

FOREWORD

Access to safe drinking water and hygienic sanitation facilities are enshrined in our Constitution as basic human rights. A failure to secure these basic human rights can mean the difference between life and death for the poorest of our communities. Ensuring safe drinking water is not simply a question of providing water infrastructure. Water and sanitation without the right health and hygiene practices may result in water that is not safe to drink, and sanitation that is a threat to our health. 'Water services' are therefore about providing water and sanitation services, which address the health of our communities as well as tackling the cycle of poverty and disease.

Central to safe drinking water, improved health, and poverty reduction is better-managed water, where our water resources are developed, protected, used, conserved and managed sustainably. A holistic approach is needed to avert the vicious cycle of water-related diseases, ill-health and poverty. Fundamental to this approach is developing a vision and understanding in society of sustainable water services and sustainable water resources. This vision of sustainability requires ensuring that our society is empowered with information, knowledge and skills to use water efficiently and wisely, to practice good hygiene habits for healthy living, and to protect our water resources so that they do not become contaminated.

A major initiative towards achieving this vision is the 2020 Vision for Water and Sanitation Education Programme (2020 VFWSEP), which targets learners at schools. This is a collaborative programme between the Department of Water Affairs and Forestry (DWAF) and the Department of Education (DoE). It encourages learners to participate in water resource management, to promote good health and hygiene practices and to identify problems related to water and sanitation in their schools and communities.

It is particularly significant that through the 2020 VFWSEP, water and sanitation issues have now become integrated into the school curriculum, thus ensuring continuity and sustainability of this initiative and ensuring that our children will now learn about these issues from an early stage. We also hope that this programme will stimulate the interest of learners to future career opportunities in the water sector thus addressing the skills shortage in this sector.

The integration of water and sanitation in the school curriculum necessitated the development of curriculum aligned educational resource materials for educators. Consequently, the Department of Water Affairs and Forestry in collaboration with other sector partners developed these resource materials for grades R – 9, and have been tested by 90 educators from the 9 provinces. I am confident that these materials provide excellent inputs for learners and communities about water resource management, water supply and sanitation related issues.

I would like to encourage all learners and educators to become involved in the 2020 Vision for water and Sanitation Education Programme and thereby become involved in critically important issues related to water supply, sanitation and water resource management. These are issues that have serious impacts in terms of health and well being for many communities and your involvement can make a significant difference to the quality of people's lives.

I urge all schools to identify water-and-sanitation related problems such as water leaks, blocked toilets, polluted water, and so on, and to bring these problems to the attention of their local municipalities or the Department of Water Affairs and Forestry in their respective areas.

In order to ensure continuity from Grade R to Grade 12, the Department of Water Affairs and Forestry will also develop educational resource materials for the Further Education and Training (FET) Band.

I would like to express my sincere appreciation to the team who developed the materials and to the educators who tested the resource materials. I have no doubt that your efforts will bear fruit, and instill principles of good water resource management and good hygiene, and ensure that our learners become ambassadors for sustainable water and sanitation services. This will mean better health, longer lives and greater dignity for the poorest of our people. Jointly we will work towards a better education and a better life for all.

Mrs L. Hendricks
MINISTER – DEPARTMENT of WATER AFFAIRS and FORESTRY

Table of Contents

WATER IS LIFE	10
1. WATER PURIFICATION.....	11
Activity 1A: Desalination – Removing salt from water	11
Activity 1B: Purification of water by evaporation and condensation	13
2. A BRIEF LOOK AT WATER ACT	15
Activity 2A: What does water act tell us	15
WATER USE EFFICIENCY	17
3. MEASURING THE AMOUNT OF RAIN.....	18
Activity 3A: How to make a rain gauge.....	18
4. RAIN, RAIN, STAY	20
Activity 4A: Process of building water apparatus	20
Activity 4B: Evaluation of the water catchment facility	21
5. USE WATER WISELY	22
Activity 5A: The price we pay for the use and misuse of water	22
Activity 5B: The use of water at home	23
WATER QUALITY	26
6 DO NOT POLLUTE WATER.....	27
Activity 6A: Water pollution	27
Activity 6B: Presentation of problems in the local environment.....	28
7. DO NOT POLLUTE WATER	29
Activity 7A: How the water from the storm drain can impact on water quality?	29
Activity 7B: The effects of water pollution	30
SANITATION, HEALTH AND HYGIENE	32
8. CARING FOR THE ENVIRONMENT WE LIVE IN	34
Activity 8A: Sanitation practices	34
Activity 8B: Project on healthy and clean environment	44
Activity 8C: Analysis of results.....	37
9. WATER RELATED DISEASES	39
Activity 9A: Keep away from germs.....	39
Activity 9B: Cleaning water.....	40
WATER SAFETY	42
10. HOW TO TREAD WATER	43
Activity 10A: Practising treading water	44
Activity 10B: Practising resuscitation.....	47
FORESTRY AND AIP'S	48
11. TYPES OF TREES	49
Activity 11A: Classification of trees.....	49
ALIEN INVASIVE PLANTS	52
12. OUR ROLE IN FIGHT AGAINST ALIEN INVASIVE PLANTS	52
Activity12A: Role play on what to do to curb the threat posed by AIP's	52

Message and guidance to the educator

INTRODUCTION

The purpose of this guide is to help educators to educate children to develop a healthy, mature and responsible attitude towards water and sanitation resource management and basic hygiene practices. The guide also aims to encourage the development of awareness to infections, so that communicable diseases do not infect people. The knowledge and skills gained from this resource pack, combined with values taught in the home, will enable and empower young children to lead healthy lives and become the ambassadors of good hygiene and water conservation. The content and teaching / learning activities are intended to be developmentally appropriate and sequential. It is appropriate that water conservation and sanitation information be infused into the established school curricula areas to ensure a comprehensive approach to health education.

This resource material, therefore, assists with the infusion mentioned above into the existing school curricula.

BACKGROUND INFORMATION

In 1996 the Department of Water Affairs and Forestry Sub – Directorate for Community Development and Environmental Education commissioned the development of the first Resource Pack as part of its commitment to support Environmental Education and Water Conservation linking directly to Outcomes Based Education (OBE). Its ultimate goal was to integrate the 2020 Vision for Water Education and Sanitation Programme into the school curriculum and community development training and capacity building programmes.

However, with the advent of the Department of Education's National Curriculum Statement, it became imperative that the second edition be developed in order to make it easy for the educators to integrate water and sanitation into the school curriculum.

Yet again, the Department of Water Affairs and Forestry, in its pursuit to support all programmes that serve to improve the immediate environment of young children invite all its partners including learners to assist in taking up the challenge of ensuring a better environment through active participation in Environmental Education for sustainable development, so that by the year 2020 the state of the said environment, water conservation and sanitation in South Africa is positively sustained.

ACRONYMS

AC -	Arts and Culture
AL -	English – Home Language
AS -	Assessment Standards
CO -	Critical Outcomes
DO -	Developmental Outcomes
EMS -	Economic and Management Science
HL -	Home Language
IAP -	Invasive Alien Plants
LA -	Learning Area
LO -	Learning Outcomes
LO -	Life Orientation
MATHS -	Mathematics
NS -	Natural Sciences
SS -	Social Sciences
Tech -	Technology

SUMMARY OF MODULES

Topics	LO's (*Main and #integration)	Environmental learning focus
1. Water purification	*NS LO1: AS2 # HL LO6:AS1	In this activity learners will learn how to purify water.
2. A brief look at the Water Act	*EMS: LO1: AS 1, 2 #AL LO1: AS 2 HL LO4:AS2	This chapter highlights the role of the government to make sure that water is protected, used and developed, managed and controlled in a sustainable way for the benefit of the present and future generations.
3. Measuring the amount of rain	TECH LO1:AS2 #MATHS LO5:AS2	In this activity learners are engaged in making a rain gauge, which they can use to measure the amount of rain in their areas.
4. Rain, rain, stay	*TECH: LO1: AS 1,2,3 # HL LO5: AS5	This lesson affords learners the opportunity to construct a simple technological device that can be used to ensure that every drop of the scarce water we have counts. It also instills the skill of water quantity management.
5. Use water wisely	*SS (G) LO2: AS5 #NS LO1: AS2	This lesson comprises a water quantity audit that enables learners to compare two sources from different settlements, analyse the advantages and disadvantages of both sources. They will come to realise that water is a scarce resource that comes at a price, in some cases, so it is essential that it must be conserved and not wasted. Equally important is to note that the quality of water we use impacts on our quality of life.
6. Water pollution is bad	*LO: LO1 AS1, 2, #SS (G) LO3, AS1, 3	Through this lesson learners will realise how land use practices, settlements and industries impact on the quality of our water sources. They will develop some conceptual understanding of what pollution is and how it can be controlled. They will understand that care and love for their environment means better health and protection from harmful diseases.
7. Do not pollute water	*NS: LO1: AS1, 2 # HL LO2: AS1	In this activity learners will demonstrate how an average storm drain collects water during a rainfall event.
8. Caring for the environment we live in	*LO LO1 AS 2, AS 3 SS (G) LO3, AS1, 2 # NS LO1, AS2,	In this chapter learners work in groups to conduct a scientific investigation to identify causes of health problems in their locality and suggest ways in which such problems can be avoided
9. Water-related diseases	*LO: LO 1: AS 3 #AC: LO4: AS2 #AL LO1: AS 1 LO2: AS2 HL LO4:AS2	Through drama learners take the necessary actions to raise awareness about the causes of health problems in certain types of settlements. The activity highlights the importance of a healthy environment and good sanitation practices in curbing the spread of disease.
10. How to tread water	*LO LO4: AS5 # AL LO1:AS1, 2 NS LO2: AS1	Learners will demonstrate knowledge of safety measures in and around water.
11. Types of trees	*NS LO1: AS2 #HL LO3: AS9	In this activity learners will look at the classification of trees according to origin, season and botanical.

Topics	LO's (*Main and #integration)	Environmental learning focus
12. Our role in the fight against IAPs	*NS LO1: AS2 #HL LO3: AS9	In this activity learners demonstrate their ability to research and recall information on curbing spread of IAPs

MESSAGE AND GUIDANCE TO THE TEACHER ON INVASIVE ALIEN PLANTS

Introduction to the World of Invasive Alien Plants

Invasive alien plants have a damaging impact on our environment. It is causing billions of Rands of damage to South Africa's economy every year, and are the single biggest threat to our water and biological biodiversity. They intensify the impact of fires and floods and increase soil erosion. Of the estimated 9000 plants introduced to this country, 198 are currently classified as being invasive. It is estimated that these plants cover 10.1 million hectares or about 7 % of the country and the problem is growing at an exponential rate.

The inclusion of invasive alien plant content into the resource is to provide you as the educator with relevant information about the topic and to assist you in educating learners and others about this very serious environmental threat to especially our water sources. The lessons included will also assist you in taking action to adequately respond to the problem.

The lessons on invasive alien plants were developed and implemented by a diverse group of educators during a research project which focused on the development of curriculum aligned invasive alien plant resource materials. The educators were constituted from the three phases (GET band) and supported by curriculum advisors from the Western Cape (EMDC) South Metropole. Sixteen schools with 32 educators were involved in the project. The Working for Water Programme acknowledge the following schools for their contributions:

Primary schools: Hyacinth, Siyazingisa, Huguenot, Levana, St Mary's, Westville, Qingqa Mntwana, Edendale.

Senior Schools: Glendale, Grassdale, Oscar Mpetha, Cedar, Sopumelela, I.D. Mkize, Goodhope Campus, Grassy Park.

For additional information on invasive alien plants you can contact the Working for Water Programme offices. Toll free no. 0800 005376

HOW TO USE THIS GUIDE:

SCOPE AND SEQUENCE:

The scope of this resource pack includes:

- Water is life
- Water use efficiency
- Water quality management
- Sanitation, health and hygiene
- Water safety
- Forestry and invasive alien plants

The sequence of the activities contained in this Resource Pack is graded for **Grade 5** and is aligned to the National Curriculum Statements (NCS).

LAYOUT OF EACH TOPIC:

At the beginning of each topic, learning area/s, learning outcomes and assessment standards attained in that chapter are outlined and are further interpreted in the activities that the learners will achieve in that lesson.

Mostly, each chapter begins with a tuning in activity, which serves to identify existing knowledge or gaps pertaining to the topic and to introduce the learners to the activities of the whole chapter. Please use results of these activities to inform the development of the structure of the main topic.

Finally, a suggestion of what can be assessed during the learning and teaching process has been made and linked to the learning outcomes and assessment standards in that chapter. Other aspects pertaining to assessment have been left entirely to the educators because developers of this module indicate that the choice of what assessment strategies to use is a subjective one. It is unique to each school, grade and depends on the educator's professional judgment as well as availability of space and resources.

Same applies to time allocation and other aspects such as linking the lessons to the previous or forthcoming lessons. Although there are some indications here and there, those aspects can best be catered for in the development of lesson plans, which will again be unique to different circumstances.

TEACHING / LEARNING STRATEGIES:

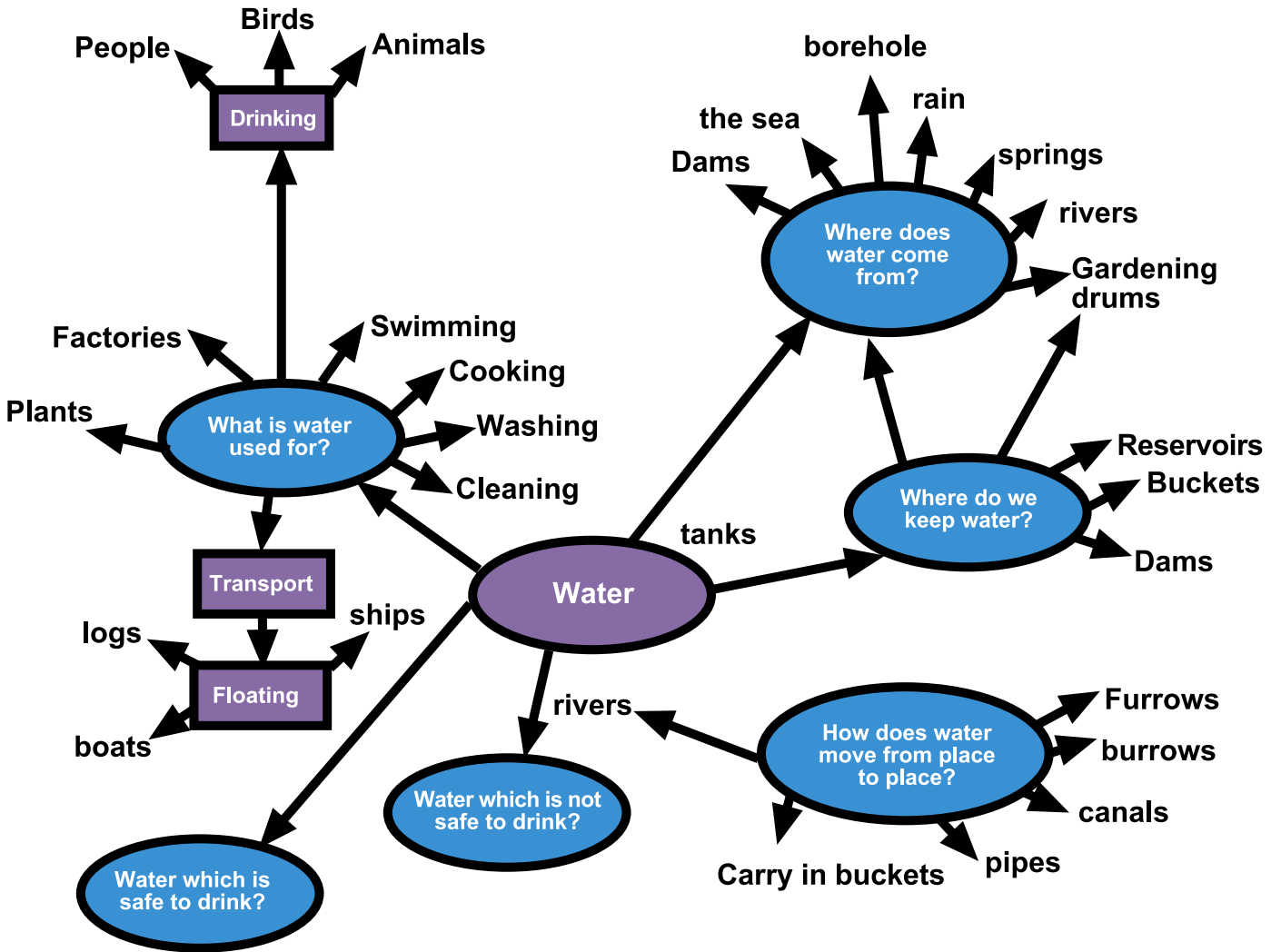
The teaching / learning suggestions in this guide are meant to serve as guidelines, not requirements. In many cases there are many suggestions for activities that will accomplish the same aspects of the outcome.

It is, therefore, not intended that you use all the given strategies. Rather, one or more of the teaching/ learning strategies will be appropriate for a particular grade or situation.

The teaching/learning strategies used in this guide use the current Outcomes Based Education (OBE) methodologies such as:

BRAINSTORMING:

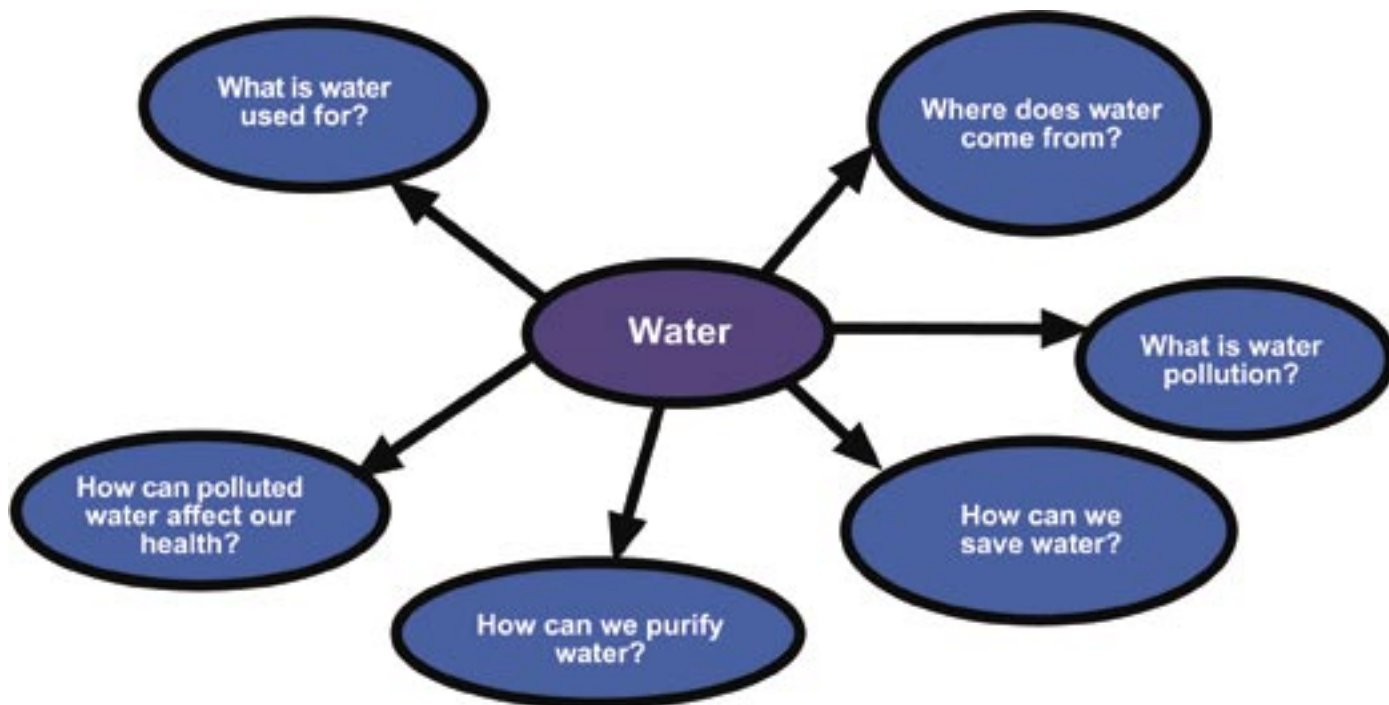
Brainstorming is used to begin discussions or generate a variety of ideas. One of the exemplars of brainstorming methodology is the use of mind / concept map shown below.



CLASS DISCUSSION:

It is used to begin a lesson, to review or to clarify information. For instance, you can use an incomplete mind map to begin a lesson an example of which is shown below.

It is important to realize that there is not only one-way to do mind maps. Different learners will know different things and you should accept these, if they are correct, even if they are not in your mind map.



GROUP DISCUSSION:

This strategy can be used to produce information or to analyse ideas while encouraging interaction among learners in line with group dynamics principles.

ROLE PLAY:

Role-play actively involves learners in learning concepts or practising behaviours in non-threatening situations by acting out an imaginary situation.

HANDS-ON ACTIVITIES:

Use of worksheets, puzzles, and games or other types of written materials to test or review learner's knowledge of a particular topic are especially effective for foundation phase grades.

ASSESSMENT:

In this guide assessment is integrated into the learning and teaching process.

An integrated approach, which assesses both the process of learning and the product of learning, is used here in order to assess holistic learning. This involves:

- ▣ Assessing learners against outcomes and assessment standards, whilst they are working on tasks and activities.
- ▣ Assess learner's investigative, problem solving and co-operative skills.
- ▣ Assessing at the end of learning cycles. This could be a product such as a project or a summative assessment.

**WATER IS
LIFE**



1. WATER PURIFICATION

MAIN LEARNING AREA

NS: LO1 SCIENTIFIC INVESTIGATION

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.

AS2: Conducts investigations and collects data: Carries out instructions and procedures involving a small number of steps.

INTEGRATION WITH THE OTHER LEARNING AREAS:

HL: LO6 LANGUAGE STRUCTURE AND USE

The learner will know and be able to use the sounds, words and grammar to create and interpret texts.

AS1: Works with words: uses phonics and spelling rules to spell words correctly.

ACTIVITY

Learners will be able to:

- Explore the ways to take salt out of water before using it.
- Make a model of a desalination plant (factory).

BACKGROUND INFORMATION

Water is humanity's second most precious resource after the air we breathe. Water covers 70% of the earth surface, but only 1% is available as fresh water. The major portion of the earth is mainly oceans with salt water. Over **1.1 billion** people on earth lack access to safe water and **2.6 billion** live without proper sanitation. Water-related diseases result in over five million deaths annually, of whom most are children.

You will need:

- Glass bowl
- Dinner plate
- Saucer containing salt water

ACTIVITY 1A – DESALINATION – REMOVING SALT FROM WATER

In this activity learners will be able to:

- extract salt out of salty water
- suggest a plan that could be used to obtain fresh water

Did you know?

In some places there is not enough water and the only water is salty ocean water.

PREPARATION FOR THIS ACTIVITY

Ensure that the following apparatus is assembled beforehand. Some of this apparatus available at school and some could be requested from the learners to bring from home.

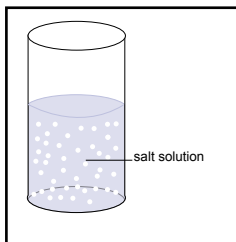
- Two teaspoons of salt (per group)
- Water
- Saucer
- Glass bowl

Divide learners into groups of four.

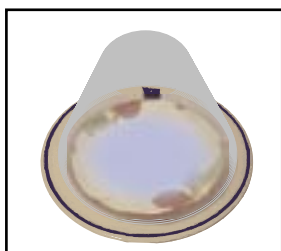
What to do:

Let learners follow the following instructions and carry out an experiment to extract salt from the salty water. Make sure that when observation has to be done, learners record all they see.

DESALINATION WORKSHEET1. Prepare a salt solution by dissolving about two teaspoons (10ml) of salt in one cup (250ml) of water. How does it look?



2. Put the saucer on the dinner plate.
3. Fill the saucer with salt water.
4. Place the glass bowl over the saucer. Make sure that the glass bowl is dry.



5. Leave the apparatus to stand in a sunny place.
6. After some time observe what happens.

(a) In the bowl.

.....
.....

(b) On the saucer

.....
.....

7. Turn the glass bowl back to its position. Notice what happens.

.....
.....

Learners need to respond to the following questions based on the experiment that has been conducted.

QUESTIONS

- (a). What would you do to find out if the water droplets on the glass jar are fresh or salt water?
- (b). What will you do to collect the drops of water on the glass bowl?

Explanation

This is the process that is used to extract salt from the salty water. The table salt we use in our houses for cooking is the by- product of this process.

Extension activity

Dudu's family lives on the island which is mainly surrounded by the sea. Look at the picture that shows Dudu's house and **suggest ways in which Dudu's family could get access to fresh water.**



- Brainstorm that with your partner.
- Present a plan to the classroom on how Dudu's family could access fresh water.

ACTIVITY 1B: WATER PURIFICATION BY EVAPORATION AND CONDENSATION

In this activity learners are introduced to the concept of evaporation and condensation. They will demonstrate how these two processes occur.

Read the following information to the learners.

Fresh water is limited and its quality is under constant pressure. Preserving fresh water quality is important for drinking, water supply, food production and recreational water use.

For this activity the following will be needed:

- 4 cups of dirt / sand
- 2 litre container
- A large glass bowl
- A short glass
- Clear plastic wrap
- Sun

WHAT TO DO:

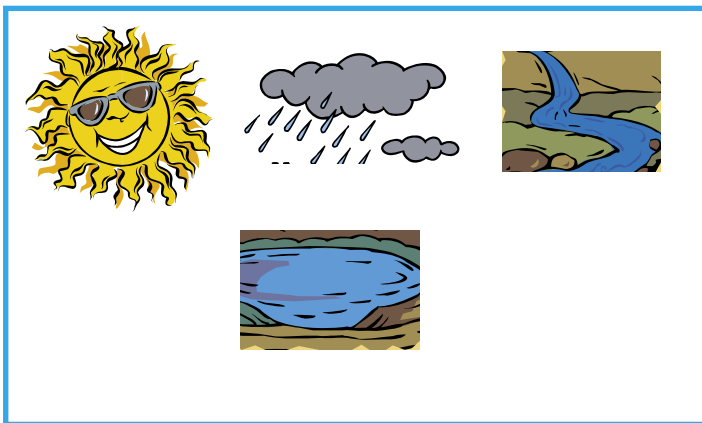
You may want/need to demonstrate the following steps to the learners and then facilitate when they demonstrate them on their own. Together with the learners:

1. Mix the dirt / sand and water in a bowl.
2. Put a clean and empty short glass in the centre of the bowl.
3. Place the bowl outside in the sun.
4. Cover the bowl with the plastic wrap.
5. Place a small stone on the plastic wrap directly over the cup.
6. Leave the bowl to stand for several hours.
7. Observe what happens.
 - (a). In the glass.
 - (b). In the bowl.

- Ask the learners to answer the following questions based on the experiment:
- Learners can work in pairs for this activity.
- Check if learners still remember the water cycle they did in Grade 4.

Questions

1. Which processes for water purification are demonstrated in the experiment?



2. What does the plastic wrap represent?
3. What do you think will happen if the plastic wrap was dirty?

WATER QUIZZ

Ask learners to complete the following sentences by putting the letters in the right order.

e.g. Do not (etswa) water. **Waste**

1. All living things need (tawer) to live.
2. When the sun heats the earth's surface, water will evaporate back into the air and become part of the (dlocu).
3. 1% of all water on earth is the (hefrs) water.
4. Water can be saved by taking a quick (howser).
5. Washing cars with a (kecbut) instead of a hosepipe will save water.
6. Ask your (mfaiyl) to always save water.

ASSESSMENT

Assess whether the learners were able to:

- Explore the ways to take salt out of water before using it.
- Answer all the questions.

VOCABULARY:

- **Condensation** is the process through which vapour becomes a liquid.
- **Evaporation** is the process through which a liquid becomes a vapour.



2. A BRIEF LOOK AT THE WATER ACT!

MAIN LEARNING AREA

EMS LO1: ECONOMIC CYCLE

AS2: Identifies and describe the role of government in the use of resources and services

AS1: Differentiates between levels of needs that people have, and explain how these might be satisfied.

INTEGRATION WITH OTHER LEARNING ARE

AL: LO1 LISTENING

The learner will be able to listen for information and enjoyment, and respond appropriately and critically in a wide range of situations.

ASI: Understands stories (told or read to learners)

AL: LO2 SPEAKING

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

- AS2:**
- Acts in culturally appropriate ways.
 - Uses additional language to communicate information.
 - Uses additional language creatively.

HL: LO4 WRITING

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

AS2: Applies knowledge of language at various levels: Word level-Consults dictionary or thesaurus to check words.

ACTIVITY

Learners will be able to:

- Identify and describe the role of the government to ensure that our water resource is protected, used, managed and controlled in a sustainable and fair manner
- Present ideas of how water should be conserved.

ACTIVITY 2A: A BRIEF LOOK AT THE WATER ACT

Engage learners into a class discussion about the government departments they know and the main services that they render.

WHAT NEEDS TO BE DONE?

This activity should be done in pairs.

- Read and mediate the following text to learners. There may be words and phrases that are new and difficult. Explain to them or ask them to use their dictionaries to check them.
- Ask learners to read the fact sheet again in pairs and then answer the questions that follow.

FACT SHEET: A BRIEF LOOK AT THE WATER ACT

The constitution of the Republic of South Africa in chapter2 (Bill of rights) P. 24 states that everyone has the right to:

- a) An environment that is not harmful to their health and well-being; and
- b) To have the environment protected for the benefit of the present and future generations through reasonable legislative and other measures that-
 - (i) prevent pollution and ecological degradation.
 - (ii) promote conservation, and
 - (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”

South Africa’s law about water is contained in the National Water Act. This act specifies that government (through the Department of Water Affairs and Forestry) as the public trustee of the nation’s water resources, must make sure that water is protected, used and developed, managed and controlled in a sustainable way so that all persons can benefit.

The Act also recognises that all people have a basic need for water for drinking and hygiene and that these needs must, at all times, be satisfied.

The Department of Water Affairs and Forestry is thus responsible for water resource management for the following

purposes:

- **Social development:** everybody should have equal access to water.
- **Economic growth:** water must support economic and social development.
- **Ecological integrity:** water resources must be protected so that the resource will continue to provide water in the future.

Complementing the Wateract is the Water Services Act (no. 108 of 1997). Its aim is to define roles and responsibilities of the different spheres of government like municipalities in order to ensure that everyone has access to basic water supply and basic sanitation. Various structures, from municipalities themselves, private companies, local people and businesses share this responsibility.

In September 2000, the Free Basic Water policy was announced by the Minister of the Department of Water Affairs and Forestry. It committed the government to providing 6 000 litres of free water per month, regarded as the basic human requirement of water, to each household.

CLASSWORK:

1. Which government department has the responsibility for water resources management?
2. What is the name of the law that deals with water-related services in South Africa?
3. By passing this law, what is the government trying to achieve or ensure?
4. What basic needs for water are mentioned in the fact sheet?
5. According to the law, how many litres of free basic water must be obtained by each household?
6. Which other government structure is responsible for the supply of water and sanitation facilities to local communities?
7. State whether the following statements are true or false. Water resource management aims to ensure that:
 - a. Everybody gets water.
 - b. Water is used for economic purposes
 - c. Water sources are protected.
8. Does your household get this water? If not, why not?
9. If your household does get this free water find out from your water account / local municipality how much money do you save from this per month?

ASSESSMENT:

Assess the learner's understanding of the role of government in the use of resources and services and the needs satisfaction process from the answers given to the above questions.

ANSWERS

1. The Department of Water Affairs and Forestry.
2. The National Water Act.
3. The Government is trying to ensure that water is protected, used and developed, managed and controlled in a sustainable way so that everybody can benefit.
4. Drinking and hygiene.
5. 6 000 litres of water per month.
6. Municipalities.
7. a)True b) True c)True
8. Answers will vary according to places where learners reside.
9. Cost of 1 unit in your area multiply by 6 000 litres will give you savings for your household.

EXTENTION: SIMULATION EXERCISE

To be done in groups.

- Pretend that you are a Minister of Water Affaires and Forestry. Your group is in Parliament where there is a debate on how you can control water so that it can be used sustainably. Give three suggestions.
- In your group design a poster that will encourage to RESERVE, RE-USE and RECYCLE water.

Each group will display its poster and then a reporter/speaker from each group will present their reports as a Minister of Water Affairs and Forestry.

WATER USE EFFICIENCY

3. MEASURING THE AMOUNT OF RAIN



WATER USE EFFICIENCY

MAIN LEARNING AREA

TECH: LOI TECHNOLOGICAL PROCESSES AND SKILLS

The learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies.

AS2: Makes

- Uses suitable tools and materials to make products by measuring, marking out, cutting or separating, shaping or forming, joining or combining, and finishing the chosen material.
- Works neatly and safely ensuring minimum waste of material.

INTEGRATION WITH OTHER LEARNING AREAS

MATHS LO5: DATA HANDLING

The learner will be able to collect, summarise, display and critically analyse data in order to draw conclusions and make predictions, and to interpret and determine chance variation.

AS2: Makes and uses simple data collection sheets that involve counting objects in order to collect data (alone and/or as a member of a group or team) to answer questions posed by the teacher and the class.

ACTIVITY

Learners will be able to:

- Make a rain gauge following given instructions.
- Use the rain gauge to record the average rainfall in their areas.
- Collect data and draw conclusions.

GUIDELINES FOR THE LESSON.

In this lesson learners make a rain gauge with which they can measure how much rain falls in their areas. Learners will see the importance of not wasting water.

BACKGROUND INFORMATION

South Africa is a dry country. A large part of the country has very little rain and in the eastern half of the country where more rain does fall, it falls only during the rainy season and for half the year little rain falls. This means we have to be very careful about using our rainwater and storing it for the dry season.

We store water in dams. We also use rainwater tanks and reservoirs but in the dry part of the country the most important source of water is groundwater.

ACTIVITY 3A: MAKE YOUR OWN RAIN GAUGE

- Ask learners to make a rain gauge that will help them to collect water when it rains so that you can record how much rain has fallen.

Facilitate this activity by letting learners understand the following method in making the rain gauge.

METHOD:

1. Cut off the top of a plastic two-litre cold drink bottle.
2. Turn the top upside down inside the bottom half.
3. Put it firmly between two bricks and leave it in the open.
4. Make sure it has no water in it.



Why a rain gauge?

- When it rains the rainwater will collect in the bottom of the bottle.
- After it rains carefully measure the amount of water in the container. Measure in millimeters.

.EXTENSION:

- Keep a record of rainfall in your area for at least two months. It will be best to do this activity during the rainy season or you may get no rainwater at all!
- Calculate the average rainfall of your area from the data collected over the two months.

ASSESSMENT

Assess the learner's ability to:

- Make the device in accordance to instructions given.
- Take necessary precautions not to sustain injuries.
- Collect and record data correctly.

GLOSSARY OF TERMS:

Groundwater:	Subsurface water in the zone in which permeable rocks, and often the overlying soil, are saturated.
Reservoir:	It is a lake or dam that is used to store water before it is supplied.
Average:	It is the result that you get when you add two or more numbers together and divide the total by the number of sets that you have added.
Rain Gauge:	A device that is used to measure the amount or quantity of rainfall.

**MAIN LEARNING AREA****TECH: LO1: TECHNOLOGICAL PROCESSES AND****SKILLS**

The learner will be able to apply technological processes and skills ethically and responsibly using appropriate information and communication technologies,

AS1: Investigates – Finds out about the background context (e.g. people, environment, nature of the need) when given a problem, need or opportunity and list the advantages and disadvantages that a technological solution might bring to people.

AS3 Makes: Outlines a plan that shows the steps for making, including drawings or sketches of main parts

- Uses suitable tools and materials to make products by measuring, marking out, cutting or separating, shaping or forming, joining or combining, and finishing the material chosen.
- Works neatly and safely ensuring minimum waste of material

AS4: Evaluates: Evaluates, with assistance, the product according to the design specifications and constraints and suggest improvements and modifications if necessary.

INTEGRATION WITH OTHER LEARNING AREAS**HL LO5 THINKING AND REASONING**

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

AS1: Use language to think and reason:

- Makes estimations based on known information.

ACTIVITY

Learners will be able to:

- Design and make a technological device that can be used to solve the problem of wasted rain water.
- Select appropriate resources and develop products in a safe and waste-free manner.

You will need:

- Wood for supports
- A large tub-preferably metal
- A tap if possible
- A sheet of wire mesh (with fine holes bigger than the open area at the top of the tub)
- Nails and screws

Preparation

- Silicone sealant
- Allocate groups of learners to ensure that the materials needed are available by a certain date. They may look for unwanted material at home, school etc or ask you to help them write letters of request to local business people.

What to do:

- Divide learners into groups.
- Ask them if there are any places around the school where they feel that rain water is wasted.
- Ask for some suggestions of what can be done to avoid that.

ACTIVITY 4A: BUILD YOUR OWN WATER CATCHMENT CONTAINER

Ask each group to develop a plan that details a step-by-step process of building a water catchment container. The purpose of choosing each material or apparatus should be explained as well. Assess the design brief and then ask each group to make their product following the specifications given below.

In designing a catchment device:

Learners must design and build a water catchment apparatus that:

- Will catch rain water.
- Will not leak.
- Will be installed out of reach of animals that might want to drink from it.
- Will keep away small animals like rats, bats etc.
- Will allow you to drain some water.
- Will be easy to clean.

ACTIVITY 4B: EVERY DROP OF WATER PLAYS A ROLE

Ask each group to evaluate the water catchment facility they have designed, making use of the following questions as a guide:

1. What could this water be used for?
2. What could they not use this water for?
3. What can be done to make this water suitable for those things mentioned in 2 above?
4. In their case what would they suggest that the water in their water catchment apparatus be used for?
5. Why is it necessary to keep away animals from water used for human consumption?
6. How would they improve or modify the water catchment container?

ASSESSMENT

Design an assessment tool to evaluate whether:

- The design brief/plan satisfies the specifications
- They have selected the appropriate material to make the finished product
- In the process of making the product, safety precautions were taken and the material was not wasted.

**MAIN LEARNING AREA****SS (G): LO2- GEOGRAPHICAL KNOWLEDGE AND UNDERSTANDING**

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

AS2: Identifies links between natural resources and economic activities in South Africa [people and resources]

NS: LO3: 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.

AS2: Understands the impact of science and technology: Identifies the positive and negative effects of scientific developments or technological products on the quality of people's lives and/ or the environment: compares results of an audit of water use in own home with results of other learners, noting differences in amounts used and for what purposes, as well as cost of getting the water.

- Compare results of an audit of water used in own home with results of other learners, noting differences in amount used and for what purposes, as well as costs of getting water.

ACTIVITY

Learners will be able to:

- Analyse audit results and learn ways of saving water.
- Compare the results of audits from homes with different technological facilities.
- Identify and describe the impact of technology on people's lives.

GUIDELINE FOR THE LESSON.

In this lesson learners will audit and compare two sources from which different settlements get water. They will analyse the advantages and disadvantages of both sources and will eventually realise that water is a scarce resource that comes at a price in some cases so it is essential that it must be conserved and not wasted. Equally important is to note that the quality of water we use impacts on our quality of life.

BACKGROUND INFORMATION

We have already looked at some resources and services provided by the government. Let us now look at the very important resource which the government of South Africa provides (water).

Providing water

The Department of Water Affairs & Forestry is a department of the National Government. It provides everyone with water. This is a very complicated and an expensive process.

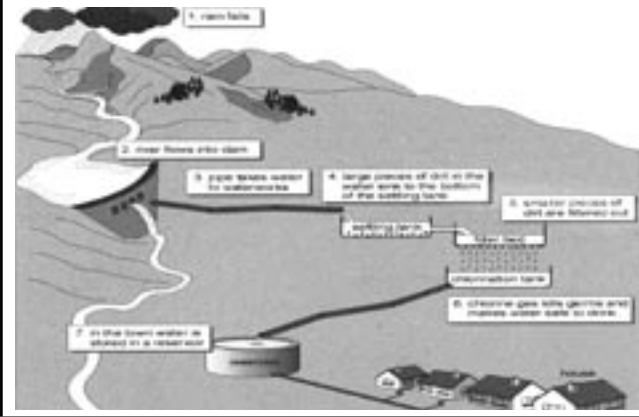
ACTIVITY 5A: THE PRICE WE PAY FOR THE USE AND MISUSE OF WATER

Interpret the two pictures with the class so that they understand the source of water for each family, how it gets to the two homes as well as the cost involved.

INSTRUCTIONS:

1. The two pictures below show different sources of water used by Paul and Pinky's houses.
2. Ask learners to study the following pictures and describe how water gets into Paul and Pinky's homes.
3. Ask them which method they use to collect water at home?

A. How water gets into Paul's house



B. How water gets into Pinky's house



ACTIVITY 5B: USE OF WATER AT HOME

- Divide learners into pairs.
- Let them answer the questions together with their partners.

1. Let learners study the table below and answer questions that follow with their partners.

What do they use for?	Paul	Pinky
1. Bathing.		
2. Washing clothes.		
3. Getting drinking water.		
4. Watering their plants.		
5. Washing their car.		

Questions:

1. Which family gets its water easily? Give reasons for your answer.
2. Which family uses more water? Give reasons for your answer.
3. Which family uses less water? Give reasons for your answer.
4. For the family that use the most water suggest three changes that they can do to save their water.
5. Looking at the amount of water used, where and how it is obtained and used as well as the cost of obtaining it, what would you say are the advantages and disadvantages of both families?

Family	Paul's	Pinky's
ADVANTAGES		
DISADVANTAGES		

ASSESSMENT

Let learners use the following assessment tool

In your responses did you list the following?

	YES	NO
Saves time		
Uses clean water		
Easy to get		
Saves water		
Less labour		

OR

Design an assessment tool to assess whether learners:

- Can suggest ways of saving water
- Can describe the advantages and disadvantages of scientific developments or technological products on the quality of people's lives.

ANSWERS:

1. Paul's family because their water comes from the tap. They do not have to walk long distances to get it.
2. Paul's family. The facilities and methods they use utilize a lot of water.
3. Pinky's family because they use facilities and methods that save water.
4. Any three of the following answers:
 - Use less water in the bath (e.g. ankle size amount) or use a shower or basin to wash your body.
 - Wait until you have a full load before washing clothes in a washing machine or use a basin to wash clothes.
 - Do not drink from a tap, use a cup.
 - Use a watering can to water plants.
 - Use a bucket to wash the car, not a hosepipe

FAMILY	ADVANTAGES	DISADVANTAGES
PAUL'S	<ul style="list-style-type: none"> • They get their water easily. • Their water is probably safe because it goes through a purification process. • They are more likely to have a constant supply of water. • They are more likely to practice good hygiene because they have enough water. 	<ul style="list-style-type: none"> • They pay for their water.
PINKY'S	<ul style="list-style-type: none"> • They get their water cheaply. 	<ul style="list-style-type: none"> • They carry their water on their heads and probably have to walk long distances to fetch it. • Most probably their water may not be safe to drink. • Their water supply may dry up. • Since they struggle to get their water, they may save it by using small, insignificant quantities.

WATER QUALITY



6. WATER POLLUTION IS BAD!

MAIN LEARNING AREA

LO LO1: HEALTH PROMOTION

The learner will be able to make informed decisions regarding personal, community and environmental health.

AS1: Explores and reports on ways to protect the quality of food and water in various contexts.

AS2: Investigates a local environment health problem using different data sources and plans a strategy to address the problem.

INTEGRATION WITH OTHER LEARNING AREAS

SS (G): LO3 EXPLORING ISSUES

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

AS1: Identifies challenges to societies and settlements with a focus on the spread of diseases.

AS3: Suggest the best way from a range of alternatives to reduce the risk of diseases.

ACTIVITY:

Learners will be able to:

- Identify the different ways in which the society destroys the quality of water.
- Suggest some solutions to these problems as a means of reducing the risk of diseases.

YOU WILL NEED:

- A set of two pictures
- Worksheet for each learner
- Worksheet
- Pen/Pencil
- Scribbler

BACKGROUND INFORMATION: WATER POLLUTION

We all need water for survival. We need it for drinking, cooking, washing and sanitation. We need it for growing vegetables and for keeping livestock. It is needed in mining, industry and agriculture, to help them grow and create more jobs. But we don't just need water, we need clean water. Dirty or polluted water affects our environment and makes us sick, prevents children from growing properly and poisons vegetables and livestock. Dirty water may also have to be cleaned before using it. In settlements where sanitation and waste removal are not working or are not used properly, the waste finds its way into nearby rivers and streams, which then become polluted. When this happens, people in all the settlements suffer health problems, and even death. This especially affects children and the elderly. Most of our common illnesses, such as stomach problems, diarrhoea, cholera, typhoid, and skin and eye diseases, are caused by polluted water and poor sanitation.

Water pollution occurs when people dump waste, chemicals, metals and oil into the water. Polluted water is dirty, can smell bad and contain germs or chemicals that are harmful to people, water animals and plant life and can cause diseases. We need to look after our riverbank vegetation. The roots of plants and grass prevent soil erosion. Some plants clean water and slow down floodwater.

GUIDELINES FOR THE CHAPTER:

Learners will realise how land use practices, settlements and industries impact on the quality of our water sources. They will develop some conceptual understanding of what pollution is and how it can be controlled. They will understand that care and love for their environment means better health and protection from harmful diseases. They will also have a chance to share information.

ACTIVITY 6A: WATER POLLUTION

- Divide learners into 5 groups for the purposes of discussion and presentation.
- Supply each group with a set of pictures and a worksheet for discussion.
- Each group will be allocated a section (a, b, c, d or e) of the river.
- Explain what the learners are supposed to do.
- Give each group time to discuss.
- Supervise and assess.

Ask learners to look at picture A and answer the following questions:

PICTURE A: BEFORE



1. Use the following words to describe the condition of the environment in your picture. Also what impact does the activity in that environment have on the quality of water?

Smelly, polluted, murky, clear, good, not smelly, at risk, not polluted, bad, not at risk

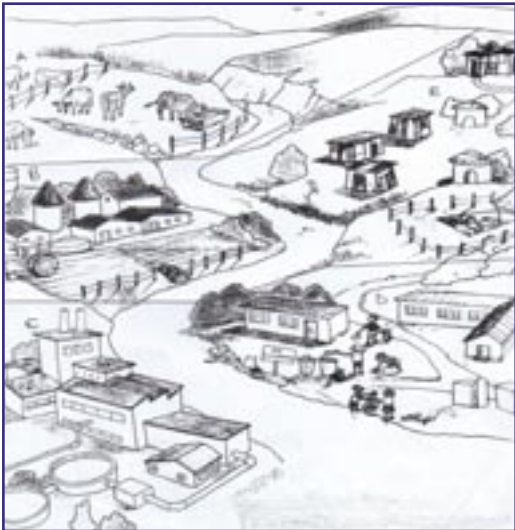
This section of the river is, the water is probably..... and.....

This means the quality of the water is..... and so the people using it are..... from diseases.

2. The possible source of this pollution is

Ask learners to look at picture B and answer the following questions:

PICTURE B: AFTER



1. Look at your group's section of the river and suggest what action can be taken to improve the quality of the water in your section of the river.

2. Choose the correct word / phrase from the list below and fill in the spaces left in the passage:

Smelly, polluted, murky, clear, good, not smelly, at risk, not polluted, bad, not at risk

This section of the river is now, the water is probably..... and.....

This means the quality of the water is..... and so the people using it are..... of diseases.

ACTIVITY 6B: THE USE OF WATER AT HOME

- Ask each group to make a presentation of its discussion using their worksheet.
- They must suggest an information sharing action project or outreach programme to address similar problems in their local environment.

ASSESSMENT:

Design an assessment tool to assess the ability to observe and identify:

- Sources of water pollution.
- Actions taken to solve the problem of pollution.

GLOSSARY OF TERMS:

Murky: Water that is dark and dirty that you can not see through it.

Chemicals A substance used in or resulting from a reaction involving changes to atoms or molecules.



7. DO NOT POLLUTE WATER

MAIN LEARNING AREA

NS: LO1 SCIENTIFIC INVESTIGATION

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.

AS1: Plans investigation: Contributes ideas of familiar situations, needs or materials, and identifies interesting aspects, which could lead to investigations.

AS2: Conducts investigations and collects data: Explores the possibilities in available materials, finding out how they can be used.

INTEGRATION WITH OTHER LEARNING AREAS

HL: LO2 SPEAKING

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

AS1: Communicates experiences, ideas and information in different audiences and purposes.

- Ask and responds to questions.

ACTIVITY 7A - REMOVE THE POLLUTANTS FROM WATER

ACTIVITY

Learners will be able to:

- Demonstrate how an average storm drain collects water during a rainfall event.
- Demonstrate how the water from the storm drain can impact on water quality.

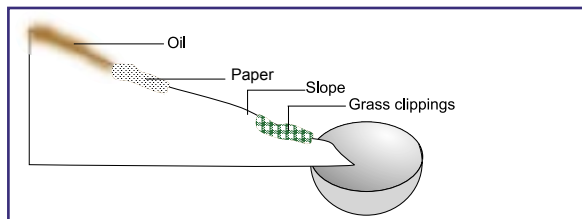
You will need:

- A watering can.
- A water bowl.
- Pollutants e.g. motor oil, fertilizer, soil, grass clippings, shredded paper.
- Water
- Gentle slope.

What to do:

Together with the learners do the following demonstration.

1. Divide learners into groups. You need to work outside for this activity.
2. Ask learners to select any pollutant they want to work with, from the list above.
3. Learners must fill the watering can with water.
4. Place the water bowl at the foot of the gentle slope.



5. Spread the pollutants on the slope.
6. Vigorously pour water on the tip of the slope.
7. Observe what happens.

.....

.....

.....

ACTIVITY WORKSHEET

Explanation

This is how groundwater is polluted, through surface runoff or water from the storm drain

QUESTIONS

Ask learners the following questions. They must write the answers in their workbooks.

- How does water in the bowl look?
- How do you think pollutants damage the environment?
- How do you feel about what happened?
- How can this type of pollution be stopped?

Extended Activity

As an extension to the previous activity, learners must:

1. Share with other groups what happened in their groups.
2. Suggest ways in which we can remove the pollutants from water.
3. Which pollutants were easy to remove?
4. Which ones were difficult to remove?

ACTIVITY 7B: THE EFFECTS OF WATER POLLUTION

Water pollution is one of the dangerous things. It mainly disturbs the environment, particularly living things found in water.

In this activity learners will:

- Discover the effects of water pollution.
- Suggest ways to prevent water pollution.

What to do:

Learners are given a picture of the ship spilling oil in the ocean and some animals like seals, fish and other aquatic animals dead on the shore. They must study this picture carefully explain what is happening in the picture by engaging themselves in the following activity:



Ask learners to:

- (a) Explain what is happening in the picture.

(b) Spot the dangers that result from this action.

(c) Mention the things that could be damaged or destroyed by this situation.

Glossary of Terms

- Pollutant** - A substance that pollutes, usually the chemical waste of an industrial process.
- Impact** - The effect or impression made by something.

ASSESSMENT

Assess the learners' answers using the following rating scale:

1	Unable to answer all the questions.
2	Need assistance. Did not master work.
3	Satisfactory, mastered work.
4	Performs above expectations.

SANITATION HEALTH AND HYGIENE

8. CARING FOR THE ENVIRONMENT WE LIVE IN

**MAIN LEARNING AREA****LO1: HEALTH PROMOTION**

The learner will be able to make informed decisions regarding personal, community and environmental health.

AS2: Investigates a local environmental health problem using different data sources, and plans a strategy to address the problem.

AS 3: Recognises the symptoms and causes of locally occurring diseases and discuss prevention strategies.

SS (G):LO3: EXPLORING ISSUES

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

AS1: Identifies challenges to societies and settlements within focus on the spread of diseases.

AS2: Explains the factors that cause some people to be more at risk of disease than others.

INTEGRATION WITH THE LEARNING AREAS:**NS: LO1: SCIENTIFIC INVESTIGATION**

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.

AS2: Conducts investigations and collects data: Carries out instructions and procedures involving a small number of steps.

ACTIVITY

In this activity learners will be able to:

- Conduct a survey/ research on health problems in different types of settlements.
- Identify the causes of these health problems.
- Suggest solutions to these problems.

You will need:

- Magazines to cut pictures of settlements.
- A letter.
- An environmental checklist.

GUIDELINES FOR THE LESSON.

- This project/ lesson is divided into 3 activities, each with several steps.
- The progress of each step should be monitored and properly supervised by the educator.
- It will take a week or two to cover all the sub-activities of this project.
- This project will develop learners' investigative and listening skills to be able to draw conclusions from information gathered.
- Learners will be able to classify different types of settlements in their locality and understand how these settlements are affected by diseases that are caused by poor health practices. In order to achieve these learners should investigate two or more different types of settlements so as to be able to compare the ones that will be affected more than the others.
- The information gathered should give them insight and a basis for suggesting reasonable solutions to the health problems identified in certain types of settlements.
- This could be used as an audit activity that will lead to activities for the National environmental week, World Health Day, and World Environmental Day etc. Refer to the calendar of special days published by Sharenet annually.

What to do:

Assess learner's prior knowledge of settlement types by asking them to:

- Describe types of places in which they live and also others different from their own that they have seen. For each description give an appropriate name (e.g. township, farm, village, informal settlement/shacks, suburb etc)
- Cut out pictures of different settlement types from the magazines. If they have a problem about getting magazines these must be supplied to them by the educator.
- Paste the picture of the settlement type they are investigating in the cover page of their project.

PREPARATION:

1. Divide learners into groups according to their capability to access different types of settlements listed in the environmental checklist.
2. Explain that each learner will do the survey individually, but the results will be combined and reported as a group.

ACTIVITY 8A: SANITATION PRACTICES

- Ask learners to bring magazines from home and cut out pictures of different settlement types from the magazines. (You may supply magazines).
- Learners must choose one picture of the settlement type they are going to investigate and paste it in the cover page of their project book.

ACTIVITY 8B: PROJECT ON A HEALTHY AND CLEAN ENVIRONMENT

In this activity learners are conducting a research project to determine the environmental problem identified in a particular community by visiting the local clinic to gather the information about the frequency of cases referred or treated at the clinic.

PROJECT

This project will be done in the following series of steps:

- Step 1 - obtaining information from the local clinic or nurse
- Step 2 – conducting interviews
- Step 3 - a survey on the use and care of toilet facilities
- Step 4 – observation of environmental cleanliness and personal hygiene.

STEP 1 - Information from the local clinic or nurse

- Supply each learner with a letter to the nurse.
- Ask them to take the letter to the clinic nearest to the area they are surveying.
- They may leave the letter with a nurse and collect it on the date agreed upon as a class.

Dear nurse

The learners of..... school are investigating the impact of poor sanitation practices in your area. Would you kindly assist them by visiting our school and provide the school with the following information?

1. *Which group makes up the majority of patients visiting your clinic each day?*

Old people

Middle age

Young people

2. *Which gender visits the clinic frequently?*

3. *How many young people visit the clinic for sanitation-related practices?*

Cholera

Dysentry

Bilharzia

- Analyse the result from the nurse.
- Identify the problem caused by poor sanitation in your area.

DATE OF SUBMISSION:.....

ENVIRONMENTAL CHECKLIST

Learners will then have to find out the causes of the health problems identified in the local environment by doing the following survey. The survey should be conducted in the same type of settlement. Each learner should sample five families from the area.

STEP 2: Conducting interviews

- Explain the instructions for each question in the environmental checklist and give them suggestions on how they can go about doing their survey.
- Agree on the date of submitting this part of the checklist.

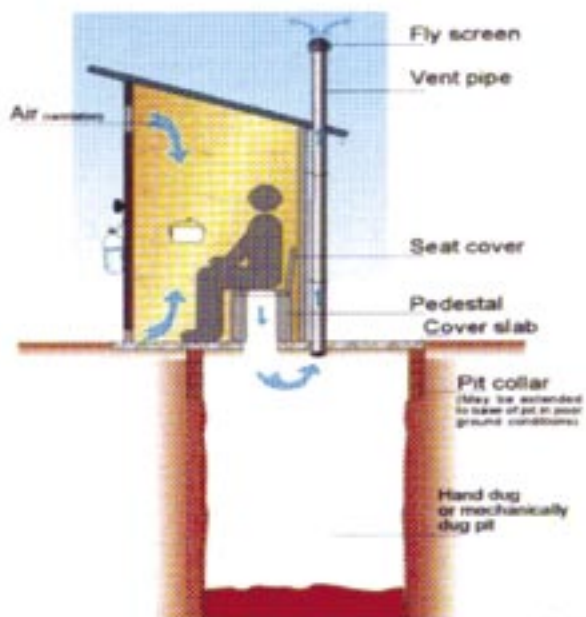
Engage learners in this exercise.

1. Circle the type of settlement you are surveying:

- a) Township
- b) Informal settlement
- c) Village
- d) Suburb

2. Which of the following toilets are used in the area you are surveying? Tick the appropriate alternative.

- a) Flush toilets – full water-borne sewerage
- b) Pit latrine-pit toilet with no vent pipe
- c) Ventilated improved pit latrine –pit toilet with vent pipe
- d) Bucket system – ½ bucket of water used to wash away sewerage



3. Interviews:

- Interview one person from each of the different families you are surveying to find out if they or members of their families have suffered from illnesses related to poor sanitation practices.

	YES	NO
1. Has any member of the family suffered or is suffering from diarrhoea or food poisoning?		
2. Does it happen more than twice a year?		
3. Do your neighbours also suffer from these diseases?		

STEP 3 - Survey on the use and care of toilet facilities:

- Explain the instructions for each question in the environmental checklist and give them suggestions on how they can go about conducting their survey.
- Agree on the date of submitting this part of the checklist.

4. Survey on the use and care of toilet facilities:

- Below is a list of good and bad sanitation behaviors with regard to **use and care of toilet facilities**.
- This observation should be carried out in 5 toilets of the 5 families sampled.
- Of the five toilets you observed, write the number of toilets in which you observed.
- Learners should evaluate if they think it is a positive (✓) or negative (x) thing to do and indicate in the appropriate column with a tick or a cross.

NB: Two columns will be filled in at this stage, columns 1 and 3

No.	Physical condition	✓ / X	Rating
	Clean toilets		
	Dirty toilets		
	Smelly toilets		
	Broken toilets		
	Toilets with hand washing facilities		
	Toilets without toilet paper		
	Soap to wash hands available		
	Toilets with flies in or around them.		
	Rubbish bins available in the toilet		
	Privacy when using the toilet		
	Someone leaving the toilet without washing their hands		
	Toilet with litter inside (e.g. tins, plastic, food etc)		
Rating with the highest number			

STEP 4 - Observation of environmental cleanliness and personal hygiene

- Explain the instructions for each question in the environmental checklist and give them suggestions on how they can go about doing their survey.
- Agree on the date of submitting this part of the checklist.
- Learners must observe the **environmental cleanliness and personal hygiene** in the area around the houses they are surveying.
- As they observe each of the following, they must write the number in the first column. Learners do not necessarily have to observe five instances of these; it can be more or less than five.
- They must state whether they think it is a positive (✓) or negative (x) thing to do and indicate in the appropriate column with a tick or a cross

No		✓/X	Rating
	Litter lying around		
	Uncollected rubbish		
	Dustbins covered with lid		
	Food left uncovered		
	Someone eating without washing their hands		
	Animals aloud to eat and or drink from human food and water supply		
	A dirty child / child with runny nose		
	Flies		
	Dead animals lying around		
	Patches of dirty stagnant water		
	Person urinating / child defecating outside the toilet		
	Drinking water kept in a covered container		
Rating with the highest number			

Adapted from Eco-Schools Toolkit: Sharenet 2003

ACTIVITY 8C: ANALYSIS OT THE RESULTS – Done in class

STEP 1

- Give learners their projects.
- Go through the checklist with them and request by the show of hands for each item- who indicated this one as bad or good physical condition.
- Ask one learner to tell the reason why they consider each item as good or bad ?
- Agree as a class and let those who got it wrong correct themselves.

STEP 2

- Send learners to their groups.
- Show them the group rating scale below and ask them to take the rating with the highest number, used by the majority of the group as the overall rating for their settlement type.
For example if 3 out 5 members of a group have the highest number of OK's in the use and care of sanitation facilities checklist = OK on the group rating scale.
- Each group should fill that into the appropriate column on the group rating scale.

GROUP RATING SCALE: (Use ok /not so high/ high)

How do you rate the:	Village	Informal settlement	Township	Suburb
Occurrence of diseases in the..... (activity 2, step 1 results)				
use and care of sanitation facilities (Activity2 ,step 3 results)				
Environmental cleanliness and personal hygiene (Activity 2, step 4 results)				

ACTIVITY 8D: EXTENSION:

- Ask learners to discuss the following in their groups:
 1. Is your settlement type at risk of contracting diseases? Yes / No.
 2. State the reasons why those people are / are not at risk of becoming ill.
 3. For those who are at risk, suggest what can they do to prevent themselves from becoming ill?
- Ask each group to present their discussion to the whole class.

ASSESSMENT:

Assess each learner's evidence of learning by observing and recording the following:

1. Knowledge of:
 - How good and bad sanitation practices contribute towards diseases.
 - Actions that can be taken to prevent diseases.
2. Skills of:
 - Finding information using different investigation skills.
 - Recording and organizing information from a variety of sources.
 - Analyzing the reasons why conditions in some settlements put them at risk.
 - Following instructions and procedures involving a small number of steps explained to him/her.
 - Finding information he/she needs.

GLOSSARY OF TERMS:

Settlement:	A place where people have come to live and have built homes.
Survey:	To try to find out detailed information about a lot of different people or things, usually by asking a lot of people a series of questions.
Sanitation:	A process of keeping places clean and healthy, especially by providing sewerage systems and clean water supply.
Communicable diseases:	A contagious or infectious disease that can be passed from one person to another.
Diarrhoea:	It is a sickness, which makes one's body lose a lot of liquid in the form of liquid faeces.
Stagnant water:	Water that is not flowing, and therefore often smells unpleasant and is dirty.
Urinating:	Getting urine out of your body through genitals.
Defecating:	Getting faeces or stools out of your body.



9. WATER-RELATED DISEASES

MAIN LEARNING AREA

LO: LOI HEALTH PROMOTION

The learner will be able to make informed decisions regarding personal, community and environmental health.

AS3: Recognises symptoms and causes of locally occurring diseases and discusses prevention strategies.

INTEGRATION WITH OTHER LEARNING AREAS

AC LO4: EXPRESSING AND COMMUNICATING

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

AS2: Drama- Dramatises social, cultural or environmental issues through the use of different drama techniques such as tableaux, verbal dynamic sequences or role-plays.

AL: LOI- LISTENING

The learner will be able to listen for information and enjoyment, and respond appropriately and critically in a wide range of situations.

ASI: Understands stories (told or read to learners)

AL: LO2 SPEAKING

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

AS2: -Acts in culturally appropriate ways.

- Uses additional language to communicate information.
- Uses additional language creatively.

HL: LO4 WRITING

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

AS2: Applies knowledge of language at various levels: Word level-Consults dictionary or thesaurus to check words.

ACTIVITY 9A: KEEP AWAY FROM GERMS

ACTIVITY OUTCOMES

The learner will be able to:

- Show understanding of oral text by responding appropriately to questions asked and connects the story to personal life.
- Explain and communicate to others, symptoms and causes of locally occurring disease as well as prevention strategies.

BACKGROUND INFORMATION

The human right to water entitles everyone to sufficiently and physically accessible, safe and acceptable water for personal and domestic uses. Inadequate water and sanitation are primary causes of diseases such as cholera, typhoid, malaria, dysentery and diarrhoea.

What to do?

- Divide learners into groups. There may be 4 in her group.
- Read and mediate article1 to the learners.
- Discuss the article openly in class, asking probing questions to ensure that learners understand the gravity of the situation portrayed in the article.
- Read articles 1 and 2 as a class and look up meanings of unfamiliar words and phrases in the dictionary.

ARTICLE 2: CITY PRESS SEPTEMBER 11 2005

Precautions to avert typhoid fever infection.

TYPHOID fever is a bacterial infection caused by Salmonella typhi. This bacterium infects only humans and does not come from animals. The bacterium is transmitted by the faecal-oral route and can also be found in urine. People can become infected by eating food contaminated by someone with typhoid fever, by ingesting water contaminated with human sewage or by direct contact with the faeces or urine of a person who is ill with typhoid fever or is a carrier of Salmonella typhi in their gut.

Symptoms of typhoid fever can be mild or severe. These include a flu-like illness with symptoms such as fever, malaise, loss of appetite, headache, constipation or diarrhoea. Most people will show symptoms within one to three weeks after they have been exposed. Typhoid fever can be effectively treated using specific antibiotics and the fatality rate is low with effective treatment. To prevent infection, use safe water and wash hands after using the toilet and before handling food.

• ***Source: The Epidemiology and Outbreak Unit, National Institute for Communicable Diseases.***

ARTICLE 1

Cholera is one of the common diseases that affects many related people, particularly children under the age of five. At least 1.8 million people die every year from diarrhoea-related disease, including cholera. About 88% of diarrhoea diseases can be attributed to unsafe water supply, inadequate sanitation and poor hygiene.

Unsafe water supply can be attributed to sources like drinking water from the fountain, direct from rain, water from the drums. Swimming in dirty water is equally dangerous since it can cause a disease called dysentery. This is a disease that mainly affects boys. The symptoms are diarrhoea with blood. Blood can also be observed in the urine.

Improved water supply, sanitation, hygiene education and improvements in drinking water quality through household water treatment can help reduce diarrhoea.

ACTIVITY 9A: DIFFERENT CATEGORIES OF PROBLEMS AFFECTING STREAMS

- Learners must write all the unfamiliar words and their meanings in this worksheet 1.

Unfamiliar Word	Meaning

• As a group, discuss the symptoms of each of the diseases you read about. Complete worksheet 2.

Disease	Symptoms

ACTIVITY 9B: THE INVISIBLE THEATRE

- Read and explain the background information about an Invisible Theatre”.

BACKGROUND INFORMATION: “INVISIBLE THEATRE”

A Brazilian dramatist, Augusto Boal invented one of the most effective ways of dramatizing a situation called “Invisible Theatre”. Invisible theatre, of course, is anything but invisible. Its central principle is that the audience does not know that it is watching theatre - it believes what it is seeing is a real life experience with the result that they become involved without even knowing it. Its purpose is to educate and to raise awareness about issues which people find uncomfortable about.

Invisible theatre is about acting out or role-playing an improvised conversation about what you want to educate the people about. The best style is to use an argument. Arguments are spontaneous. They are often noisy and they attract attention – even the most discreet people love to watch public disagreement! Arguments are even likely to draw other people in, which is one of the aims of invisible theatre. Just ensure that you keep your argument believable and, just like all drama, have conflict. Characters should understand staying in character once they enter the public arena. What is important is that the audience must believe that what they are seeing is real.

Another important aspect is that role-playing must as normal conversation not be too loud at first. Gradually the discussion becomes heated as bystanders begin to notice and, hopefully some join in the discussion. It is then that relevant issues are brought up as characters are contradicting each other. Hopefully by then, bystanders would have taken sides and get involved in the play. Actors should have the skill of incorporating the new fellow actors in their play.

WHAT TO DO

- Pair learners and ask them to select one of the water diseases and write a summary on the following sub topics.
 - What is that disease?
 - What are its causes?
 - What are its symptoms?
 - How can it be prevented?
- Assess the summaries and give feedback to enable learners to correct mistakes.
- Each pair to improvise (make up) a conversation, role-playing a scenario about one of their school mates being absent from school and is being suspected of suffering from the disease chosen. In their conversation they must cover all points covered in the summary.
- Each pair should present its role-play to the class and let the whole class assess each role-play.
- Choose the best role-plays and tell learners that they will use those to take the message to the public.
- Let them decide on the best venue/s to act out your play. It should be a place where there are lots of people (e.g. a queue in a local supermarket, clinic, public tap, spaza etc.)
- Remember to ask permission if it is a private place.
- Warn learners not to be threatened by the bystanders, but create a way of involving them in the drama.
- Remind them not to use slang or vulgar languages or aggressive gestures- this could hurt their message.
- After rehearsing in class, you could let your learners practice in the school playground before going to a public place.

Extended Activity

1. Ask learners to brainstorm with their group members on the methods that could be used to clean water from:
 - o The fountain.
 - o Rain.
 - o Drums.
 - o Dirty water.
1. Leaving water for more than 3 weeks can cause water to have tadpoles.
2. Can that water still be used? Suggest ways to purify it.

ASSESSMENT

Design assessment tools to assess the learners:

- Knowledge of the various diseases through their summaries and drama pieces.
- Skill of engaging in a conversation flexibly for the purposes of educating and raising awareness.

WATER SAFETY



10. HOW TO TREAD WATER

MAIN LEARNING AREA

LO LO4: PHYSICAL DEVELOPMENT AND MOVEMENT

The learner will be able to demonstrate an understanding of, and participate in, activities that promote movement and physical development.

AS5: Demonstrate knowledge of safety measures in and around water.

INTEGRATION WITH OTHER LEARNING AREAS

AL LO3 READING AND VIEWING

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

AS1: Understands in a simple way some elements of stories: notices the role that visual images (pictures, photographs) play in the construction of meaning.

AS3: Reads for information: reads texts across the curriculum (e.g. textbooks in their learning areas).

NS LO2: CONSTRUCTING SCIENCE KNOWLEDGE

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

AS1: Recalls meaningful information: at the minimum, uses almost fluent language to name and describe features and properties of objects, materials and organisms.

ACTIVITY

Learners will be able to:

- Demonstrate knowledge of safety measures in and around water.
- Practice some important water safety skills.

You will need:

- Paper
- Koki pens
- Scissors
- Old doll
- Stopwatch

Background Information

Read the following background information to the learners and let them share the safety drowning measures with their parents.

Drowning

Drowning of children can easily happen. It usually happens so quickly. According to Aqua-Net, the pool safety specialist since 1972, drowning is the second leading cause of accidental death of children in South Africa. They say that drowning is the silent and quick occurrence. It can happen within 30 seconds in only 4cm of water. Most drownings are preventable if you are cautious.

Buckets

- Never leave any bucket of water or other liquid unattended.
- When finished with the liquid in the bucket, empty it immediately.
- If not finished, but you need a break, move the bucket of liquid to a safe place out of reach of children.
- Store buckets upside down, especially outdoors because rain water can fill the bucket and it can become a drowning hazard.

Bathtubs

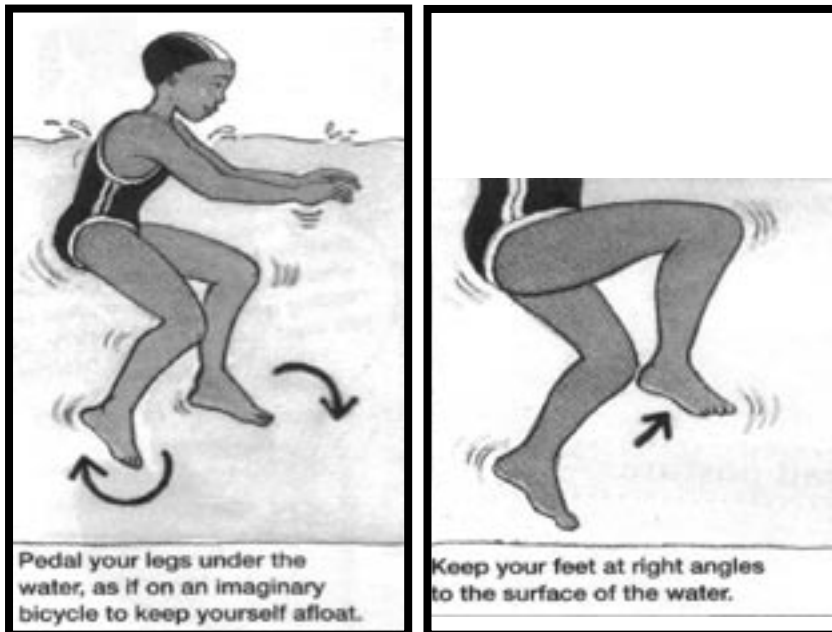
- Never leave your child unattended in the bathtub for any reason.
- Do not leave your child to be watched by an older sibling.
- Get supplies, (soap, towel, face cloth etc) ready first – before you even run to the bath water.
- Always drain the bath tub when you are finished with the bath and before you leave the bathroom.
- Slips and falls: place a rubber mat in the tub.
- Electrical hazards: keep electrical devices well away from the tub.

Toilets

- Always close the toilet lid.

HOW TO TREAD WATER

If you are able to swim, practise the following skills with a friend. If you cannot swim ask a teacher or life guard at a public swimming pool to help you. (Show him/her the pictures in this book). If you become tired when swimming or playing a water sport you can tread water to conserve energy. Practise this skill so that you can do it with minimum effort. This is what you do:



THE CYCLING METHOD

1. Get into the water. Educator/ lifeguard to stay close to the side of the pool.
 - Hold out your hands. They should be 15 to 22cm beneath the water. Hold your palms down, with your hands in a cupped position.
 - Your hands should be extended a little bit beyond each shoulder, in front of her chest. (Imagine that you are stroking a dog). You will feel pressure on your hands.
 - Practise treading water continuously but slowly.
 - Remember to keep your head in a relaxed position above the water.
2. To do the leg movements, pretend that you are riding a bicycle by moving your hands in a circular motion beneath the water.
 - Keep your feet at an angle of 90 degrees to your skin.
 - Keep the movement slow.
3. Now practise doing the arm and leg movements together.
Ask the life guard to help you as you practise.

ACTIVITY 10A: PRACTISING TREADING WATER/ THE CYCLING METHOD

Learners should work in pairs for this activity. Only do this activity if you have access to a swimming pool and other adults to help you.

1. Practise treading water with your partner.
 - (a) Observe your partner treading water. Use the above pictures to make sure he/ she is doing it correctly.
 - (b) Now let your partner observe you as you tread water.
2. For a bit of fun, use a stop watch to see who can tread water the longest.

Some basic rescue skills

Read through the text with the class. This is a valuable skill for learners to know about. Even if the learner cannot swim, they can help someone.

- If you ever go swimming and someone gets into difficulty in the water, this is what you can do to help:
1. If the person is close to the water's edge, find a pole or stick which the person can grab onto to pull themselves to safety.
 - Before you do this, attract the person's attention by waving your hands and shouting out. Make sure the person looks at you and keeps their head above water.
 - Decide quickly what you are going to use to reach to the person, like a strong stick or pole.
 - Lie on your tummy at the edge of the water with your leg slightly apart. If someone is with you, get him/ her to hold onto your feet and to place their weight over your legs.
 2. Give clear instructions to the person in the water. As soon as the person has taken hold of the pole, pull it gently towards the side. If you need to help him out, wait until he is close to the edge shore and then grab the back of his wrist.



How to resuscitate a person

Resuscitate- (re-sus-ci-tait) means to revive or 'restore to life' an unconscious person. If someone is pulled unconscious out of the water, this is the skill that could save his/her life. Read through the steps with the class and discuss the pictures. It has to be done carefully, so it would be best if you could get a nurse or someone with a first aid certificate to demonstrate and explain the technique to the class.

One day, you might be required to resuscitate an unconscious person so it is useful to know what to do and how to do it properly.

Here are a few steps to help you practise the technique of resuscitation:

Step 1

Lie the person on their back. Tilt their head sideways and clear the mouth.



Step 2

Tilt the head back.



Step 3

Pinch the nose and cover the mouth completely, sealing it with your mouth. Now blow out.



Step 4



Watch for the rise of the chest and, as you remove your mouth, listen for the air being expelled (breathed out).

Repeat the blowing in for as long as is necessary. Never give up. Keep the person warm and watch them all the time until medical help arrives. Practise the resuscitation technique with a friend or partner until you feel comfortable with it. Remember that this technique could help you save someone's life.

ACTIVITY 10B: PRACTISING RESUSCITATION

- Learners should be able to explain the resuscitation steps in the correct order.
 - (a) Ask learners to draw pictures of each step in the resuscitation technique on separate pieces of paper.
 - (b) Cut out each drawing.
 - (c) On small cards let them write the description of the four steps.
 - (d) Ask them to juggle the pictures and their action words.
- They must first give their partners a chance to unscramble the cards and action words. Use a stop watch to see how fast and accurately they do all four steps.

SAFETY TIPS

Read the following safety tips to the learners.

1. If you are within distance of trained help (a nurse, a doctor, a hospital, a clinic), phone or call for help and direct the life saver to the person in need.
2. If you are alone, try to reach the person from a shore by pulling him to safety without letting yourself being pulled in.
3. To help a lifesaver in a rescue situation, stand on the shore as a marker, constantly pointing to the person in distress.
4. Keep calm.
5. Realise your own limitations. Don't try to do things you are unable to do.
6. Act quickly.

ASSESSMENT

Assess whether the learners can:

- Demonstrate knowledge of safety in and around water.

FORESTRY



11. TYPES OF TREES

MAIN LEARNING AREA

NS: LO1: SCIENTIFIC INVESTIGATION

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.

AS2: Conducts investigations and collects data: Carries out instructions and procedures involving a small number of steps.

INTEGRATION WITH OTHER LEARNING AREAS

HL LO3 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.

AS9: Understands and responds appropriately to a range of information texts.

ACTIVITY

In this activity learners will:

- Look at the classification of trees according to the origin, season and botanical.
- Discuss the characteristics of different kinds of trees.

YOU WILL NEED

- Pictures of different kinds of trees.
- Information brochure


ACTIVITY 11A: CLASSIFICATION OF TREES.

What to do?

1. Ask the learners to read the following information about the types of trees.

Types of trees

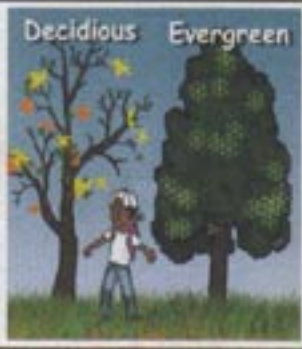
There are different ways to classify trees



Seasonal classification

Some trees are evergreen and some are deciduous, which means that some trees keep their leaves in winter while others lose their leaves.

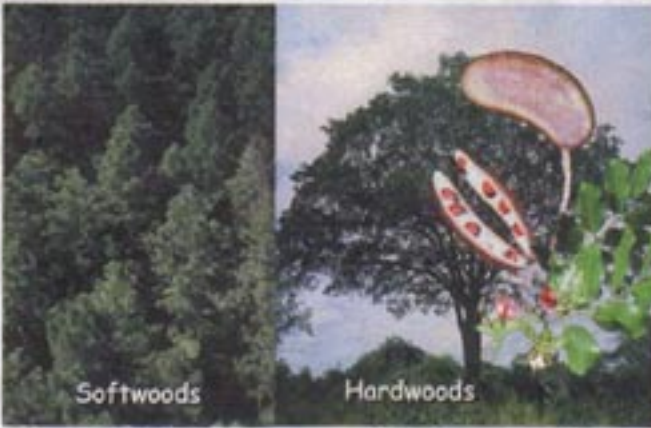
Deciduous Evergreen



Botanical classification


Two main groups are relevant here, namely trees that produce flowers and fruits (also called broad leaved trees or hardwoods) and secondly, trees that do not produce flowers such as conifers (also called softwoods).

Softwoods Hardwoods



Origin

With regards to origin, trees can be classified as either Indigenous or exotic. Indigenous trees naturally occur in South Africa, eg. Acacia karoo also known as the Sweet Thorn Tree. The Exotic species do not occur naturally in South Africa but are introduced from other countries.



Indigenous Exotic

2

Ask Learners to complete the following worksheet to summarise the classification of trees.

Classification	Origin	Seasonal	Botanical
Main groups	(i) _____ (ii) _____	(i) _____ (ii) _____	(i) _____ (ii) _____
Description (What are they)	(i) _____	(i) _____	(i) _____
Examples.			

Poster about classification of trees.

1. Ask learners to collect as many pictures of tree cuttings.
2. Tell them to obtain pictures from the newspapers, Department of Water Affairs & Forestry or you may even take photos of trees.
3. Their poster must show the following:
 - Classification.
 - Main groups of the trees.
 - Description.
 - Examples.

Assessment

The poster will be assessed based on the following:

- Classification.
- Main groups
- Descriptions
- Examples
- Legibility
- Attractiveness.

12. OUR ROLE IN THE FIGHT AGAINST INVASIVE ALIEN PLANTS

MAIN LEARNING AREA

LS: LO 2 CONSTRUCTING SCIENTIFIC KNOWLEDGE

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

AS1: Recalls meaningful information: At the minimum, uses own most fluent language to name and describe features and properties of objects, materials and organisms.

INTEGRATION WITH OTHER LEARNING AREAS

HL LO3 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.

AS9: Understands and responds appropriately to a range of information texts.

ACTIVITY

Learners demonstrate ability to effectively:

- Communicate own solutions.
- Work in a group situation.
- Research and recall information on curbing the spread of IAPs.
- Finds solutions to IAPs from the point of view of various stakeholders.

ACTIVITY 12A: THREATS POSED BY INVASIVE ALIEN PLANTS

Role play: To find solutions to the problems posed by IAPs from the perspective of various role players

WHAT TO DO:

- Divide the class into seven groups.
- Write the identities on the leaves of a branch taken from an invasive alien plant/tree, and allow a member from each group to pick one leaf (i.e. an identity)

WHAT THREATS DO THESE INVASIVE ALIEN PLANTS POSE?

Invasive alien plants pose one of the greatest threats to the natural ecosystems of the Cape Peninsula. These plants are disrupting the ecology of natural ecosystems, displacing indigenous plants and animal species, and degrading the Peninsula's unique and diverse biological resources. Aggressive invaders reduce the amount of light, water, nutrients and space available to indigenous species, alter hydrological patterns, soil chemistry, moisture-holding capacity and erodibility, and change fire regimes. Some invasive alien plants contain toxins that may be lethal to certain animals. In some cases, invasive alien plant invaders are driving our rarest species closer to extinction. Effects such as these have direct and indirect economic costs. For example, alien invasions not only reduce the ecotourism potential of Fynbos landscapes and the land available for agricultural purposes, but also deplete the potentially exploitable genetic stock of wildflowers and medicinal plants. And management of these species is expensive. Invasive plants cause great economic losses and expenditure each year, measured in billions of rands, for agriculture, forestry, grazing and roadways management.

The Peninsula fires of January 2000 provided dramatic evidence of the destructive effects of invasive alien plants. If it wasn't for the invasive alien plants, the fire would have been more manageable. It has been clearly demonstrated that all houses damaged and destroyed during these fires were as a direct consequence of dense stands of invasive alien plants surrounding properties. In addition, the intensity of fires is significantly higher in alien invaded areas and causes substantial environmental damage. As a result, soil alters in such a way that it actually repels water and becomes prone to erosion by wind and water. Roots, seeds of indigenous vegetation and other organisms in the soil are destroyed and damaged, and the landscape battles to recover. In the first major downpour after a fire, tons of soil from the burned areas pours like muddy soup into streets and homes surrounding the mountain slope. Many homes suffer thousands of rands worth of damage. In uninvaded fynbos however, erosion seldom occurs after fires because the natural landscapes have had thousands, if not millions, of years to co-evolve with fire.

Perhaps the most important threat of all is that of alien plants on the water yield from mountain catchments, springs and vleis. Dense stands of invaders may not reduce water yield in these areas by as much as 50% in extreme cases. In the water-starved lowlands of the Cape Metropolitan area, this is a serious matter and it affects our socio-economic well-being.

OUR ROLE IN THE FIGHT AGAINST INVASIVE ALIEN PLANTS

The Cape Peninsula, some 470 km² in extent, is recognized as one of the world's most prominent "hotspots" of plant diversity. The Peninsula has more than 2 285 species of plants – more than the entire British Isle (1 492 species) and New Zealand (1 996 species). Of these, 90 are considered endemic (i.e. occur nowhere else in the world). This natural trove is threatened by the persistent spread of invasive alien plants.

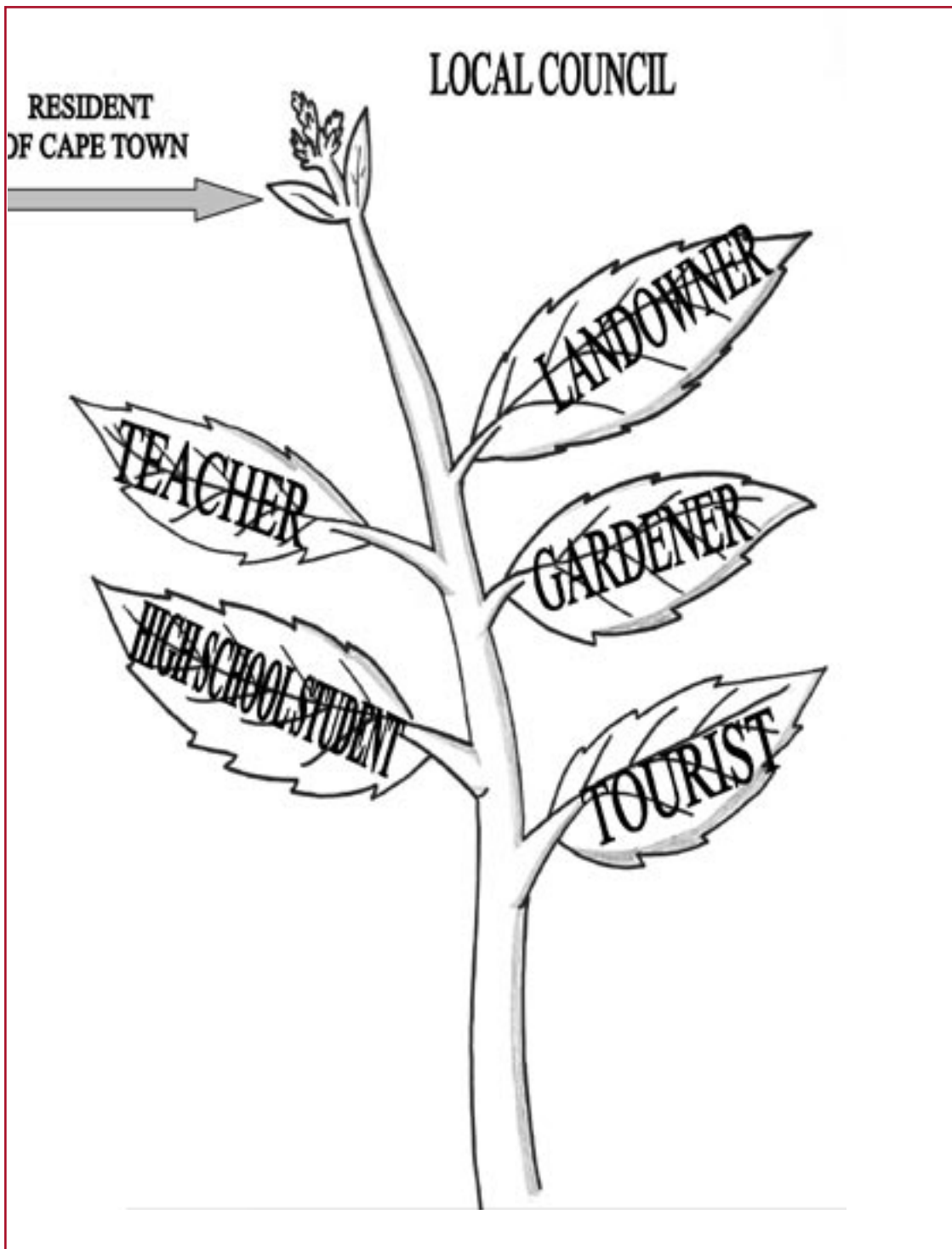
Why are invasive alien plants a problem?

Invasive alien plants are highly adaptable, vigorous growers that easily invade a wide range of habitats. Thus, invasive alien plants are a major threat to the biodiversity and economy of the Western Cape, as they:

- ⊙ Increase the intensity of wild fires by greatly increasing the fuel to burn
- ⊙ Consume large amounts of water (3.3 billion cubic meters more than indigenous plants)
- ⊙ Displace indigenous fynbos species and impact on biological diversity
- ⊙ Invade land better used for crops and livestock grazing, and
- ⊙ Increase the speed of water run-off which can lead to erosion and flooding

Role Play Activity

Question: I live in South Africa – **what can I do to curb the threat posed by invasive alien plants?**



Each group is assigned an identity (a landowner, a gardener, a high school student, a teacher, a tourist, the local council, or a resident of Cape Town) and they need to compose an answer to the above question from their perspective (the role they chose).

Let the learners discuss in groups and respond to the question and report back to the whole class.
Role Play Assessment Instrument

RUBRIC

Assessment Criteria	Performance Indicator Levels			Comment
	0	1	2	
Group work	Conflict between members	Not all members participated	Effective group work and good group spirit	
Use of background information	None used	Reference to one resource	Reference to more than one resource	
Report back	Shows no understanding of the question	Shows partial understanding of the question	Shows understanding of the question	
Awareness and recognition of environmental problems	Unaware of environmental issues	Aware of issues but does not engage with them	Interested in resolving environmental problems	
Creativity	Lacks creativity	Elements of creativity	Very creative	

BIBLIOGRAPHY

Clitheroe, F. et al. (2004). Oxford successful: Economic and Management Sciences - Learners' book, Oxford University Press Southern Africa.

Clitheroe, F. et al. (2004). Oxford successful: Life orientation - Learners' book, Oxford University Press Southern Africa.

Department of Education. Pretoria (2002). Revised National curriculum statement (Grades R – 9), Additional Language.

Department of Education. Pretoria (2002). Revised National curriculum statement (Grades R – 9), Arts and Culture.

Department of Education. Pretoria (2002). Revised National curriculum statement (Grades R – 9), Economic and Management Sciences.

Department of Education. Pretoria (2002). Revised National curriculum statement (Grades R – 9), Home Language.

Department of Education. Pretoria (2002). Revised National curriculum statement (Grades R – 9), Life Orientation.

Department of Education. Pretoria (2002). Revised National curriculum statement (Grades R – 9), Natural Sciences.

Department of Education. Pretoria (2002). Revised National curriculum statement (Grades R – 9), Social Sciences.

Department of Education. Pretoria (2002). Revised National curriculum statement (Grades R – 9), Technology.

Eco-Schools Toolkit: Sharenet 2003

Environment Diary – Sustainable living at work. Ince Custom Publishing. (2004).
Joy, P (2004). *Considering Conservation: The world's Water*. Dryad Press Limited: London.

Enviro – Teach Vol 11: Sharanet Project, May 2002.

Monteith, M. et al. (2004). Oxford Successful: Social sciences – Learners' book, Oxford University Press Southern Africa.

Nyren, P. (2000). Study Skills Grade 6. Maskew Miller Longman.

Precautions to avert typhoid fever infection. City press September 11 2005.

Real Magazine, December 2006.

Schools sanitation and Hygiene – A helpful guide for teachers: Department of Water Affairs and Forestry, Department of Health, Department of education.

The treasure buried deep under the ground – Find out about groundwater: NORAD- assisted Programme for the sustainable development of the groundwater sources, Community Water supply and Sanitation Programme in South Africa.

Rural Communities and River Health pamphlet, 2003.

Swimming South Africa