wide angle, close-up, camera angle) all contribute to the overall impact of the image.

4 **What does the photograph tell you about:**

- People living together (our society and culture):
  Does the picture celebrate or critique some aspect of society or culture?
  Does it draw attention to social issues (e.g. health, shelter, education, safety)?
  Does it present a hopeful or negative picture?

- People and nature (our environment and ecology):
  Does the picture represent a healthy, sustainable environment, or not? Is the relationship between people and nature one of respect or neglect, conservation or exploitation? How do you think the environment impacts on the people?

- People and money (our economy):
  Does the photograph reflect a fair, just and sustainable economic system?
  Are people's needs being met or is there evidence of poverty, unemployment, greed or wasteful consumption?

- People and power (our political system):
  Does the picture indicate that powerful people are making wise decisions, or that the decision-makers are failing in their duty to provide citizens with a safe, healthy, fair society / environment?

5 **Has this activity challenged any of your points of view?**
Explain:
Different learners may interpret the picture(s) differently, as a result of their particular life experiences or the viewpoint from which they chose to analyse the picture.
Sharing these different perspectives may challenge the preconceptions of members of the group.
The sharing of perspectives should be sensitively and respectfully managed in order to acknowledge the diversity of opinions in the group.
However, it is also important to note that some points of view represent socially just and ecologically sustainable choices, while others may contribute to social and ecological problems.

Learning Areas, Learning Outcomes and Assessment Standards

South Africa's Biomes

No.	Title	CB / CS	LA	LO and AS	Notes
B1	Biome Summary Table	CS	SS (GEOG)	LO 1 7.1.1; 8.1.1; 9.1.1 7.1.2; 8.1.2; 9.1.4	Save or print out table; use to summarise information in the Home Page plus contributions from class
			NS	LO 2 7.2.2; 8.2.2	
B2	Analysing South Africa's Biomes	CS	NS	LO 2 7.2.3; 8.2.3	Draw a bar graph and pie chart showing the relative area of SA's biomes; convert % area to area in km^2 and represent in a table.
			MATHS	LO5 7.5.7; 8.5.7; 9.5.7 LO1 7.1.7	

Module 1: Nature on your doorstep

No.	Title	CB / CS	LA	LO and AS	Notes
1.1	(a) Biodiversity Word Puzzle	CS	NS	LO2 7.2.1; 8.2.1; 9.2.1	Print out puzzle; complete using interactive poster; Answer in Educators' Guide
			LANG (HOME)	LO5 7.5.3; 8.5.3; 9.5.3	
	(b) What does this word mean?	CS	LANG (HOME)	LO6 7.6.1; 8.6.1; 9.6.1	Work out own definition of "Biodiversity"; Answer in Educators' Guide
1.2	Languages of Science	CB	LANG (HOME)	LO6 7.6.1; 8.6.1; 9.6.1	Activity based on the interactive poster; Computer checks and corrects answers.
1.3	True or False?	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4 LO5 7.5.1; 8.5.1; 9.5.1 7.5.3; 8.5.3; 9.5.3	Comprehension test based on Module 1; Computer checks and corrects answers.
1.4	Odd one Out	CB	NS LO2	LO2 7.2.2; 8.2.2; 9.2.2	Comprehension test based on Module 1; Computer checks and corrects answers.
			LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4 LO5 7.5.1; 8.5.1; 9.5.1 7.5.3; 8.5.3; 9.5.3	

Module 2: Four lowland ecosystems

No.	Title	CB / CS	LA	LO and AS	Notes
2.1	Build a habitat	CB	SS (GEOG)	LO 1 7.1.7; 8.1.7; 9.1.7	Group pictures representing soil, vegetation and animals into appropriate habitats.
2.2	Habitats near our homes	CB	SS (GEOG)	LO 1 7.1.2; 8.1.2; 9.1.4	Use the maps of habitats and suburbs to find out what vegetation originally grew in which areas.
2.3	What grows where	CB	NS	LO2 7.2.2; 8.2.2; 9.2.2	Use the maps of soil and vegetation types to answer questions.
2.4	Habitat word-finder	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4	Complete a summary on Cape Town's lowland ecosystems by selecting the correct word from pairs of options.

Module 3: A brief human history

No.	Title	CB / CS	LA	LO and AS	Notes
3.1	The nature of place names	CB	LANG (HOME)	LO6 7.6.1; 8.6.1; 9.6.1	Find out which plants and animals suburbs and landmarks in Cape Town are named after.
3.2	Build a time line	CB	SS (HIST)	LO2 7.2.1; 8.2.1; 9.2.1	Build a time line of factors that affected the environment of Cape Town in the 20th century.
3.3	Drawing graphs	CB	SS (GEOG)	LO3 7.3.1; 8.3.1; 9.3.1	Use a spreadsheet programme to draw graphs of urban populations and development issues in Cape Town.
			MATHS	LO5 7.5.7; 8.5.7; 9.5.7 7.5.8; 8.5.8; 9.5.8	
3.4	Matching pairs	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4	Test your knowledge of political and environmental regulations.
3.5	True or False	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4 LO5 7.5.1; 8.5.1; 9.5.1 7.5.3; 8.5.3; 9.5.3	Test your knowledge of Cape Town's history with this True / False quiz.

Module 4: Urban nature under pressure

No.	Title	CB / CS	LA	LO and AS	Notes
4.1	Understanding fragmentation	CB	NS	LO2 7.2.1; 8.2.1; 9.2.1	Match types of environmental challenges facing nature in the city to examples.
4.2	Meet the Aliens	CB	NS LO2	LO2 7.2.2; 8.2.2; 9.2.2	Complete a table summarising some invasive alien plants in Cape Town.
4.3	Living in a healthy environment	CS	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4	Test your knowledge of environmental issues by completing this word puzzle

Module 5: Rare, threatened and extinct

No.	Title	CB / CS	LA	LO and AS	Notes
5.1	Conservation definitions	CB	NS	LO2 7.2.1; 8.2.1; 9.2.1	Match terms relating to threatened species to their definitions
5.2	Search and define (HOME)	CB / CS	LANG	LO6 7.6.1; 8.6.1; 9.6.1	Use the computer search functions to find a number of definitions for the term "endemic"; write your own definition.
5.3	A threatened plant summary	CB	NS	LO2 7.2.2; 8.2.2; 9.2.2	Complete a summary table of five threatened plants of Cape Town's lowlands
5.4	True or False?	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4 LO5 7.5.1; 8.5.1; 9.5.1 7.5.3; 8.5.3; 9.5.3	Test your knowledge about threatened animals by completing this quiz.

Module 6: Conserving nature in the City

No.	Title	CB / CS	LA	LO and AS	Notes
6.1	Conservation Challenge	CB	LO	LO1 7.1.2; 8.1.5; 9.1.5	Find out how conservation friendly your home or school garden is by completing this quiz.
6.2	Find out about the biodiversity network	CS	SS (GEOG)	LO1 7.1.1; 8.1.1; 9.1.1 7.1.6; 8.1.6; 9.1.6 7.1.7; 8.1.7; 9.1.7	Do research into the biodiversity network using information on the website.
6.3	Get to know the City's nature reserves:				
	(a) Smallest to largest	CB	SS (GEOG)	7.1.2; 8.1.2; 9.1.3	List reserves from smallest to largest in a table.
	(b) Name the nature reserves	CB	SS (GEOG)	7.1.2; 8.1.2; 9.1.3	Label a map of Cape Town's nature reserves.
	(c) Who's in charge?	CB	LANG	LO3 (HOME) 7.3.4; 8.3.4; 9.3.4	Identify the organisations responsible for Cape Town's nature reserves.
	(d) True or False?	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4 LO5 7.5.1; 8.5.1; 9.5.1 7.5.3; 8.5.3; 9.5.3	Complete a True or False quiz on the ecosystems in the nature reserves.
	(e) Nature Reserve Crossword	CS	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4 LO5 7.5.1; 8.5.1; 9.5.1 7.5.3; 8.5.3; 9.5.3	Test your knowledge of the nature reserves by completing this crossword.
	(f) Who am I?	CB	NS	LO2 7.2.2; 8.2.2; 9.2.2	Test your knowledge about animals by completing the summary table.
6.4	Who can help?	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4	Complete a table of information on environmental organisations in Cape Town.
6.5	Survivor Planet Earth	CS	LO SS (GEOG)	LO1 7.1.2; 8.1.5; 9.1.5 7.3.4; 8.3.5; 9.3.5	Do research on how to live more sustainably in the City of Cape Town – present your findings as a role-play.

Module 7: Nature and Culture

No.	Title	CB / CS	LA	LO and AS	Notes
7.1	Food: Yesterday and Today	CB	TECHNOLOGY	LO3 7.3.1; 8.3.1; 9.3.1	Compare what we eat today with what hunter-gatherer people ate; Match pictures of food "then" and "now".
7.2	Pick a Plant	CB	TECHNOLOGY	LO3 7.3.1; 8.3.1; 9.3.1	Select the correct plant used for healing, beauty or shelter; match a photograph to the relevant description.
7.3	Careers in Nature	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4	Match the career title to the relevant description.

Module 8: Adapting to the Environment

No.	Title	CB / CS	LA	LO and AS	Notes
8.1	Adaptation Arrows	CB	NS	LO2 7.2.1; 8.2.1; 9.2.1 7.2.2; 8.2.2 7.2.3; 8.2.3	Plants are adapted in many ways to survive drought; match the leaf adaptation to the plant.
8.2	Survivor Cape Town!	CB	NS	LO2 7.2.1; 8.2.1; 9.2.1 7.2.2; 8.2.2 7.2.3; 8.2.3	Match the plant pictures to their adaptations for surviving fire and drought.
8.3	Adaptation Word Puzzle	CS	NS LANG (HOME)	LO2 7.2.1; 8.2.1; 9.2.1 LO5 7.5.3; 8.5.3; 9.5.3	Print out puzzle; complete using information on the website; Answers in Teachers Guide.
8.4	Help to write a Wetland Story	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4	Complete a story about a wetland by selecting the correct name to fill each gap.

Module 9: Local Ecology

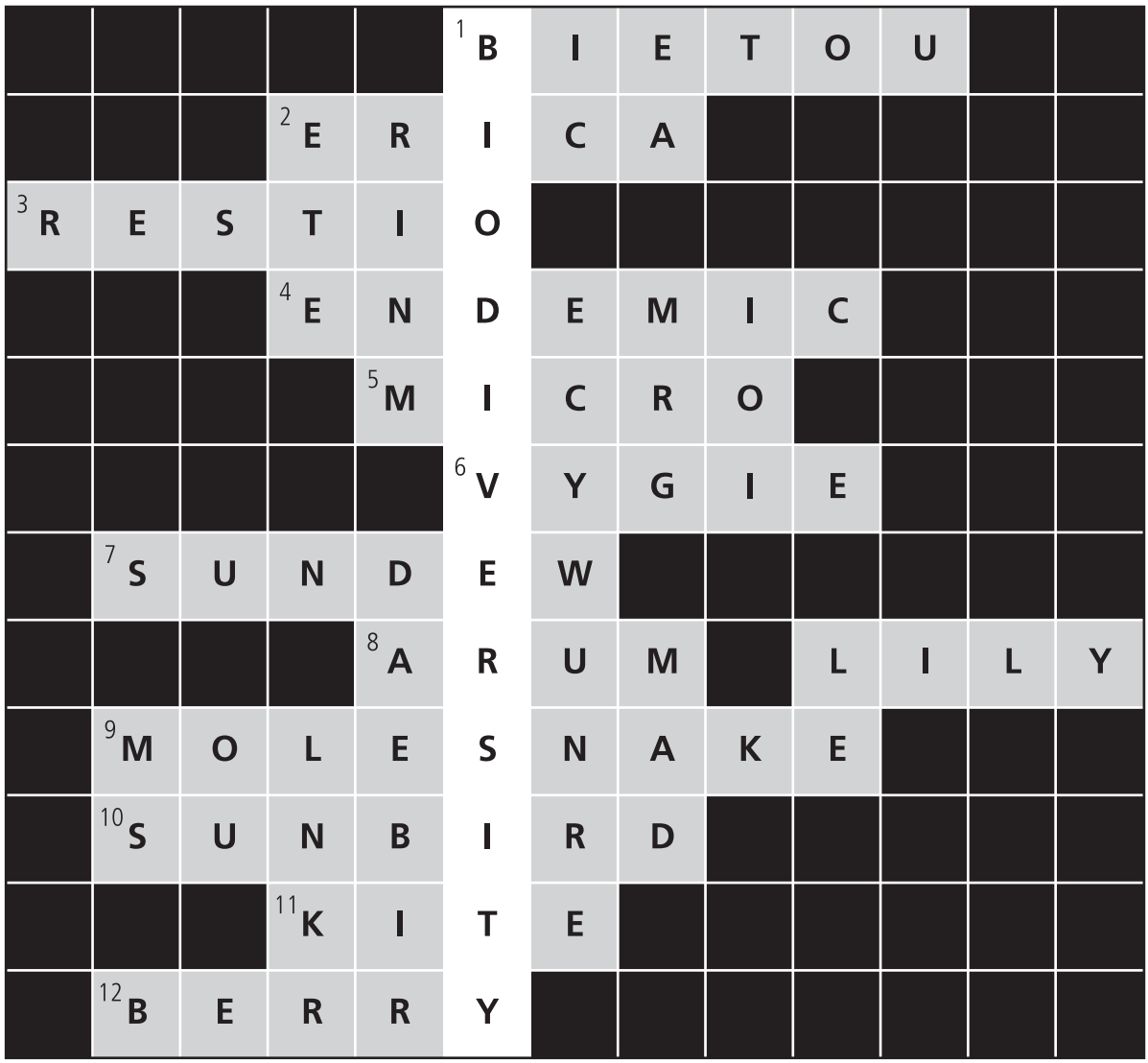
No.	Title	CB / CS	LA	LO and AS	Notes
9.1	Build a Food Pyramid	CS	NS	7.2.2; 8.2.2; 9.2.2	Select pictures of plants and animals to complete this food pyramid.
9.2	Matching Pairs	CB	NS	7.2.1; 8.2.1; 9.2.1	Identify the animals involved in pollination and dispersal of local plants.
9.3	Colour in Nature	CB	NS	7.2.2; 8.2.2; 9.2.2	Identify the flowers that belong to three local "pollination guilds".
9.4	Keeping Safe	CB	LANG (HOME)	LO3 7.3.4; 8.3.4; 9.3.4 LO5 7.5.1; 8.5.1; 9.5.1 7.5.3; 8.5.3; 9.5.3	Test your animal knowledge with this True / False quiz.

Module 10: Planting Indigenous

No.	Title	CB / CS	LA	LO and AS	Notes
10.1	Design your Dream Garden	CB / CS	TECHNOLOGY	7.1.5; 8.1.5; 9.1.5	Use the computer, as well as paper and crayons, to design an indigenous garden.

Module 1: Nature on your doorstep

1.1 **Word Puzzle**



Meaning of the word

B I O — Life

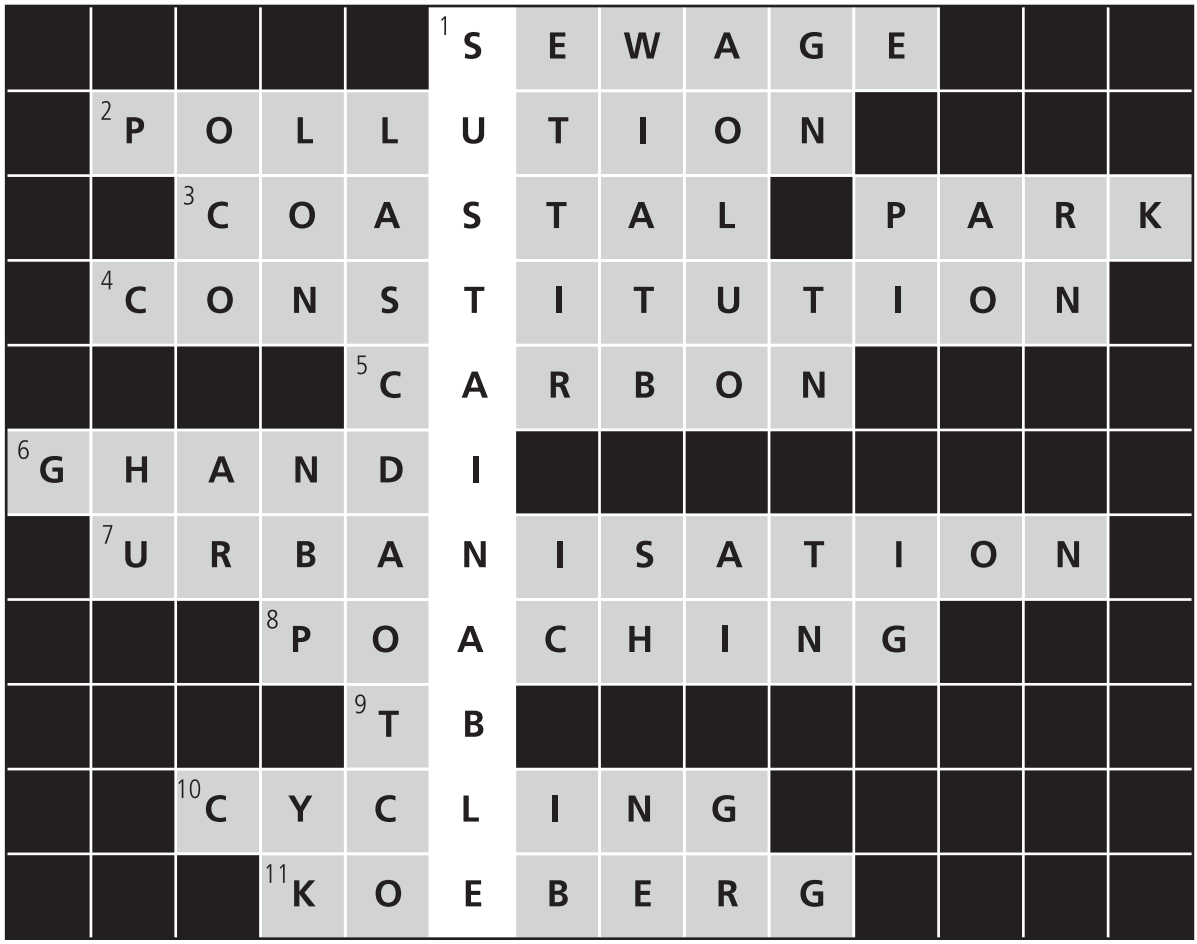
D I V E R S I T Y — Variety

Biodiversity

the variety of life on Earth, including the variety of ecosystems, species and genetic variation within species.

Module 4: Nature under pressure

4.3 **Word Puzzle**



We should all be living lives that are …

S	U	S	T	A	I	N	A	B	L	E

Module 6: Conserving nature in the City

6.3 **Crossword Puzzle**

Module 8: Adapting to the environment

8.3 **Word Puzzle**

				[1]D	O	R	M	A	N	T		
						[2]G	E	O	P	H	Y	T	E
			[3]D	E	C	I	D	U	O	U	S		
					[4]E	R	I	C	O	I	D		
						[5]S	T	O	M	A	T	A	
		[6]B	E	N	G	U	E	L	A				
			[7]M	Y	C	O	R	R	H	I	Z	A	
[8]T	R	A	N	S	P	I	R	A	T	I	O	N	
			[9]A	N	N	U	A	L					
[10]P	H	O	T	O	S	Y	N	T	H	E	S	I	S
			[11]P	R	O	T	E	O	I	D			
					[12]E	L	A	I	O	S	O	M	E
[13]S	U	C	C	U	L	E	N	T					

The type of climate in Cape Town

M	E	D	I	T	E	R	R	A	N	E	A	N

The season in which most rain falls in Cape Town

W	I	N	T	E	R

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