

## **A MESSAGE TO TEACHERS**

Access to water is one of life's most basic and essential needs. The South African government is working hard to deliver clean water to every community for drinking, washing and cleaning. But that is not where it all ends. Used water (called sewage) from kitchens, bathrooms, laundries and industries can contain many harmful germs, which cause diseases, and a variety of dangerous chemicals. The sewage has to be 'cleaned-up' or treated before it is returned to the environment, where it re-enters the water-cycle. In Durban, this is the job of the Water and Sanitation Unit of the eThekweni Municipality.

This Unit operates 28 sewage treatment plants with a combined capacity of 735 million litres per day. Sewage collection is provided for about 300 000 premises in a 1 364 square kilometre area. The Unit operates 265 pumping stations and approximately 5 500 km of sewer lines, the largest pipe being 1 600 mm in diameter. Pipes connecting homes to the sewer systems are 100 mm in diameter.

This all sounds impressive, but the effectiveness and efficiency of the sewage disposal system is greatly affected by the conduct of the users (us!). Abuse of the system, such as the irresponsible use of sewage pipes and toilets as dumps for solid wastes and rubbish not only hinders the treatment process, but leads to sewer blockages and overflows of sewage into watercourses, rivers and the sea. This can be a serious health hazard in itself, but also results in poor water quality that can affect the health of people and the environment. Any careless and wasteful use of water in homes and industries is also very costly as all the water that enters the sewers has to go through the expensive treatment process.

South Africa is a dry country. We cannot afford to waste our precious water resources. South Africa is also a developing country. We cannot afford to waste our financial resources on unnecessary sewage treatment and sewer maintenance. That money would be better spent in providing new services.

South Africa's new education curriculum is committed to transforming our country into one in which we all want to live. We trust that you, the teacher, will be inspired to use this resource on sewage and sanitation meaningfully. Along with sensible hygiene practices, South Africans need to choose to use our water resources responsibly if we are to achieve the personal and environmental health that is needed to take us successfully into the next century.

## INTRODUCTION TO THE MANUAL

- **FOCUS**

The ideas given in the manual focus mainly on what happens to used water (called sewage) in the greater eThekweni Municipal area, and how and why people should use the sewerage system responsibly if community and environmental health is to be ensured.

Ideally, teams of teachers should use this resource to develop cross-curricular Learning Programmes based around a local sewage issue. This approach is well suited to OutcomesBased Education.

- **ABOUT THIS MANUAL**

This resource is not a text-book, nor is it a recipe for a Learning Programme. It has been developed as a ' toolbox' of ideas related to sewage disposal issues which you, the teacher, can use and adapt to develop exciting Learning Programmes that are relevant to your pupils.

The format has been used as it allows you to ' grow your toolbox' as you find new resources and relevant articles. Worksheets or activities which you, your colleagues or your pupils have developed or adapted can be added into the appropriate sections. You may even wish to add new sections!

Some guidance is provided about an issues-based approach to Learning Programme development. This is just one of the ways to develop a locally relevant curriculum. Over time you may wish to adapt some of these ideas to better suit your situation and experience.

- **MANUAL LAYOUT**

In this manual you will find:

- **Infosheets:**

These provide background information on sewage related topics and will help you in your preparation of lessons.

- **Activity Sheets:**

Each infosheet is supported by a range of activity sheets, which will help suggest ways in which learners can participate in the lesson(s).

**- Support Sheets:**

This section includes:

- An answer sheet.
- OBE support materials, including an example of a lesson plan and lists of specific outcomes for all 8 Areas of Learning.
- Useful addresses and phone numbers. These organisations can either provide resource materials, answer sewage related questions or offer workshops and courses related to sewage.
- A glossary.

- **EXPLANATIONS OF WORDS**

Throughout the manual you will find some words written in bold type. These are explained in the section called "Glossary".

## **INTRODUCTION TO ISSUES-BASED TEACHING**

Exposing learners to experiences that are real to them in their life is good education practice. Learning involves the mind, the body and the emotions. All these are naturally stimulated into action when locally relevant issues are focused on at school. This approach is called *issues-based teaching*.

Issues-based teaching strongly supports the achievement of *Critical Crossfield Outcome No. 2* as it follows a problem-solving approach to learning.

The following ' steps' offer one set of suggestions on how you, the teacher, can select appropriate learning activities, teaching methods and specific outcomes when dealing with a local sewage issue.

Plan for learners to:

1. participate in recognising the problem.
2. explore the problem through ' hands-on' activities.
3. identify and understand all the facets of the problem.
4. develop possible solutions to the problem.
5. embark on group action to resolve the problem.

These 5 steps are described in more detail, with examples, below.

## 1. RECOGNISING THE PROBLEM

The teacher, preferably together with colleagues and learners, selects a local issue. Some local sewage-related issues may include:

- the poor state of the school toilets.
- blocked, overflowing street sewers in your community.
- an epidemic of gastroenteritis in the community.

Arrange for learners to visit the site of the sewage issue, or hand out relevant photographs, drawings, cartoons or newspaper clippings. Discussion, debate, role-play or written responses are a variety of ways in which the problem can be 'recognised' by the learners.

## 2. EXPLORING THE PROBLEM FURTHER

IMPORTANT! This manual includes InfoSheets and Activities covering a variety of sewage-related topics. There are strong links between most of these topics. For easy reference they have been divided under the following headings:

- sewage and waterborne
- sewerage systems
- sewage treatment.
- sewerage system problems.
- sewage disposal and health.
- sewerage tomorrow.

Working from front to back is probably not the best way of using this manual. It is recommended that teachers first familiarise themselves with the infosheets and activities in this manual in order to select the most appropriate starting activities and to develop the learning and teaching programme in a logical way in response to the learners.

When exploring your local sewage issue further, start with activities immediately related to that issue. For example, if the school toilets are the issue, explore the problem further by starting with the activity: *School Toilet Audit*. The activity: *A Day with the Drain Doctor* would be a more suitable activity for exploring the problem of blocked, overflowing street sewers. A project on Waterborne Diseases would be a useful activity to begin exploring the issue of a gastroenteritis epidemic in your local community.

## 3. IDENTIFYING AND UNDERSTANDING THE FACETS OF THE PROBLEM

As the learners explore their issue, the many different facets of the problem will begin to emerge. The teacher who is familiar with the infosheets and activities in the manual will then be able to develop the programme in response to 'discoveries' made by learners, interests expressed by them or questions asked by them. This allows for a natural, more logical progression in the learning and teaching programme.

For example, after exploring the state of the school toilets, learners may be asking whether the toilets are a health hazard. Others may be wondering to where the sewage flows. In order to understand the facets of the problem further, it would now be appropriate to introduce the activities following the infosheet *Sanitation Saves*. Should your learners be more interested in finding out to where the sewage flows, it would be appropriate to move on to the activities following the infosheet *Different Drains*, followed by a visit to a sewage treatment works and the activities related to that topic. The learning and teaching programme can then develop until all the facets of the topic are explored fully and satisfactorily.

Note: It is possible that it may become necessary to explore facets of a problem that are not covered in this manual. Teachers are encouraged to develop their own activities in response to these facets rather than ignore them. It is good to maintain flexibility, but be sure to remain on track!

#### **4. DEVELOPING POSSIBLE SOLUTIONS TO THE PROBLEM**

IMPORTANT! As learners move towards meaningful action, expect them to re-visit some of the earlier 'steps' again and again. Reflecting, replanning and ~~re~~doing are usually part of any successful Action Plan!

Some useful questions that learners could ask themselves when developing solutions could include:

- What can we do?
- How will we do it?
- Who will do it?
- Will it cost money?
- When can we do it?

#### **5. EMBARKING ON GROUP ACTION TO RESOLVE THE PROBLEM**

Solving problems is never simple. It often requires co-operation and interaction between a wide range of people and organisations. The time- frame set by teachers should be long enough to allow learners to deal with a particular issue meaningfully.

Be sure to allow enough time for action to take place!

## **SELECTING SPECIFIC OUTCOMES**

Appropriate Specific Outcomes can be clustered from across all 8 Learning - Areas according to the type of issue being addressed, and the ways in which learners and the teachers from various Learning Areas involve themselves in the issue. Remember to look out for the unexpected or coincidental Outcomes that emerge during the learning and teaching programme.