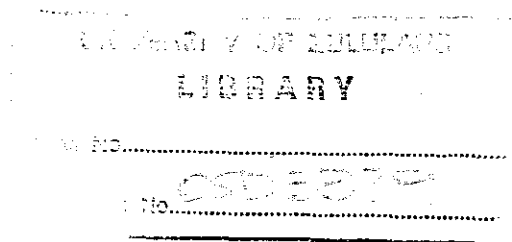


**EVALUATING THE ROLE OF LEARNING SUPPORT  
MATERIALS IN CURRICULUM IMPLEMENTATION:  
THE CASE OF "WE CARE"**



**CLEOPATRA LUTHULI**

**2008**

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IN CURRICULUM IMPLEMENTATION:  
THE CASE OF "WE CARE"**

**BY**

**CLEOPATRA LUTHULI**

**A mini dissertation submitted to the Faculty of Education in partial  
fulfillment of the requirement for the degree of**

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In the  
Mathematics, Science & Technology Education Department**

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**Supervisor: Dr ET Dlamini**

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## DECLARATION

I, Cleopatra Luthuli hereby declare that this dissertation for the degree of Masters in Environmental Education at the University of Zululand, is my own work and that it has never been presented in part or its entirety at this or any other university in order to obtain a degree.



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**C. Luthuli**

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**KwaDlangezwa**

## **SUMMARY**

The study sought to explore the impact that exemplary curriculum materials called "We Care" had made on the classroom practice of the recipients, namely *educators in rural areas*. It also explored the ways in which the recipients put the materials to use.

The materials in question introduced the educators to the practice of integrating Environmental Education (EE) into the teaching of the Natural Sciences. The materials also provided suggestions with regard to learner-centred activity-based ideas for learning programme development. Teaching experiences of educators using "We Care" were recorded mainly by means of videotaped lessons, which were transcribed and analyzed.

Results showed that all the educators found the materials informative and interesting to use. "We Care" materials generated collegiality among the educators and inspired them to work together and share ideas. Analysis of the videotaped lessons, however, revealed that the participants often lacked adequate content to explain science concepts clearly.

Group work was also handled poorly, with the result that the objectives of group activities were not being achieved. A general weakness in handling the

outcomes-based approach was evident, despite the participants' expressed conviction that "We Care" had helped them to demystify OBE. The study's value manifested in the identification of good practice among the participants and in the opportunity that it provided to discuss exemplary practice.

## **ACRONYMS AND ABBREVIATIONS USED IN THIS STUDY**

<b>CoP</b>	<b>Communities of Practice</b>
<b>DAEA</b>	<b>Department of Agriculture and Environmental Affairs</b>
<b>EE</b>	<b>Environmental Education</b>
<b>EEPUS</b>	<b>Environmental Education Programme of the University of Stellenbosch</b>
<b>LA</b>	<b>Learning Area</b>
<b>NCS</b>	<b>National Curriculum Statement</b>
<b>NEEP-GET</b>	<b>National Environmental Education Programme for the General Education and Training</b>
<b>OBE</b>	<b>Outcomes Based Education</b>
<b>RNCS</b>	<b>Revised National Curriculum Statement</b>
<b>UNCED</b>	<b>United Nations Conference on Environment and Development</b>

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## **CHAPTER ONE**

### **PURPOSE AND ORIENTATION OF THE STUDY**

#### **1.1 Background**

This study focuses on a project called "We care" which was developed by the Environmental Education Programme of the University Stellenbosch (EEPUS), funded by TOTAL (SA) and sponsored by the Shuttleworth Foundation. "We Care" is learning support material which was developed in order to assist educators in focusing on the immediate environment when developing learning programmes. It also aims at assisting educators to implement environmental education across the different learning areas in the Revised National Curriculum Statement (RNCS).

The "We Care" learning support material provides suggestions for developing a learning programme which is learner-centered and activity-based. It is designed to help educators with interpreting the RNCS and with developing outcomes-based learning programmes while focusing on local and contextual environmental issues and concepts. The curriculum focuses on materials for the Intermediate Phase learners i.e. Grades 4-6. The presentation of the materials is such that the learners are encouraged to interact with their local environments. This strategy is supported by Fensham (2005) where he describes his choice of curriculum emphasis, he suggests that in the primary years the pre-eminent emphasis should be the development of an interest in Natural phenomena and in

the ways that illustrate how science has enabled humans to interact with the natural environment.

Issues of teaching, learning and curriculum implementation are intertwined. The curriculum will not be successfully implemented if educators are not equipped with the necessary skills and materials to implement the curriculum. The National Curriculum Statement is there for the educators to implement the curriculum. However not much is being done to help them. The educators have been caught up by the jargon used in OBE. The fact that the medium of instruction is also foreign has made a lot of educators uncertain about authentic implementation of OBE. "We Care" curriculum materials were therefore expected to demystify the implementation of OBE. Secondly, the materials were also meant to introduce environmental education into natural sciences, since it is very important to develop an environmentally literate society.

The main focus of this study was to evaluate how educators used the "We Care" learning support material in their classes in implementing the curriculum.

## **1.2 Motivation of the study**

The government has indirectly mandated that environmental education should cut across all the learning areas. This can be seen in one of the critical outcomes which envisages learners who are able to use science and technology effectively and critically, showing responsibility towards the environment and the health of

others (RNCS, Grades R-9 2002:1). Numerous environmental and developmental issues (NEEP-GET document 2004:5) directly and indirectly affect learners' life experiences. For instance, issues of HIV and AIDS where a number of learners are orphaned young and have to head families. Other learners have been infected at birth by their parents who were HIV positive. There is also a growing trend of very young children being raped by people who are paedophiles or who are avoiding to contract the disease.

In order to carry out this indirect mandate of the government to integrate environmental education across the curriculum, educators need to be empowered. Letting the educators use the "We Care" learning support material is a way to empower them in their classrooms in order to implement environmental education. The researcher intends to evaluate the use of these materials in order to see whether these materials were really helping the educators in implementing EE in the curriculum.

### **1.3 Statement of the problem**

There have been many changes in the South African Education system since 1994. For example, the NCS was revised and is now the RNCS. These changes have been very sudden and educators have at times not been able to catch up with these changes. This is affirmed by the Report on the Implementation and Development of Curriculum 2005 (1998:3) which states that one of the biggest

problems with the implementation of Curriculum 2005 has been that it has happened too quickly.

The government can change the curriculum as much as it wants to, but if the educators are not empowered, then it becomes a futile exercise. It goes without saying that an education system is as good as its educators. Now that some educators have been provided with the "We Care" learning support material to help them implement EE in the curriculum, this study wants to see how these educators are using them and what impact they have on their delivery of OBE.

The "We Care" learning support material was developed by the University of Stellenbosch. The materials are designed for active learning. The material addresses three themes. These themes are: **Earth as a living planet, Life on planet earth and Our threatened planet earth.** Each theme covers various topics and activities. The activities may be used in situations ranging from the most remote rural areas to city environments. None of the activities requires expensive equipment or a supply of electricity. Most activities are supplied with the required information as access to such information may be difficult.

The involvement of both educator and learner in the planning of the learning experience is encouraged. The activities are structured to help the educator with the implementation of OBE. Each activity has a short summary of learning area links, skills developed in a particular activity, critical outcomes addressed, activity

outcomes and examples of assessment strategies (see Appendices). Each activity is also graded as to the level of difficulty and this is shown with an icon in the form of an ant. If there is one ant then the activity is easy, two ants mean the activity is not so difficult, but three or four ants mean the activity requires a lot of effort to do but not impossible. The time it will take to complete the activity is also given. The activity also indicates where it can be undertaken, be it indoors or outside. There is also an indication whether the activity can be done by an individual, a pair or a group. Key words used in the activity are also explained.

#### **1.4 Aims of the study**

This study aims:

- To explore how the educators are using the “We Care” learning support material.
- To find out whether these materials are assisting the educators to gain a repertoire of teaching methods instead of using the ‘telling method’.
- To identify which activities educators select and why, deviation and adaptation to the different contexts existing in schools or other elements of creativity shown by educators around the use of these materials.
- To determine whether the educators follow the strategies provided in the materials to the letter, that is, whether there is any deviation, if so, why.

- To find out if learners are engaging in group work and if so how the educators ensure that learners learn from group work.
- To identify difficulties that educators encounter while engaging with the “We Care” materials.

### **1.5 Significance of the study**

Evaluation of the role of the “We Care” learning support material, as used by Natural Science educators in the schools in which it is being piloted, will help to determine whether these materials should be disseminated to other schools. Secondly, with the outcry that educators are failing to implement OBE successfully, if “We Care” has been useful to demystify OBE, then education officials should make available exemplar materials to the educators.

### **1.6 Delimitation of the study**

Five primary schools were chosen to pilot the “We Care” materials. These schools are will be designated as A, B, C, D and E as a means of protecting their identity. This is an ethical requirement to make sure the schools remain anonymous. They are all situated in the vicinity of Esikhaleni and Empembeni in the Empangeni district.

Educators who teach in the Natural Science learning area in the Intermediate Phase were identified from each of these schools. A workshop was then held at the University of Zululand to familiarize them with the materials before they could use them in their classrooms. This was to make sure that the educators had interacted with the material and understood how to work with both the learners' as well as the educator's activities.

### **1.7 Limitations of the study**

The first limitation of this study is that the number of schools using the "We Care" materials is very small. Secondly, visiting these schools sufficiently often to make the study significant means that there must be a lot of travelling involved for the researcher. So in order to minimize the travelling, the schools chosen had to be close to the University of Zululand where the researcher is based. However, the small number of schools made it easy to work with the educators frequently and to get to know and be trusted by them throughout.

### **1.8 Definition of terms**

#### **1.8.1 Evaluation**

The term evaluation involves a process of identifying or determining the worth of something. This study will be evaluating the "We Care" learning support material to determine its worth as a tool in the implementation of EE. The Joint Committee on Standards for Educational Evaluation (1981) states that the evaluation refers

to the 'systematic investigation of the worth or merit of an object.' This definition centres around using evaluation for a purpose. Evaluations are conducted for action related reasons, and the information provided should facilitate deciding a course of action.

### **1.8.2 Learning support material**

Learning support materials are a means of promoting both good teaching and learning. "Although learning support materials cannot replace an educator, successful learning depends to a great extent on the educator's ability to identify the relevant resources, then design, and adapt or use them to produce effective learning support materials." (<http://curriculum.wcape.school.za>). In this study the learning support material refers to the "We Care" materials.

### **1.8.3 Curriculum**

Print (1993:9) gives the following definition of curriculum: "...all the planned learning opportunities offered by the organisation to learners and the experiences learners encounter when the curriculum is implemented. This includes those activities that educators have devised for learners which are invariably represented in the form of a written document."

The Southern African Development Community (2000:8) defines curriculum as "a composite whole including the learner, the teacher, teaching and learning methodologies, anticipated and unanticipated experiences, outputs and

outcomes possible within a learning institution.” A curriculum therefore considers the learners and their interaction with each other, the educator and materials.

#### **1.8.4 Curriculum implementation**

Curriculum implementation involves putting into practice the officially prescribed courses of study, syllabuses and subjects. What is of importance is that the implementation of the curriculum cannot take place without the learner. The learner is therefore the central figure in the curriculum implementation process. The educator has been identified as the agent in the curriculum implementation process. Curriculum implementation therefore refers to how the planned or officially designed course of study is translated by the educator into syllabuses, schemes of work and lessons to be delivered to students (University of Zimbabwe, 1995).

#### **1.8.5 Sustainable Development**

The most frequently quoted definition of sustainable development is the one by the Brundtland Report (1997) which defines it as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” From this definition it is clear that while development may be essential to satisfy human needs and improve quality of life, it should occur in such a way that the present and future needs are not compromised. Pachauri (2001:37) comments on this definition by adding the fact that “the emphasis on

satisfaction of needs in itself implies that a pattern of development which is not based on the satisfaction of needs is clearly unsustainable.”

The emphasis is on meeting human needs in a manner that respects intergenerational responsibility. The Earth Summit (1992) gave high priority to the role of education in order to foster values and attitudes of respect for the environment. The Johannesburg Summit (2002) proposed the Decade of Education for Sustainable Development as a way of signaling that education and learning lie at the heart of approaches to sustainable development.

All definitions of sustainable development require that we see the world as a system, a system that connects space and a system that connects time. ([www.iisd.org/sd/](http://www.iisd.org/sd/)). Everything concerning EE is about sustainability of what we do. If educators cannot implement OBE efficiently, learners will not learn effectively and that is not sustainable.

#### **1.8.6 Outcomes-based education (OBE)**

Berlach and McNaught (2007:2) use a definition by Spady (1994) who is one of the leading pioneers of OBE which states that OBE means “clearly focusing and organizing everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences. This means starting with a clear picture of what is important for students to be

able to do, then organizing the curriculum, instruction and assessment to make sure this learning ultimately happens.”

Mokhaba (2005:30) writes that an outcome is an “observable demonstration of something that the learner can do as a result of a range of learning experiences and capabilities that underlie it. This demonstration does not occur in a vacuum, but in a particular context which has a direct bearing on what is being carried out.” In other words, OBE means organizing the educational process to obtain the desired results and allowing learners to demonstrate their achievement as a means of evaluation. A major point of departure is that in OBE learners are at the centre of the teaching process.

The activities found in the “We Care” material have been structured in a way which helps in the implementation of EE through OBE. Each activity has a short *summary of learning area links, skills developed in a particular activity, critical outcomes addressed, activity outcomes and examples of assessment strategies.* Therefore there is a need to analyze the “We Care” curriculum materials.

### **1.8.7 Constructivism**

OBE has as its central premise the rationale of constructivism that also fits the principles that drive the “We Care” materials. Schulte (1996:25) has this to say about constructivism: “...learners bring their personal experiences into the classroom and these experiences have a tremendous impact on students’ views

of how the world works....Learners construct understanding or meaning by making sense of their experiences and fitting their own ideas into reality. Collaboration with others is so important that cooperative learning is a major method used in the constructivist classroom.” In the “We Care” learner support material, learners mostly work in pairs or groups to carry out the activities and they are encouraged to take action based on what they know will help to create a better world.

According to McBrien and Brandt (1997) constructivism is an approach to teaching based on research about how people learn. This is a belief that students learn best when they gain knowledge through exploration and active learning. Furthermore, hands-on materials are used and students are encouraged to think and explain their reasoning. Education is centred on themes and concepts and connections between them rather than isolated information. The ‘We Care’ material has been organized and divided into themes which show a connection between them.

The following website is also of the same opinion as the above cited writers when it states that constructivism is a philosophy of learning founded on the premise that, by reflecting on our experiences, we construct our own understanding of the world we live in. It also emphasizes hands-on problem solving. ([www.funderstanding.com/constructivism.cfm](http://www.funderstanding.com/constructivism.cfm)).

### **1.8.8 Environmental Education (EE)**

The Wisconsin Association for Environmental Education (2007) defines EE as “a process aimed at developing a citizenry which is knowledgeable about natural and human-made environments and their associated issues, skilled in resolving those issues and motivated to participate in actions leading to quality of the environment and the quality of life.” Teaching about the natural and built environment provides a real-world context for learning by linking the classroom to the students’ community. Because EE encourages inquiry and investigation, students develop critical thinking, problem-solving and effective decision-making skills in a constructivist way.

### **1.9 Research methodology**

In order to be able to evaluate how educators were using the “We Care” materials in their teaching, they were videotaped while in action, that is, while they were teaching in their classrooms.

When analyzing the data, the following was looked at:

- How the educators were using the “We Care” learning support material.
- Clarity of explanation and clarification of concepts.
- Degree of integration of the materials with the Natural Science Learning Area.
- How much the educator involved learners in his/her teaching, that is, how much the educator conducts group work.
- Activities selected by educators.

### **1.10 Ethical consideration**

The participants were requested to give consent for their voluntary participation in this study and the researcher agreed not to divulge their names to maintain confidentiality.

### **1.11 Conclusion**

This chapter has unpacked the reason for undertaking this study. The aims of this study have also been listed as well as defining the important terms that are in line with this study. The next chapter will deal with literature review about the state of Environmental Educational both internationally and nationally.

### **1.12 Overview of the study**

The study is planned thus:

- Chapter 1 Introduction and Orientation
- Chapter 2 Literature review
- Chapter 3 Research design and methodology
- Chapter 4 Presentation and discussion of results
- Chapter 5 Conclusions and recommendations for further research

## **CHAPTER TWO**

### **THE STATE OF ENVIRONMENTAL EDUCATION: INTERNATIONALLY AND NATIONALLY**

#### **2.1 INTRODUCTION**

*This chapter focuses on the theoretical background to the principles and policies that have shaped the present status of environmental education (EE) and its integration into formal education in South Africa. There is a discussion on the theoretical framework which underpins this study. EE is a field which involves active learning and participation. Educators are seen as change agents who must implement EE in the curriculum in their schools as the government has mandated. In turn, the learners are expected to implement what they learn in EE by adopting sustainable life styles.*

#### **2.2 THE DEVELOPMENT OF ENVIRONMENTAL EDUCATION**

##### **2.2.1 An international perspective**

*The historical development of EE shows that EE is a relatively new discipline, still finding its way in the curriculum in education. The following table shows a summary of the conferences, declarations and strategies that have shaped EE through the years (Borman 1997:61; Lebeloane 1998:29; Loubser 1997:74-75; Mosidi 1999:24; United Nations 2002:5) in Ruhinda (2003:20).*

**Table 1: A summary of the conferences, declarations and strategies that have shaped environmental education**

Year	Conference/Declaration/Strategy	Contribution to the development of EE at international level
1972	United Nations meeting held in Stockholm	Special UNEP programme for promoting EE throughout the world
1975	Belgrade Charter	Guidelines for worldwide EE initiatives were laid down
1977	Tbilisi conference	During this conference the Tbilisi Declaration in which principles for EE were outlined
1980	The EE in the light of the Tbilisi Conference held in Paris	This was a follow-up conference to the Tbilisi convention to determine the progress made by UNEP in the area of EE
	IUCN meeting in Gland-Switzerland	At this meeting the Worldwide Conservation Strategy (WCS) was formed. The latter was to incorporate guidelines and strategies for curriculum design into EE
1987	The Moscow Conference	Delegates at the conference spelled out a strategy for EE for the decade 1990-2000. It also reconfirmed Tbilisi principles
	The World Commission on Environment and Development (WCED) or Brundtland Commission	Convened in response to global environmental concerns, highlighted the need for sustainable development
1988	UNESCO-UNEP initiative	UNESCO and UNEP compiled the International Strategy for Action in the field of EE and Training for the 1990s
1990	World conference on 'Education for All'	Dealt with the provision of basic learning needs which included knowledge about a sustainable lifestyle
1992	The Earth Summit	Agenda 21 – a 'blue print' for sustainable development was compiled. In it new EE programmes were proposed
2002	The World Summit on Sustainable Development	Recognized a recommendation made by the Johannesburg Summit on Sustainable Development and declared the ten-year period beginning on 1 January 2005 a 'United Nations Decade of Education for Sustainable Development'

As seen from Table 1, governments have staged many notable events with regards to the environment and EE. The Tbilisi conference charted a way forward by recommending for the wider application of EE in formal and informal education. This gathering resulted in the declaration of 12 principles, now

referred to as the Tbilisi Principles of EE which provided the framework and guidelines for the practice of EE on a global, regional and national scale. These principles were also reaffirmed in succeeding conferences as sound guidelines for the development of national EE programmes.

The 1992 Earth Summit focused on the role of EE as an educational response to the environmental crisis. One of the key documents to emerge from this conference is Chapter 36 of Agenda 21, which emphasizes the need for wide scale environmental education processes in diverse settings. Agenda 21 describes environmental education processes as “those processes that involve educators and learners in promoting sustainable development and improving the capacity of people to address environment and development issues.” (UNCED 1992; Chapter 36:2). There was also recognition of the central role of education in promoting and shaping values and social action. Environmental education is viewed as a socially transformative, continuous learning process based on respect for all life.

The World Summit on Sustainable Development (WSSD) in 2002, once again highlighted the role of education as a response to issues of poverty, global inequalities and the need for sustainable development in all societies. The need for action, commitment and partnerships with a focus in action for change in environmental education processes was emphasized (Irwin & Lotz-Sisitka, 2004:46).

The definition of sustainable development has been amplified to integrate issues of economic growth, social development and environmental protection. Documents emanating from the Rio Earth Summit of 1992, the Johannesburg World Summit on Sustainable Development (WSSD) of 2002 and other international and regional forums suggest that sustainable development is anchored on three pillars of sustainability: **environment, economy and society** (Ogunyeni 2005:95). A new educational approach has evolved due to the concern over the environment and development problems. This new angle focuses on educating for sustainability which considers the social, political and economic causes of the environmental situation (Tilbury, 1995).

### **2.2.2 THEORETICAL FRAMEWORK**

This section will discuss issues that underpin this study. There have been calls for a formal education response to environmental concerns since the first democratic election in 1994. Since that time, awareness of the interrelationship between environmental and social issues, including development, health and well-being, has grown both nationally and internationally. Environmentalists, politicians and educationists have advocated that individuals must learn in a formal way to reflect on the implications of their actions and act in positive ways that support and enhance the quality of life and the environment. (Chi Kin Lee and Williams, 2001).

Kruger (1991) writing on "chemistry and our endangered environment" states that men is a part of the ecosystem of the Earth. Therefore men's survival depends on the survival of biodiversity. However, men is drastically altering and the ecosystems of the Earth and has the power to destroy many of them. This has to change for future generations to find a livable planet Earth.

Evidence of a growing national commitment to environmental education processes is reflected as early as 1995 in South Africa's White Paper on Education and Training. The document states that: "environmental education, involving an interdisciplinary, integrated and active approach to learning, must be **a vital role of all levels and programmes for the education and training system** in order to create environmentally literate and active citizens, present and future, enjoy a decent quality of life through the sustainable use of resources." (White Paper on Education and Training, 1995:22)

When South Africa's new Constitution was adopted in 1996, it linked injustices to human rights and social responsibilities. The Constitution signaled a national commitment to environmental action. This is reflected in our Constitution as our right to an environment that is not harmful to our health or well-being. Environment is also linked to many other of our human rights, such as a right to adequate water and food, and our right to shelter, (NEEP-GET 2004:6)

As part of its commitment to addressing South Africa's environmental issues through environmental education, the Ministry of Education launched a National Environmental Education Project for General Education and Training (NEEP-GET). NEEP aims to

- Address the co-ordination of environmental education activities in schools, as well as curriculum and educator development.
- Support the provinces and educators to facilitate environmental learning.

The NEEP-GET project supports educators to implement environmental education within South African schools and particularly within the new South African Curriculum. NEEP-GET is a response to and offers support for new educational policies within the training context of South African environmental policy.

The Revised National Curriculum Statement (RNCS) has recognized the importance of environmental learning by making the environment part of one of the underlying principle in the RNCS. This importance can be seen from the various Critical Outcomes, in particular Critical Outcomes six and seven, which state that learners will be able to:

- Use science and technology effectively and critically, showing responsibility towards the environment and the health of others, and
- Demonstrate an understanding of the world as a set of related systems by recognizing that problem solving contexts do not exist in isolation (RNCS 2002:1).

Appreciating the relationships between science, society and the environment develops an awareness of environmental issues and responsible attitudes about the use of science and technology. Learning about the environment prepares learners to address environmental issues as accountable and responsible citizens. All of this requires skill, knowledge, attitudes and values which are best developed through active learning, critical thinking, and involvement in real issues and encounters in the learner's own environment.

Chi Kin Lee and Williams (2001) cite Lucas (1980/81) who made a distinction between education about, in and for the environment. They further state that Lucas (1980/81) explained that education **about** the environment is concerned with providing cognitive understanding including the development of skills necessary to obtain this understanding. Education **in** the environment is the use of real-life situations as a basis for inquiry learning. Education **for** the environment focuses on assisting, more actively, the preservation and improvement of the environment, inculcating attitudes to, or concern for the features of the environment that enhance the quality of life, creating a predisposition towards committed action.

Fien (1993) refers to education **about, in and for** the environment as approaches to EE. He states that education about the environment emphasizes knowledge about natural systems and processes and the ecological, economic, social and

political factors that influence decisions about how people use the environment. Education through the environment uses students' experiences in the environment as a medium for education. The aims of this learner-centered approach are to add reality, relevance and practical experience to learning and to provide students with an appreciation of the environment through direct contact with it. Lastly, education for the environment aims to engage students in the exploration and resolution of environmental issues in order to foster the values and promote lifestyles that are compatible with the sustainable and equitable use of resources.

Tselane and Mosidi (1998) concur with Fien (1993) when they sum up the role of EE as

"a process or approach which develops correct attitudes, values, behaviour and skills which will enable people to live in harmony with the natural resources (water, air, soil, animals, etc), maintain good quality of life considering that there are still generations to come. This approach enables the exploration of environmental issues through educational experiences and reflection in the environment, knowledge about the environment and appropriate commitments and action for the environment."

An important reason for linking the environment and education in South Africa is that environmental education can contribute significantly to transformation and

development. Education can be improved significantly by promoting active learning in and about the environment through outcomes-based education which deepens the relevance of classroom learning (NEEP-GET, 2004).

### **2.3 THE INTERDISCIPLINARY NATURE OF ENVIRONMENTAL EDUCATION**

Environmental Education involves a holistic and interdisciplinary approach. This is reiterated by Wilke (1993:26) where he states that "environmental education today serves as a common thread uniting longstanding interests and emphases in nature study, conservation education and outdoor education, that is, learning in and about the environment." He further mentions that "EE forces and fosters holistic, integrated, interdisciplinary education because the learner and educator must confront more than one discipline at a time." The White Paper on Education and Training (1995:18) expresses the need for EE processes "involving an interdisciplinary, integrated and active approach to learning." Recent years have seen considerable effort being put into reorienting EE from conservation education to education for sustainable living.

All learners, children and adults need to see the connections among the discrete bits of knowledge gained on a daily basis if they are to respond to the challenges of a nation moving towards sustainability. The environment itself is a constantly changing web of interconnected and interdependent biophysical, cultural, social, economic and political contexts. Because of this, education for sustainability continually stresses the importance of integrating education for sustainability into

all areas, programmes and systems of education. Working towards sustainability requires integration between all sectors, involvement of all concerned parties, cross-sectoral approaches and holistic application.

There is a general trend to implement EE in a cross-curricular form rather than through the medium of a single subject. While both have advantages and drawbacks, the cross-curricular approach is well-suited to the multi-sectoral origin and impact of environmental issues. Implementation of EE within formal education can be greatly facilitated by its inclusion within formal curricula. Without its inclusion there is no imperative to integrate it into teaching and learning. The emphasis prior to 1994 was EE as a separate subject. It was a great struggle to generate a cross-curricular approach.

Cross-curricular teaching involves a conscious effort to apply knowledge, principles and values to more than one academic discipline simultaneously. The disciplines may be related to one another through a common theme. The organizational structure of interdisciplinary / cross-curricular teaching is called a theme or unit. It is a framework with goals that specify what students are expected to learn as a result of the experiences and lessons that are part of the theme. More-over, cross-curricular themes integrate language skills with a variety of content areas such as science, art, music and so on. ([www.zsp2wadowice.iap.pl/strony/publikacje/cross.doc](http://www.zsp2wadowice.iap.pl/strony/publikacje/cross.doc)). The Natural Science

Learning Area means that the boundaries have been softened (as opposed to subjects) for cross-curricular approaches.

The government, through the RNCS has mandated that EE be introduced across the curriculum. This implies that all educators are expected to infuse it into their teaching. Kethoilwe (2003:75) refers to "the implementation of EE as an infused phenomenon, that is, attempts are made to infuse EE into the existing curriculum." Pandor's speech, Minister of Education in South Africa, (2007: 2) also touched on the cross-curricular approach towards the teaching of EE when she said, "EE is not taught in one learning area. It is taught in a cross-curricular fashion, because environmental issues are to be found in every learning area."

Education for a sustainable future involves a comprehensive approach to educational reform. Monroe and Cappaert (1994) state that meaningful learning requires learners to integrate ideas from many different perspectives rather than compartmentalize what they learn into discrete 'boxes' of knowledge. As a result, educators need to be flexible and skilled in accessing and integrating knowledge from different sources or disciplines. This illustrates that education for a sustainable future can be integrated into and across the different learning areas of the curriculum.

Other countries have also adopted the cross-curricular approach when it comes to the inclusion of EE in formal education. For example in Namibia they have an

Enviroteach project which aims to establish EE in formal education, (Imene, 1999). With the aid of this project EE has been infused or integrated across the curriculum. The "We Care" learner support material uses the interdisciplinary and cross-curricular approach. With this material each activity has been designed such that it shows the main focus learning area and the other learning areas where the cross-curricular approach can be applied. This is evident when one looks at the way in which the lessons and activities have been designed. Each one shows how the integration works with the different learning areas.

#### **2.4 ENVIRONMENTAL EDUCATION, MINDS-ON AND HANDS-ON LEARNING**

In the primary years, EE should focus on concrete experiences and active participation. Emphasis should be given to activities and projects with the aim of developing skills, attitudes, habits and values in learners, leading to positive environmental action. (National Council of Educational Research and Training in [http://ncert.nic.i/sites/publication/envstudies/management\\_impl.htm](http://ncert.nic.i/sites/publication/envstudies/management_impl.htm)). *The curriculum should be learner-centered and the interests of the learners must come into play in the design of the curriculum. Curriculum relevance and interests of learners are thus intertwined, since the learner is part of the larger society (Maduewesi 2001:29).*

The "We Care" learner support material is designed such that the activities require active participation and hands-on experience. Haury and Rillero (1994) define hands-on learning as learning by doing. This hands-on learning enables

learners to become critical thinkers. It involves being engaged in in-depth investigations with objects, materials, phenomena and ideas and drawing meaning and understanding from those experiences. In such activities the role of the educator is crucial, he/she needs to ask critical questions that will lead to deeper levels of thinking by the learners.

Haury and Rillero (1994) further mention that a hands-on approach requires learners to become active participants instead of passive learners. The "We Care" learner support material has activities that have been designed for both the educator and learner and whether the activity can be performed by pairs, three or four learners in a group. So clearly the learner plays an active role. The materials have step-by-step instructions of how to do each activity. This guidance is critical for underqualified educators, of whom there are plenty in Black Schools in South Africa. While some people might say such materials prevent creativity of educators, the other side of the coin is that for some educators working with innovative materials opens them up to deeper levels of understanding of what real teaching is about, a process which may not occur in the absence of such materials.

The new emphasis and focus on a participatory, local problem solving approach to EE, thus involves learning through active involvement in local environmental issues. This perspective reflects a move from the strong emphasis on the transmission of information and suggests more active participation in learning.

Active participation in learning is also encouraged through the eco-schools programme. The eco-schools programme was developed on the basis of the **need for involving youth in finding solutions to environmental and sustainable development challenges at local level.** Learner involvement is a key part of the eco-schools programme. ([www.ecoschools.org](http://www.ecoschools.org)). "Both educators and learners commit to an ongoing process of developing lesson plans and learner-centred activities that are in line with the RNCS." ([www.wessa.org.za/eduecoschools.asp](http://www.wessa.org.za/eduecoschools.asp)).

Tilbury (1995) argues that one of the challenges of EE is to prepare students effectively to be socially critical and engage them as agents of environmental protection and change and to improve the capacity of people to address environment and development issues. Active involvement in environmental issues should, therefore, be a critical component for the new focus on EE in terms of sustainable development. Pandor (2007: 2) agrees that active learning needs to be promoted in the schools where she states that "education can be improved significantly by promoting active learning in and about the environment. EE deepens the relevance of classroom learning and strengthens school-community links."

The New South Wales Department of Education and Training (2007) in the United Kingdom mentions that EE is best delivered through a wide range of teaching and learning activities. In this way learners will develop strong

environmental knowledge, awareness and capacity for positive environmental change when it is contextualized or taught using real examples, problem solving and with active learner participation. Learners can then be expected to develop specific environmental knowledge and skills and develop positive values and attitudes through environmental activities. The "We Care" learner support material is hands-on and requires active participation from the learners. Each activity spells out the different **outcomes** and **skills** that will be developed.

Education for sustainable development is a concept that encompasses a new vision of education that seeks to empower people of all ages to assume responsibility for creating a sustainable future. Education for sustainable development is by implication **constructivist, participatory and process based**. It reflects the following principles:

- **Participation and action:** learners participate in the learning activity.
- **Relevance:** learners determine what sustainable development means to them personally in their lives.
- **Critical reflection:** learners consider how new information compares with their value and then determine how their values co-incide or conflict with the values of others.
- **Dialogue and listening:** learners exchange ideas in order to understand how other people's visions and values influence their actions.

(Tilbury,1995)

## **2.5 ENVIRONMENTAL EDUCATION AND CONSTRUCTIVE LEARNING**

The Tbilisi Declaration (1977) has five objectives with regards to EE. These are **awareness, knowledge, attitudes, skills and participation**. EE by its nature encompasses active participation and involvement with one's environment.

According to the Department of Environment and Heritage (2000), EE should be defined in its broadest sense to encompass raising awareness, acquiring new perspectives, values, knowledge, skills and formal and informal processes leading to changed behaviour in support of an ecologically sustainable environment. Constructive teaching and learning is based on the belief that learners learn best when they gain knowledge through exploration and active learning, (McBrien and Brandt, 1977).

The Educational Broadcasting Corporation (2004) agrees with McBrien and Brandt (1997) when it states that learners construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. The Educational Broadcasting Corporation (2004) further mentions that constructivism taps into and triggers the learner's innate curiosity about the world and how things work. The "We Care" learner support material encourages learners to use active techniques (experiments, real-world problem solving) to create more knowledge and then to reflect on and talk about what they are doing and their understanding.

## **2.6 EDUCATORS AS CHANGE AGENTS**

The educators who used the "We Care" learner support materials became the change agents in their schools. Carson & Johnson (2004) cite Fullan (1993:12) who defines a change agent as a leader who is "self-conscious about the nature of change and the change process." For any educator to initiate and be able to implement change in a school, the school management team must give a positive response. Going further, Carson & Johnson (2004:2) state that educators "must feel that they will be supported by those in leadership roles to ease anxiety that is both caused by change and the ever increasing demands of their job."

Change agents who wish to move successfully from initiation to implementation must carefully consider the local dynamics within the institution when deciding how to go about initiating change. The educators from the five schools were allowed to attend workshops before they could implement the "We Care" learner support materials. This gave an indication that they had support from the leadership of their schools since they were given time to attend the workshops away from their workplace.

## **2.7 CONCLUSION**

This chapter has tried to describe the development of EE taking into consideration the principles and policies that have helped to shape EE in the world generally and in South Africa in particular. The chapter has also shown the

following about EE: that it is a hands-on field which leads to learners constructing their own knowledge; that it can be taught in an interdisciplinary approach and lastly that educators as implementers of the curriculum can act as change agents when they infuse EE in the Natural Science learning area. The next chapter describes the research procedure and the methodology that was used in the study.

## CHAPTER THREE

### RESEARCH DESIGN AND METHODOLOGY

#### 3.1 INTRODUCTION

This study focuses on a project called "We Care," which was developed by the Environmental Education Programme of the University of Stellenbosch (EEPUS). "We Care" comprises learning support material which was developed in order to assist educators in focusing on the immediate environment when developing learning programmes. This is important for schools in rural areas where there are no teaching materials. "We Care" also aims at assisting educators to implement environmental education across the different learning areas in the Revised National Curriculum Statement (RNCS). A vital feature of the support material is its learner-centred and activity-based design, which assists educators in interpreting the RNCS and in developing outcomes-based learning programmes while focusing on local and contextual environmental issues and concepts. This chapter will present and describe the research method used in this study. The researcher will thus present the aims of the study and a description of how data was collected. There will also be a discussion of the researcher's use of a video recorder as a tool to collect data.

## **3.2 AIMS OF THE STUDY**

The aim of the study was to evaluate the ways in which the participants used “We Care” support materials in their classrooms. The study also sought to explore the impact of “We Care” materials on the classroom practice of the educators. The questions the researcher wanted to answer were:

1. How did the participants use “We Care” learning support materials?
2. Did the support materials assist the participants to teach better and more effectively?
3. Which activities did the educators select and why?
4. Did the participants follow the strategies of teaching provided in the materials to the letter, or were there deviations. If so, why?
5. Did the learners engage in group work? If so, how did the educators ensure that learners learnt from group work?
6. What was the general performance level of the educators in the classroom?

## **3.3 DATA COLLECTION**

### **3.3.1 PARTICIPANTS**

Participants in the research project consisted of ten educators teaching in five schools just outside of Esikhaleni, near Richards Bay. All five schools are located in a poverty stricken rural area. Although all the educators in the five schools participated in “We Care” activities, only two educators per school were able to attend workshops on how to use the support materials. Once the participants

were ready to implement "We Care" in their schools, meetings were held with all the educators to select themes or activities that they wanted to implement in their schools. The selection of the activities was carried out by participants on their own, with no assistance from the researcher.

Two of the participants were school principals and this ensured a sense of ownership of the project by school managers. Permission was obtained from both the schools and educators who participated in this study to videotape the lessons and use data collected in this way in the analysis of this study.

### **3.3.2 ETHICAL ISSUES**

All researchers are bound by key principles that should underlie the research endeavour. In a democratic country like South Africa, democratic principles are enshrined in our constitution. Every human being has to be treated with respect and dignity. The web site on Ethics in Research (<http://www.socialresearchmethods.net/kts/ethics.htm>) states that the principle of **voluntary participation** requires that people should not be coerced into *participating in research*. The researcher therefore sought informed consent of the educators to participate in the project. It was explained to the educators that the researcher wanted them to use innovative curriculum materials in order to achieve the government mandate to integrate EE into natural sciences.

The educators were also told that they had to attend workshops to get hands-on experience of using "We Care" curriculum. They could get stationery and basic materials to facilitate implementation of the curriculum. They also warned that in order for the researcher to make an informed decision on the appropriateness of the materials and their usefulness in the classroom, the researcher had to observe the educators teaching "We Care" materials. The educators therefore understood that later someone would invade their space and observe how they used the materials with their learners. These were called **Classroom Visits**.

Each of the five schools was visited twice where lessons of one hour duration were observed. Since the participants were visited twice, two different lessons were captured for each participant. Some participants however, had chosen and presented the same topics. What was of interest is that the same topic would be presented differently. The participants chose their own topics to present and arranged their classrooms as they wished.

Some practicalities regarding the dates and times for the visits and classroom observation were discussed and agreed upon with each participant during a preliminary school visit. It was explained to the participants that classroom observations would be videotaped with the sole purpose of seeing how they were using the "We Care" learning support material. Classroom observations were done by the researcher and collaborators from another institution. This was done

in order to validate observation by sharing views and interpretations of issues observed and also to avoid researcher bias.

The participants also enjoyed a retreat, during which they viewed all the lessons presented by peers and then had an opportunity to reflect on and critique each others' lesson presentations. The aim was not to find fault with the presentations of others, but to learn from their mistakes and to recognize exemplary practice which they could emulate.

### **3.3.3 THE MAIN RESEARCH INSTRUMENT**

The research instrument used in this study is an observation schedule in which a videotape was used to record observations. Each of the six schools was visited twice where lessons of one hour duration were observed and a videotape used in the classrooms to capture the events occurring during the lessons. This study will be exploring how educators used the "We Care" material in their teaching. The videotape of each lesson consisted of one camera with an appropriate microphone. The videotaping of each classroom site was conducted by the principal of one of the participating schools. The video data of classroom lessons was collected. The participants (educators) were observed and videotaped in their classroom environment.

The videotape was turned on as soon as the lesson started and turned off at the end of the lesson. For learners it was an exciting event, but they contained their excitement and no classes were disrupted.

Latvala, Vuokila-Oikkonen and Janhonen (2000:1252) have this to say about the use of videotapes in research: "videotaped material is rich and provides several possibilities for analyzing the data. An essential advantage of videotaping is that most potentially useful interaction and behaviour can be captured." Various researchers such as McMeninan, Cumming, Wilson, Stevenson and Sim (1992) have also used the videotape research methodology because they say that video material gives a lot of information about physical behaviour, facial expression, ways of moving, etc.

The usage of a video is supported by Plowman (1999:72) who believes that video recording offers advantages such as "the permanence of the record, the retrievability of data to share with others, being able to check findings and easy reinterpretation."

Jacobs, Kawanaka and Stigler (1999:720) also point out the advantage of using a videotape to capture information when they state that "video can be used to capture the lesson content and classroom events, including visual (such as writing on the chalkboard) as well as verbal content." They continue to say that "videos enable the researchers to watch the same sample of events over and

over, each time looking into a different dimension of the recorded verbal and physical behaviour.” The video therefore has the potential to capture unexpected behaviours that might have otherwise gone unnoticed.

The researcher chose to use the videotape in this study because one of the aims of this study is to explore how the educators were using the “We Care” learner support material in their teaching. In this way how they will be integrating it in their teaching will be captured on video. The methodology selected for this study will provide access to the way educators were using the “We Care” material during their lesson presentation. The advantage in terms of credibility of videotaping is that the researcher is able to review the same videotaped situations again and again. Another advantage of the video is to use the lessons to discuss good practice or exemplary approaches to teaching / learning.

### **3.4 The role of inexpensive material**

The “We Care” learning support material was developed by the University of Stellenbosch. The materials are designed for active learning. The material addresses three themes. These themes are: **Earth as a living planet, Life on planet earth and Our threatened planet earth.** Each theme covers various topics and activities. The activities may be used in situations ranging from the most remote rural areas to city environments. None of the activities requires expensive equipment or a supply of electricity. Most activities are supplied with the required information as access to such information may be difficult.

The involvement of both educator and learner in the planning of the learning experience is encouraged. The activities are structured to help the educator with the implementation of OBE. Each activity has a short summary of learning area links, skills developed in a particular activity, critical outcomes addressed, activity outcomes and examples of assessment strategies (see Appendices A and C). Each activity is also graded as to the level of difficulty and this is shown with an icon in the form of an ant. If there is one ant then the activity is easy, two ants mean the activity is not so difficult, but three or four ants mean the activity requires a lot of effort to do but not impossible. The time it will take to complete the activity is also given. The activity also indicates where it can be undertaken, be it indoors or outside. There is also an indication whether the activity can be done by an individual, a pair or a group. Key words used in the activity are also explained.

Workshops were conducted to familiarize the educators with the "We Care" learning support material. Once the participants were ready to implement "We Care" in their schools, meetings were held with all the educators to select themes or activities that they wanted to implement in their schools. The educators then had to go and implement these materials in their schools. The selection of activities was carried out by participants on their own, with no assistance from the researcher.

## **CHAPTER FOUR**

### **PRESENTATION AND DISCUSSION OF RESULTS**

This chapter presents and discusses the results obtained by the use of videotapes and direct interviews with the educators.

#### **4.1 Discussion of findings and results**

This study was intended to find answers to the following questions:

##### **4.1.1 How were the educators using the “We Care” learning support materials?**

The study revealed that the educators found the materials to be user friendly. All of them stated that they “knew exactly how to go about doing the activities because clear directions are given.” They were able to carry out most of the activities since information about how to do the activities is given. They had also been through workshops where they were shown how to use the materials and being excited to do activities. The learners were also very cooperative executing the activities. However there are activities which the educators were not comfortable with. These activities involved calculations and the educators did not choose to do these. All the participating educators had not attempted to do these activities with their learners because the activities involved simple mathematical calculations. An example of such an activity is shown in appendix B.

A session whereby the educators could view their videotapes was organized and the activities that had calculations were done so as to help the educators and make them feel comfortable doing them. Otherwise the educators said that all the activities they had chosen to do with their learners were carried out successfully because "they were practical."

Educators also exhibited a shift from teacher-centred to learner-centred teaching. This was encouraged by the simplicity and accessibility of the teaching materials being used. These materials could be accessed from the local environment. It must be stated that all five schools are in a poverty stricken rural area. The only commercial material supplied consisted of stationery like charts, coloured pens, glue and a pair of scissors. There were two instances where educators were still using the old style of teaching, where they still tell instead of letting learners find out the information on their own.

From the interviews, educators stated that the materials contributed to the enjoyment of learning by learners, because "the language used is simple and the activities make the learners to enjoy their learning." Learners even requested for after school activities for Environmental Education and Environmental Education activities outside the classroom increased. Educators also commented about better organization of learning activities. Since the "We Care" material comes ready-made, it gives all the information about how the educator and the learner

are expected to carry out each activity and what is to be achieved. The educators also appreciated that new terms are explained clearly in a language suitable to intermediate learners.

#### **4.1.2 Clarity of explanation and clarification of concepts**

Since the "We Care" learning support material has to do with environmental education, when the educators were treating a particular topic, some of them were able to first find out what the learners know about the topic, that is, what information learners possess before they can give their own explanation. They were able to correct learners when they made mistakes. They were also able to use learners' experiences and observations, that is, being able to use examples nearer to the learners' surroundings.

Terms were explained before moving on with the lesson. Some educators overlooked certain concepts. For example there is a need to write concepts being dealt with in the lesson on the board so that learners are able to see the correct spelling of the words. Other educators did not do this. There were also other instances where educators needed to unpack new concepts for clarity so as to reinforce learning. Concept clarification is centrally important for theory development and it is a process that engages critical thinking (Kramer, 1993).

#### **4.1.3 Degree of integration of “We Care” in the Natural Science and other Learning Areas**

From the analysis of the videotapes, the study revealed that some educators were able to adapt the materials to suit the topic which they were handling in their Natural Science learning area. From the interviews which were held with the educators, they stated that the selection of themes which they had chosen to teach was a collaborative effort. This collaboration in determining curriculum to be taught was new in the schools. The “We Care” project was therefore responsible for promoting collaboration.

The selection of themes was also based on different contexts since schools operate differently. The themes were also chosen because they addressed outcomes in the RNCS. One of the themes chosen was ‘Water’, by a school that has a wetland in its school yard. The educator indicated that the theme was to address the importance of wetlands. This was laudable in that the educators were beginning to contextualize their teaching by helping the learners to address real issues in their environment.

The “We Care” material was designed for the Intermediate Phase. Some of the educators also used these materials for Senior Phase with or without adaptation. When used without adaptation the need for conceptual progression was ignored. This showed that although educators can have the material, it is sometimes difficult for them to adapt the material and pitch it to a correct cognitive level for

the learners because the educators lack the art or skill of adapting the material. The educators who adapted the material did it in their own unique way by adding more flesh on the activities and bringing in some elements which were not part of the original activity to make it interesting and challenging.

Although EE cannot be a stand alone learning area in the RNCS, the curriculum does provide opportunities for environmental learning in each of the learning areas. In order to be able to teach environmental education, this necessitates that a cross-curricular approach be used. This approach shows that whatever the learners learn has integration and relevance in their lives and it can be taught across all the learning areas. The "We Care" activities specify as to with which learning areas each topic integrates. This helps to show the learners that although reality may be made of components, these components are related to each other. The environment should therefore be presented as a whole.

Each activity involves almost all the senses of the learner. As Bezuidenhout (1983:8) states: "the children must become part of their environment, they must feel it, smell it, taste it, touch it and hear it." Roff (2003:11) also emphasizes the use of senses when stating that "people seem to remember experiences in which they are involved, and involvement means using several senses." The "We Care" material provides such instances where senses of the learners are used.

#### **4.1.4 Learner involvement / participative approach**

Many of the educators in Black rural schools are under-qualified. They are not adequately prepared in terms of subject content or in strategies to stimulate learning through enquiry, problem solving, discovery and general learner-centred methods. The participants were not different. In classes of under-qualified educators, the dominant method of teaching is the lecture method.

The support materials were successful in that they caused a major shift from teacher-centred learning to learner-centred methods that made use of strategies such as group work. The analysis of the videotapes shows that the educators tried as much as possible to involve their learners in their teaching. A group discussion is thought to be a useful teaching technique for developing higher order thinking skills, skills that enable students to interpret, analyze and manipulate information. During a discussion learners are not passive recipients of information that is transmitted from an educator, rather, learners are active participants (Larson and Keiper, 2002).

Learners participated well in some instances but not all classes observed handled group work properly. In one class learners were divided into groups but the participant continued to teach them as a class. No time was set aside for the learners to discuss issues as a group and thereby to learn from one another.

#### **4.1.5 Activities selected by educators**

Participants had different reasons for selecting certain materials. For instance, one school chose the theme “water,” because the school yard contained a wetland which they wanted to rehabilitate. This was a good example of context-based teaching that was action-oriented. Some activities were selected for their suitability to teach a specific outcome. Co-planning of participants with educators from the other schools ensured that some topics were shared.

Monthly meetings were planned to discuss issues and the progress of “We Care” activities. This knowledge sharing and networking activity was one of the positive developments that need to be encouraged. Participants need to learn from one another. Besides activities suggested by the support materials, the participants also began to involve learners in such environmental activities as the International Coastal Cleanup of the Esikhaleni Beach. They also celebrate other environmental days.

On the subject of promoting knowledge sharing among educators, Wenger and Snyder (2000) express the opinion that Communities of Practice (CoP) are groups of people who are informally bound together by shared expertise and passion for a joint enterprise. The shared expertise/passion helps them to perform their task better, as they interact regularly. Educators share knowledge, teaching strategies, best practice, content and technological knowledge. They can support one another – the experts sharing knowledge with the novice

educators. However, the participants (educators) more often tend to undermine the potential which they have by failing to develop one another and thereby improving their practice.

#### **4.1.6 Types of Educators Identified**

The videotapes allowed for some analysis of the type of educators we have among the educators that were involved in the research project. Categories of educator-type will be briefly discussed below.

##### **4.1.6.1 Educator type 1: Confident, very innovative and in command of content**

One of the educators was outstanding in his performance. The content was at his fingertips, questioning was of higher level and were well integrated in the lesson, he also clearly showed and expressed how specific content integrated with other learning areas. The educator was teaching about population and the impact on resources. The lesson which was on Human and Social Sciences integrated Life Orientation and Mathematical Sciences when learners were given data to go and draw a histogram about different populations in the provinces of South Africa.

##### **4.1.6.2 Educator type 2: Innovative with ability to contextualize teaching materials**

One of the educators showed an ability to adapt material to suit the level of the class which was Grade 4. This educator also taught about population. However, she demonstrated how families grow, by making a flow chart of family growth

starting with mother and father, their children, grandchildren and great grandchildren, etc. The rest of the lesson was done according to the guidelines in the “We Care” manual. Some educators therefore appreciated that they had to adapt the materials to suit their contexts.

#### **4.1.6.3 Educator type 3: Poor content mastery and inability to handle group work**

It was clear from the lesson presentations that some educators had a problem with delivery of accurate content. The substance of some lessons was wanting making it difficult to determine what it is that the learners were supposed to have learnt. This was a lesson on indigenous knowledge in which the learners brought in examples of indigenous medicinal plants. This was very good, but the learners were not given a chance to discuss the various herbs they brought in and how they are used in their families. Although the learners sat in groups, there was no group work. The learners, also, to fill up time recited EE poems whose purpose was not explained. For some educators, teaching is keeping learners occupied but without a specific goal to achieve meaningful learning.

#### **4.1.7 Reflection Workshop**

At the end of “We Care” project the educators requested to have a workshop to reflect on their experiences with “We Care.” They also wanted to observe the videotaped lessons and critique themselves and be critiqued by their peers. The researcher was impressed by this attitude because it portrayed willingness to

learn from the project and others. Some of the questions the educators had to respond to while viewing the videotapes were:

1. Was the handling of group work appropriate? This question was discussed in terms of the role the educator must play during group work, i.e., asking questions which make learners think as they manipulate materials.
2. What did the learners do? Were they all on task? This involves the educator being vigilant that all learners are involved in executing the task.
3. What did the educators learn from teaching the activities observed? The educators had to explain whether if given a second chance to teach the same lesson what improvements they would make.
4. Was it worthwhile to be part of the project?

At the end of the workshop the educators took a unanimous decision that they not only wanted to continue using “We Care” materials but wanted to in-service neighbouring schools. This was to make sure that more people adopt the culture of caring for our environment.

## **4.2 Conclusion**

This chapter has presented and discussed the results of how the educators were using the “We Care” learning support materials and how these were integrated in the Natural Science Learning Area. The analysis also revealed that the participants could be categorized or identified by the way in which they presented the lessons.

The participants also stated that they shared, co-planned and networked with educators from neighbouring schools. The participants were given a chance to view themselves through the videotapes that were used to gather information. The next chapter will look at the lessons that have been learnt from this study and recommendations for further study.

## **CHAPTER 5**

### **CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH**

#### **5.1 Introduction**

Environmental Education (EE) holds great promise for boosting the quality of learning in our classrooms. Educators must help learners build the knowledge they will need to confront a host of ecological challenges. The environmental problems of the day will change over time, but the environmental literacy gained in schools will last a lifetime. Communities will have more people adopting sustainable life styles.

EE in teacher education has been a priority since the end of the twentieth century. During that time, educators have become more aware of the vital role they have to play in conceptualizing environmental issues and developing cognitive frameworks concerning the environment. New theories and teaching techniques have emerged for applying skills and strategies that translate EE to practical contexts, Van Petegem, Blicck and Boeve-De Pauw (2007). Such is the "We Care" material which is aimed at translating EE theory into practice by the learners.

## **5.2 Lessons Learnt From this Study**

### **5.2.1 Integration of EE Across Curriculum**

This study has shown that there is a need to involve other educators who are not in the Natural Science Learning Area since EE cuts across curricular and the "We Care" material encourages the cross-curricular approach. Workshops to re-orient educators can be helpful because some educators think that EE belongs to certain individuals and learning areas. Educators should understand the interrelatedness of the environment, society and economy and have this interrelatedness evident in their teaching and their lives as community members. EE is by definition interdisciplinary and action oriented, involving more than one subject area or curriculum focal point (Brinkman & Scott (1994) in Van Petegem et al 2007). Hua (2004) agrees when stating that the best approach is to integrate EE by organically incorporating it into various activities in different courses. In the study the educators incorporated "We Care" activities not only in Natural Sciences Learning Area but in Human and Social Sciences and Life Orientation Learning Areas.

### **5.2.2 Involvement of other stakeholders in EE**

The Department of Agriculture and Environmental Affairs (DAEA) has an important role to play in improving the curriculum and in training educators to equip them to teach EE effectively. This was evident in the collaboration the researcher had with this department, where they ran additional workshops for the educators involved in "We Care" project.

The DAEA also played a crucial role in helping the educators and learners to get involved in authentic environmental activities outside the classroom. This was when the DAEA would take both learners and educators to the *International Beach Clean Up Campaign*. Braund, Tunnicliffe, Reiss and Moussouri (2006) state that practical work in out-of-classroom contexts can be seen as authentic if it helps demonstrate work that environmentalists do or if it is perceived as having relevancy to solving real life problems. Educators play a key role because the implementation of new programmes can be very stressful and depend entirely on their concerted efforts and commitment.

### **5.2.3 Continuous Professional Development of Educators**

Educators need to be empowered with knowledge of EE to enable them to become better EE implementers. They must change their attitudes and behaviour and teach by example. It is only educators who are concerned about their environment who will be successful in developing similar behavioural patterns in their learners. Educators could be helped with lesson plans and classroom activities with an environmental and sustainability focus. The "We Care" material is already a stepping stone and educators can modify the activities as they see fit.

#### **5.2.4 EE and Life-Long Learning**

From the study the researcher got the sense that EE should be part of life long learning. It should be practiced continuously at an early stage of one's life, from youth through to adulthood, so that a continuous sense of environmental awareness can be fostered. It should be communicated how important it is to create a generation of learners who can shape our future into a sustainable one. Although EE is primarily carried out in the classroom at the right time, it should go beyond the classroom into our society and into daily activities (Hua, 2004).

#### **5.3 Recommendations For Further Study**

##### **5.3.1 The impact of Collaboration of Neighbouring Schools**

Educators who used the "We Care" material worked together as a team at school and also with educators from neighbouring schools. This was a new development brought about by the nature of "We Care" materials. It would be good to encourage and strengthen their collaboration by sharing ideas, experiences and materials. A collaborative school culture allows for co-operative learning and professional development in EE (Fullan (1994) in Van Petegem et al, 2007). They could also build partnerships and work closely to ensure continuity and mutual support. Strong partnerships can create high performance learning environments both in the classroom and outside by developing community-based programmes on sustainable development.

There is need for a systematic study of why the “We Care” materials generated the spirit of collaboration among educators of the same school and with neighbouring schools. Such a study is necessary because this culture should be encouraged.

### **5.3.2 Mathematical Literacy**

This study discovered that the educators had a phobia against any activity that had some mathematics in it. There was an indication that mathematics illiteracy exists among the educators. During a subsequent workshop it was discovered that given data on the consumption of water, the educators failed to convert the data into pie graphs. The “We Care” targeted intermediate phase learners but the educators had problems solving some simple word problems or transforming data into graphs. There is a need to explore the extent of mathematical illiteracy among educators and provision of workshops to improve the educators’ ability to deal with numbers.

## **5.4 CONCLUSION**

Environmental Education (EE) should be part of life long learning and should be a process focused on the empowerment of people, especially educators and communities in relationship to a changing environment. Educators cannot ignore the ecological dimension of learning that enhances learners’ active role in ecological sustainability. Sustainability cannot occur without active participation of learners and active citizens.

The "We Care" material proved to be useful for educators when they were *planning their lessons since most educators did not receive curriculum development in their training.* The material comes with outcomes to be achieved, the skills to be developed and the cross-curricular approach to be applied in the treatment of different topics or themes. A vital feature of the support material is its learner-centred and activity-based design, which *assists educators in interpreting the RNCS and in developing outcomes-based learning programmes while focusing on local and contextual environmental issues and concepts.* Another outstanding advantage of "We Care" support material is its effectiveness in encouraging educators to combine forces so that they can carry out their teaching activities.

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Grading:	✱
Time:	1 session
Place:	Inside / Outside
Group size:	Groups of 4 – 5



Activity 1.4

# EXPLORING SOIL

## - Understanding soil formation -

### Background:

Life-giving **natural resources** such as soil, air and water appear to be in unlimited supply because of the action of **natural cycles** that renew them. (See also Activity 1.5 Water cycles). However, thoughtless human activity can destroy or damage these important natural resources, which can endanger the future existence of life. **Soil**, for example, can be lost faster than the natural, soil-forming processes can replace it.

The mineral – or **inorganic** – component of soil is derived from rock. One of the processes which breaks up the rock in nature is **mechanical**. It is illustrated by the following activity. It must be stressed that without **organic** materials this inorganic matter cannot be called soil.

### Guidelines:

- ① Explain that falling or rolling rocks, windblown sand, and rocks being washed to and fro by streams and the sea, all have the same effect in forming smaller particles. This is one of the major ways in which rocks are broken down and worn smooth.



#### LEARNING AREAS

MAIN FOCUS: NS  
CROSS CURRICULAR LINK(S): M, SS

#### SKILLS

- ⇒ Doing investigations
- ⇒ Measuring and calculating creation of soil
- ⇒ Understanding the importance of soil

#### CRITICAL OUTCOMES

- ♦ Communicate effectively
- ♦ Work effectively with others
- ♦ Process information

#### ACTIVITY OUTCOMES:

Learners will be able to:

- ✓ manipulate materials to simulate weathering;
- ✓ demonstrate the mechanism of one of the major processes of soil formation;
- ✓ simulate the length of time needed to create soil;
- ✓ appreciate the value of soil and soil conservation.

#### ASSESSMENT:

- Educator assessment of
- Group communication and organization (use a rubric).
  - Measurements and calculations (keep record of calculations in learners portfolios. Show the methods used to calculate answers).



- ① It may be a good idea to collect a few stones from a river to illustrate the smoothness and roundness as a result of being washed and rolled along for hundreds of years.
- ① It should also be stressed that erosion (wind and water) removes soil at a much faster rate, and the possible consequences should be explained. (See also Activity 3.6, The Vanishing Land).



### Key words

**Inorganic** Non- living material, something which has no organisms, no living things within it.

**Organic** Anything which is living; organisms which are alive. Comes from the word organ, a part of a system which is inside living things. Organic can also refer to soil which contains living things within it.

**Mechanical** (Definition in context only)  
A process which takes place without any thought. Something which happens without any person or animal working with it.

**Weathering** The process of wind, water and heat action which wears inorganic things-down.

**Humus** The organic part of soil – decaying plant material.

**Soil erosion** The process by which topsoil is worn away or gradually destroyed.



## ROCKS

### Formation

Rocks are formed from molten substances deep below the surface of the earth. These substances come to the surface usually through volcanic action. Rocks can also be formed under water by the deposits of layers of silt. Rocks contain, amongst other things, minerals such as gold, iron and precious stones such as emeralds. Rocks can be any size (boulders if very large, grains if very small) and any shape. They are usually hard and can be rough or smooth in texture.

### Weathering

Rocks are broken down into smaller and smaller pieces, called particles, by the action of wind, temperature changes, water and animals. This breaking down process is called weathering. Rocks that have been weathered by water are usually smooth and rounded; those weathered by temperature changes are usually flat.

## SOIL

### Formation

Soil is formed by the slow weathering of rocks. It is estimated that it takes 600 years to produce 50 mm of topsoil. Organic matter (**humus**) mixes with rock particles to form soil. Tiny soil organisms and a healthy cover of vegetation help to develop soil. Soils differ according to the rock they originated from, and the amount of humus they contain. Soil must be protected and kept free of pollutants.

### Topsoil

It is the top layer of the earth and contains humus and other organic material. It is the layer that plants grow in.

### Subsoil

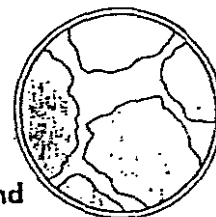
Subsoil lies in a layer below the topsoil. It is not as fertile and cannot support plant life as easily, as topsoil. Subsoil is brought to the surface by **erosion**.

### Soil Types

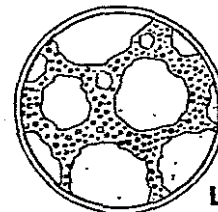
There are three major soil types:— sand, clay and loam — each with its own special properties:

- / Sand has larger particles and therefore better drainage.
- / Clay can be waterlogged and forms a crust.
- / Loam is a mixture of sand and clay and therefore combines the good qualities of both.

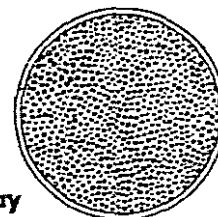
There are many combinations of soil types.



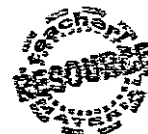
Sand



Loam



Clay



## Soil Protection

The importance of groundcover and trees to protect soil cannot be overemphasized. Plants and leaves cushion the effect of raindrops and lessen water erosion. They provide a windbreak which lessens wind erosion, and their roots bind the soil. Soil that is not covered with plants is easily blown, or washed away to silt up rivers.

## Soil Pollution

Pollution can damage the fertile soil used to grow food crops. Damage happens very quickly.

The natural nitrate balance is disturbed when large amounts of fertilizer are used on food crops. Pesticides destroy insect pests that harm crops, but upset the natural balance. Pesticides also destroy the living organisms that break down the soil through composting.

Soil erosion is a natural process, but becomes a problem if it happens too quickly.

- / Farmers can cause erosion if they remove the vegetation that hold the soil in place.
- / This changes the composition of the soil of farmlands.
- / When topsoil is removed, only infertile soil is left behind.
- / Erosion causes fertilizers and pesticides to be washed and blown into our water supplies.
- / Soil that is washed into our rivers causes water pollution.
- / Light cannot penetrate this muddy water.
- / Animal and plant organisms in the water die without any sunlight.
- / Solid waste materials, which includes scrap metal, plastic waste and rubble, pollute the soil.
- / Veldfires damage the topsoil by removing the plant cover.

### Try this:

Try the sausage test with your learners to see what soil type you have:

- Wet sand will not roll to form a sausage.



- Wet loam will roll to form a sausage that bends.



- Wet clay will roll to form a sausage that will curve into a ring.



## Soil Conservation

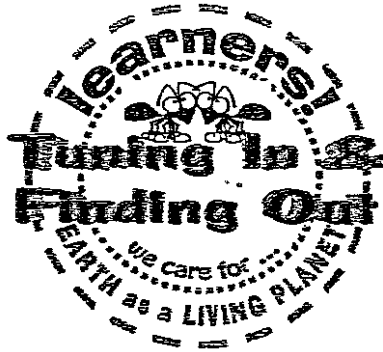
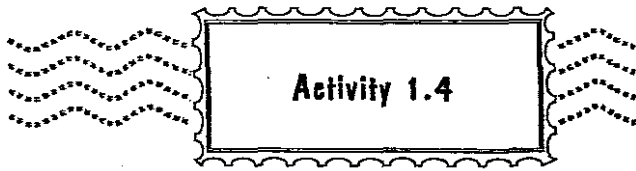
### Did you know?

Every year in South Africa, over 400 million tons of precious soil is washed into the rivers and into the sea.

The soil is a vital part of our environment. Healthy ecosystems depend on healthy soil.

Habits to be encouraged are: keeping topsoil well supplied with nutrients and organic materials; tree-planting; farmers rotating crops; the use of contour-ploughing methods on hillsides and rotating the grazing of animals.

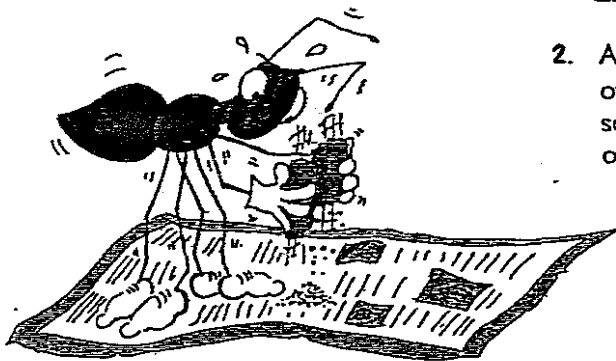
Every community can participate in managing and protecting their soil wisely.



# EXPLORING SOIL

## What to do:

1. Place the paper on a firm surface out of the wind and begin by rubbing the rocks together over the paper. Rub them together vigorously for 10 minutes. If you get tired let someone else in your group take over. Let the dust that you make collect on the newspaper.



3. If it took you 10 minutes to make that much sand, how long would it take you to make 100 cm<sup>3</sup> (100 level teaspoons) of sand? Show your calculations:

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## What you need:

Two fist-sized rocks (sandstone is best), newspaper, a spoon OR a small measuring cylinder (see resources), a watch, a tin can or plastic holder with small holes punched in the bottom, seeds e.g. maize, beans etc.



2. After ten minutes measure the amount of sand you have made by carefully scooping the sand into your teaspoon or a measuring cylinder.

The amount of sand made in 10 minutes was:

\_\_\_\_\_ level teaspoons

\_\_\_\_\_ cubic centimetres

(one level teaspoon equals 1cm<sup>3</sup> or 5 ml)

### Home-made measuring cup

- The metal screw top of a cooking oil or cold-drink bottle measures:
- 1 teaspoon or 5ml.



4. A medium sized tree needs at least one cubic metre ( $1\text{m}^3$ ) of soil in which to grow.  $1\text{m}^3$  contains 1 000 000  $\text{cm}^3$  or 1 000 000 level teaspoons.
- How long would it take to make enough soil for a tree?  
Show your calculations:

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5. Would you say that soil is formed quickly, slowly or very slowly? Bear in mind that in nature rocks are not usually rubbed together as continuously as in this experiment.

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6. Would you say that it is important for us in South Africa to conserve our soil? Explain your answer carefully using what you have learnt from this activity.

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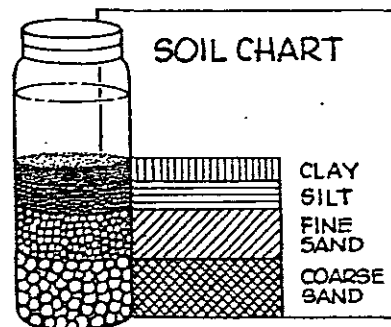
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7. Combine all the sand made by your class, mix it with some compost and put it in a pot with holes or a "Coke bottle hothouse" (see References). Plant large seeds (e.g. beans) and enjoy growing something in the soil you have made.

## MORE ACTIVITIES:

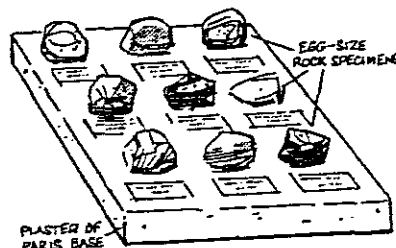
### Make a Soil Chart

1. Fill a tall glass jar two-thirds full of water
2. Pour in soil until the jar is almost full.
3. Replace the lid and shake the jar vigorously.
4. Then place the jar on the table and let the soil settle. (Allow lots of time, because small particles are very slow in settling.)
5. When the soil has settled, hold a piece of cardboard against the side of the jar, and mark off the different layers, making a diagram as shown in the sketch. Label each layer – Organic material; Clay; Silt; Sand. Label each layer – Organic material; Clay; Silt; Sand.
6. Do this in several jars, with soils taken from different places, and compare the charts.
7. You can also present your results in the form of a bar graph. (See resources)



### A Rock-Finding Hike

- ① Learn more about the geology of your area, and the rocks that break down to form your soil.
  - / Organise one or more rock-finding hikes.
  - / Collect different kinds of rock from which soil is formed. (e.g. sandstone, limestone, shale, granite) Each sample should be the size of a hen's egg.
  - / On your return, get your teacher or an expert to identify them.
  - / Arrange them on a cardboard tray.
  - / Mix some plaster-of-paris. Pour a layer of about 2 cm of plaster into your tray, around the rocks, so that the samples jut out.
  - / Let the plaster harden.
  - / When it is dry, remove the cardboard.
  - / Print the name of each specimen on a separate card and glue the cards below each of the rock samples, as shown in the sketch.
  - / GO PUBLIC! Demonstrate this project to the people in your community.



### Soil Maths



#### How about this...

Indigenous knowledge:  
**THE "COUGHING CRAB"**

Few people know that crabs cough, but if you get close enough to another person you get to hear things that you did not know before.

We need to listen to our elders to dig up the rich environmental knowledge that exists among our indigenous people. We need to get close to the crab to hear it cough!

1. Calculate the cost of a layer of topsoil of 60mm thick on a lawn 65m by 50m at R8 per m<sup>3</sup>.
2. A sand pit for children is 6m long and 4,5m wide. What is the surface area of the sand pit?
3. A sand dealer receives 4 loads of 15 tons each of sand. How many 40kg bags of sand can he fill if 60kg is lost during handling?
4. An average of 40kg of soil is washed away from a sandbank in the river every 15 minutes during a flood. How many tons of soil are washed away within 48 hours?

#### Write a paragraph on the following topic:

- ⓪ Soil conservation through indigenous knowledge practices. (See learner resources for ideas)

#### How to...

... write a paragraph

- Write one sentence to introduce the topic of the paragraph.
- Write another 5-10 lines to explain your topic in more detail.
- End with a sentence which is a very short summary of the information in your paragraph.

#### Displaying soil facts

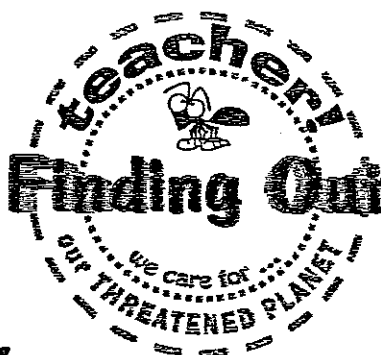
- ⓪ Collect articles and photos from newspapers and magazines on the importance of soil, soil erosion, soil pollution and soil conservation. Put it up on your display board in the classroom. (See activity 1.2: Display it)

### YOUR OWN SOIL FACTORY

- \* Dig a hole, make a compost heap and start your own "soil factory" at school or at home. (See resources for learners.) On World Environmental Day (5 June), ask everybody in your class to bring a handful of soil to school. Mix it with the compost and plant an indigenous tree in it. (See activity 2.1: Interviewing a Tree - How to plant a tree - ).



Grading:	🐛🐛🐛🐛
Time:	1 lesson
Place:	Inside
Group size:	Groups of 4 – 6



Activity 3.2

# ENVIRONMENTAL ISSUES

– Building priority pyramids –

## Background:

Anytime two or more persons disagree, you have an **ISSUE**. People disagree on topics for a variety of reasons. What might some of these reasons be?

There are so many issues concerning the environment today that it is often difficult to decide which should take priority. If everyone agreed on how to treat the earth, we would not have any environmental problems. However, different people have different uses, dependencies and needs for the earth's resources. These needs and values are often a source of disagreement.

Environmental issues stimulate a wide variety of opinions. Given limited time, money and other resources, how do we decide which problem should get priority.

Some people look into the future and see a gloomy, inhospitable picture: a world that is less healthy, less safe, less diverse, more crowded and more polluted. Negative forecasts can make people – especially young people – feeling hopeless and resigned.

This activity is designed to move young learners into action by getting them to think about the future *they want to inhabit*. They will investigate ways in which people are working to protect the

### LEARNING AREAS

MAIN FOCUS: NS  
CROSS CURRICULAR LINK(S): L, SS, EMS

### SKILLS

- ⇒ Critical thinking
- ⇒ Seeking consensus
- ⇒ Planning action
- ⇒ Accountability towards the environment

### CRITICAL OUTCOMES

- ◆ Communicate effectively
- ◆ Organize and manage yourself
- ◆ Use science and technology to address environmental problems

### ACTIVITY OUTCOMES:

Learners will be able to:

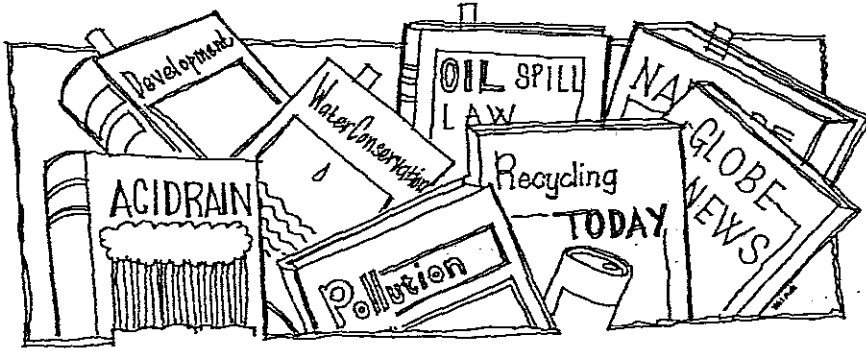
- ✓ make decisions by thinking critically;
- ✓ prepare and present information;
- ✓ understand how one action or system can have an impact on another.

### ASSESSMENT:

- Educator assesses cooperative learning. Use a checklist
- Peer assessment of individual contributions



environment and to improve the quality of life on earth, by building **pyramids** to reflect personal priorities for the future. They will learn how to reach group **consensus** using negotiation and conflict resolution skills.



## Guidelines:

- ① Explain to learners that the priority cards list 15 different possible issues or components of their future world
- ① Make sure learners understand all the words on the cards.
- ① Include one or two blank cards in each set of cards in case learners wish to add other issues which they think are important.
- ① If teams struggle to reach consensus regarding their group pyramid, you could interrupt and share negotiation suggestions. Encourage each learner to offer solutions that involve concessions on all sides. They could also vote on which choices they prefer as a group.
- ① Discuss the meanings of values and beliefs with learners, and how they might influence people's opinions.

## Key words

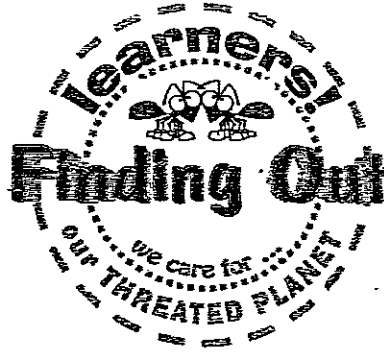
**Environmental issues** Important topics for discussion concerning the environment.

**Priorities** Things that are regarded as more important than others.

**Pyramid** Structure with a flat square or triangular base and sloping sides that meet in a point at the top.

**Consensus** Agreement in opinion.

**Diversity** A large variety of things.



# ENVIRONMENTAL ISSUES

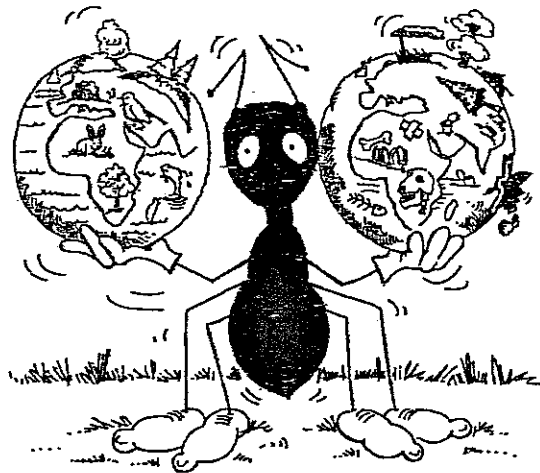
## What you need:

A set of priority cards and a copy of the "Priority Pyramid" for each group.

Pens, glue or tape, scissors

## What to do:

1. The priority cards list 15 different environmental issues or components of a future world. Which of these issues would you most want to be part of your future world when, you are say, 50 years old: Clean air, less crime, better environmental education, jobs for everybody, a cure for Aids?
2. Cut out the squares and arrange them on the copy of your "Priority Pyramid". Place the issue your group decided on, as the top priority in the top box. The next two priorities go below the first, the next three below the second row and so on, until your pyramid of choices has been completed.
3. Remember this is a group effort. If you struggle to agree on your choices, try the following: **Each member of a group makes a list of his/ her top three priorities. Everyone gets a chance to present his/her choices to the group while the others listen without interruption. Afterwards, you can vote on which issues you prefer.**



4. A representative from each team presents the team's top three priorities to the class group giving reasons for the placement of each card.
5. After each team has presented, see if you can reach a class agreement on the top three priorities.

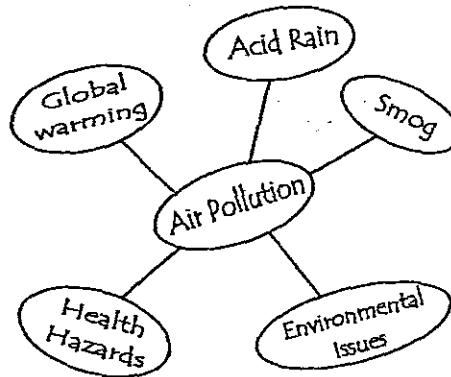


## - Environmental Issues -

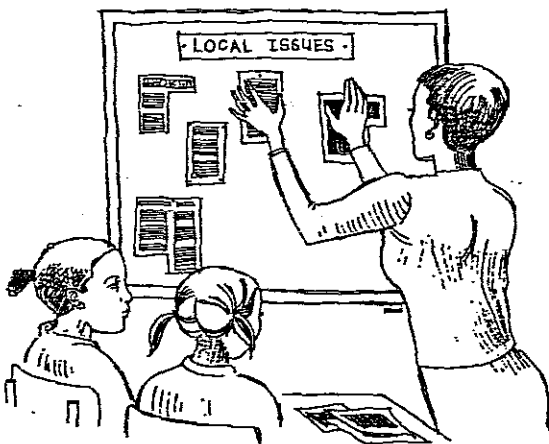
6. Were you able to come to a class consensus? What have you learned about making group decisions? How does it feel to make compromises? Is this a skill that people, who make decisions about environmental issues, need to use?
7. Name other issues that you would like to add to the pyramid.
8. Can you think of anything you or other people are doing to ensure that these issues will come true in the future?

**VARIATIONS:****A Concept Map**

- ① Create a concept map with your top priority issue as the focus. Think of other issues that you had to consider when making your choice. Include them in your portfolio.
- ✓ Use the outline on the right as a guideline

**Local Issues**

- ① Collect articles on local environmental issues that appear in newspapers/magazines.
- ② When you find an article, cut it out and display it in your classroom. Tell your classmates about the article.
- ③ Write letters to local politicians, community leaders, businessmen or to local authorities about the various issues as they arise.
- ④ The articles may also be used for your projects, debates, class discussions, oral work etc.

**Write a Paragraph**

- ① Write a paragraph explaining the reasons for your choice of top environmental priority. You could start the paragraph with: "When I imagine my 'dream future', I think of ..."

## APPENDIX E

### Environmental Issues Journal

① How to make an Environmental Issues Journal:

1. Cut two pieces of 22cm x 28 cm construction paper to create a cover. Use the example included to create a front cover for your journal. Draw environmental issue pictures in the box on the cover.
2. Insert several Environmental Issues Journal pages (See example, page 17)
3. Staple together and cover stapled edges with book tape.
4. Record your observations, thoughts and questions about environmental issues in the journal. Journal entries can be completed as a team effort or an individual activity.
5. Use journals as a focus for class science discussions and make it part of your portfolio.



\* If there is a serious, local environmental problem such as rubbish dumping, soil erosion or water pollution, write a letter to the appropriate authority explaining the problem and offering to help. See example of letter (p. 20).

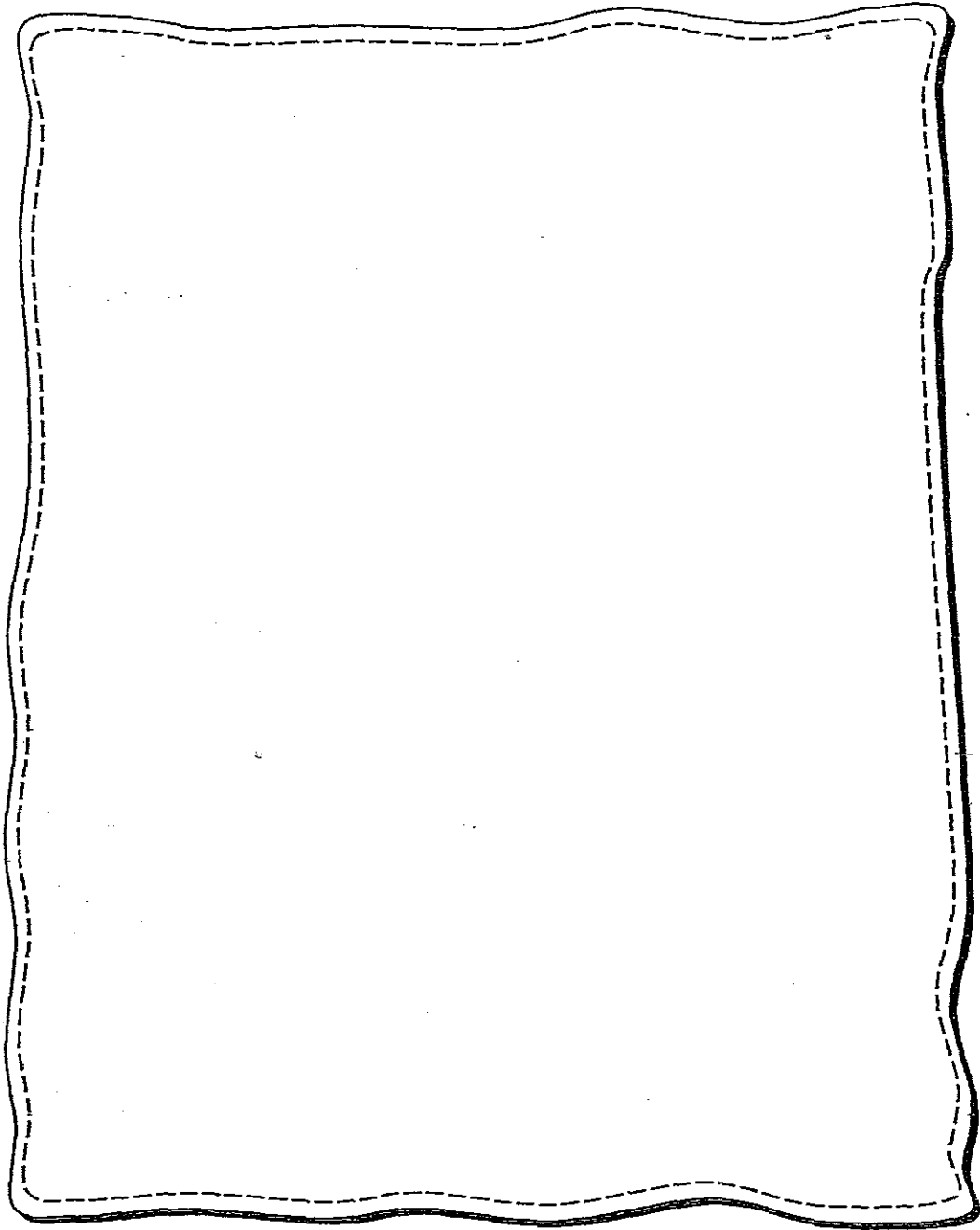


3.2

- Environmental Issues -



# MY ENVIRONMENTAL ISSUES JOURNAL



Name: .....



Theme 3





# ENVIRONMENTAL ISSUES JOURNAL

Illustration

This is what happened: .....

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This is what I learned .....

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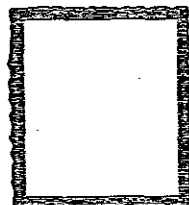
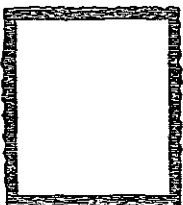
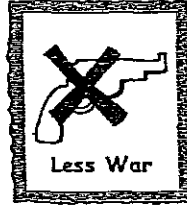
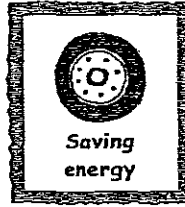
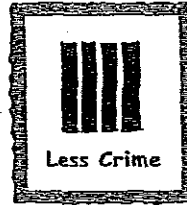
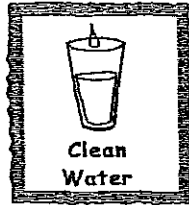
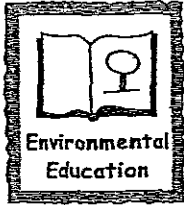
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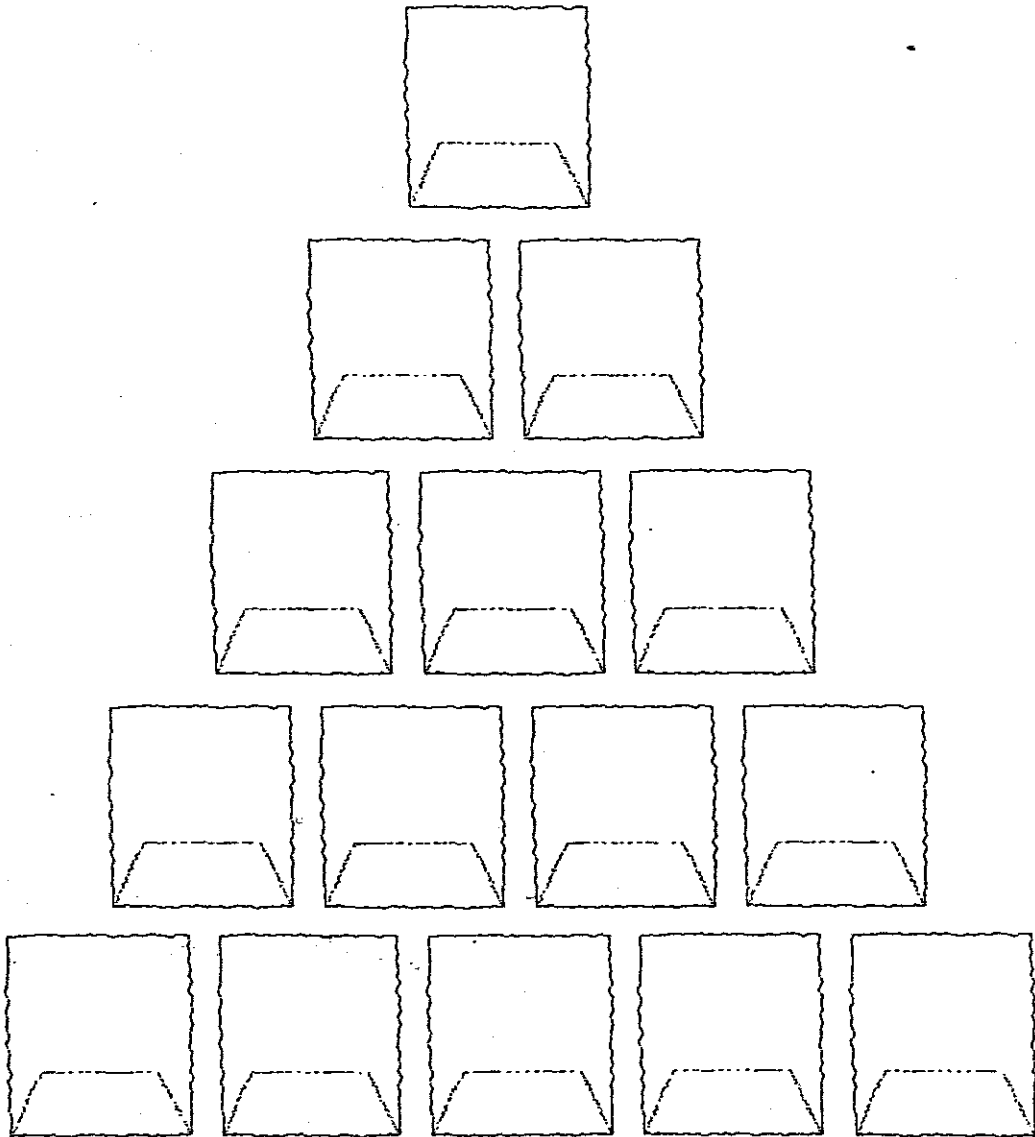


# PRIORITY PYRAMID CARDS





### PRIORITY PYRAMID



**EXAMPLE OF LETTER:**

Resource Material: Total Cares!  
30 My Street  
MYTOWN  
0000

The Town Clerk  
Mytown Municipality  
P O Box 1  
MYTOWN  
0000

Dear Sir

**POLLUTION OF THE CROCODILE RIVER**

Our class is involved in a project called "We Care!", and one of the activities is clearing up a polluted area.

Our teacher has taken us to the section of the Crocodile river between Oak Ave and Bird Street and we were amazed to see the bad state of the river. To date we have collected two lorry-loads of rubbish and we have recently displayed some of the rubbish on our sportsgrounds.

Our group held discussions on this problem and we decided to write to you to suggest the following:

1. We have identified 5 different species of trees that are regarded as invasives by the Cape Department of Nature Conservation. Would it be possible for the Town Council to start removing these invasives along the river? Our school can assist in the planting of indigenous trees.
2. Is it not possible to organise cleanups on a big scale, say once every six months, involving all the schools in town?
3. If the banks of the river are cleared of foreign trees would it be possible to build a nature trail along the bank from Main Road, to Oak Avenue? We are sure that this could become a very popular area.
4. If you should need any help with smaller tasks that can be done by children, our group would be only too happy to organise work-teams to assist you.

We urge you to give these proposals your urgent attention as the river at the moment is very dirty, it is possibly a breeding place for disease, and it is avoided by everyone we know. It could be a lovely place for walks, and possibly even a tourist attraction.

Yours sincerely

T Bekker  
(on behalf of the gr 6(b)-class)



**APPENDIX F**

**EVALUATION OF THE "WE CARE" LEARNING SUPPORT  
MATERIALS BY PROJECT SCHOOLS**

**SCHOOL:**.....

**Gender of the educator**

<b>M</b>		<b>F</b>	
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**TEACHING EXPERIENCE IN YEARS:**.....

**QUALIFICATION(S):**.....

**CLASS TAUGHT:**.....

**NUMBER OF LEARNERS:**.....

**“WE CARE” ACTIVITIES**

**I would like to take a few minutes of your time to ask you the following questions on what you did with the “We Care” materials.**

- 1. What do you think of the overall design? (the way the materials are organized?)

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- 2. Do you think the materials would help you implement OBE?

Explain.....

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**3. Is the language suitable for your learners? Explain briefly.**

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**4. In your view, do the activities compliment the Natural Science Curriculum?  
Give examples.**

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**5. What do you like best about the "We Care" materials?**

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6. What are your thoughts about methods of assessment used in the "We Care" materials?

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7. Which activities did you find difficult to carry out? Why?

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8. What additional comment(s) do you want to state about the materials?

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APPENDIX G

**CLASSROOM OBSERVATION INSTRUMENT**

**SCHOOL:**.....

**CLASS:**.....

**DATE:**.....

**TOPIC:**.....

**1. PREPARATION: Lesson notes (outcomes, neat, logical)**

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**2. PRESENTATION SKILLS:**

**2.1 INTRODUCTION:**

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**2.2 RECALLING AND LINKING WITH KNOWN WORK:**

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**2.3 LOGICAL AND SYSTEMATIC PRESENTATION:**

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**2.4 HOLDING ATTENTION AND AROUSING INTEREST:**

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**2.5 QUALITY OF QUESTIONS:**

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**2.6 HANDLING OF LEARNERS' QUESTIONS AND ANSWERS:**

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**2.7 HANDLING OF GROUP WORK:**

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**2.8 CONCLUSION: (Recapitulation, application, achievement of outcomes)**

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**3. CONTENT:**

**3.1 LEARNERS' KNOWLEDGE OF TOPIC:**

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**3.2 ABILITY TO SIMPLIFY AND EXPLAIN CONTENT AND ENGAGE LEARNERS IN ACTIVITIES THAT FACILITATE LEARNING:**

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**4. CHALKBOARD:**

**4.1 SUMMARY / CONTENT:**

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**4.2 NEATNESS, APPEARANCE, CORRECT USAGE:**

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**5. TEACHING AND LEARNING AIDS: (Preparation, effectiveness of use)**

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**6. VOICE: (Clarity and correct use of language of instruction)**

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**7. CLASSROOM MANAGEMENT:**

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**8. OBSERVATION OF TIME:**

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**9. ADDITIONAL COMMENTS:**

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