

**THE POTENTIAL OF THE TOWNSHIP LANDSCAPE
FOR FIELDWORK
IN THE TEACHING OF SENIOR SECONDARY SCHOOL GEOGRAPHY:
A CASE STUDY IN DUNCAN VILLAGE/GOMPO, EAST LONDON.**

HALF-THESIS

**Submitted in partial fulfilment of the
requirements of the Degree of
MASTER OF EDUCATION
of Rhodes University**

by

Llewellyn King

January 1994

DECLARATION

I declare that this dissertation describes my original work and has not been submitted for a degree at any other university.

Llewellyn King

ABSTRACT

The research emerged out of a need to address firsthand classroom concerns. The problem identified was that the D.E.T. geography syllabus had a Western-orientated world-view and, as such, was largely inappropriate to the experiences of township pupils. As a result, education in townships tends to maintain the status quo and the marginal position of the majority of South Africans.

Recent unpublished research has shown that fieldwork is an effective compensatory tool. If fieldwork is used in the township, it can utilize the local environment which is familiar to pupils. Fieldwork, as an approach, has an additional advantage of being a vehicle for the empowerment of users.

The research sets out to explore the potential of the township environment as a site in which fieldwork can be undertaken. Numerous opportunities are identified and these have been developed into fieldwork exercises. Out of the preparatory work, a need arose to establish the viability of doing township fieldwork. The concern is that, in spite of fieldwork appearing in the secondary school syllabus for a number of years, it is a largely unexplored teaching approach. This necessitated the testing and evaluation of fieldwork opportunities in the township environment.

The chaotic conditions of township education impinged upon the research process, causing its premature termination.

The latter part of the research process raises questions of an ethical nature. Notwithstanding these problems, several positive factors emerge; the negative aspects should not be allowed to overshadow the benefits of the research.

An emancipatory action research framework is used to evaluate the research process.

The study concludes by highlighting the main issues raised in the research and makes recommendations concerning topics requiring further investigation.

ACKNOWLEDGEMENTS

I wish to express my sincere appreciation to my friend, and supervisor, Ms U.A. van Harmelen, from the Department of Education, Rhodes University, for her valuable support, advice, encouragement and inspiration which was needed to complete this half-thesis.

I am grateful to family and friends who gave me the space I needed to do the research and who were selfless in their demands.

I wish to express my gratitude to my collaborative partner for his input, insight, and contacts that he provided. I am also indebted to ITEC; the principals of two Duncan Village schools; teachers; the Std 9 class from the second school; and the various parties who assisted by giving their input and feedback.

To my college students who provided a constant challenge to me, to teach relevant geography, and who were accepting of me, may you become teachers who inspire others to value education.

May our loyalty as teachers be to the notion we banished so innocently in class: "Viva education, long live education!"

DEDICATION

For my late parents, Mom and Dad, I owe much to the sacrifices you made to give me the best you had. You never questioned my intrigue with academia and the enjoyment I derived from studying. Thank you.

TABLE OF CONTENTS

DECLARATION	ii	
ABSTRACT	iii	
ACKNOWLEDGEMENTS	v	
DEDICATION	vi	
TABLE OF CONTENTS	vii	
LIST OF TABLES	xii	
LIST OF FIGURES	xiv	
 CHAPTER 1		
THEORETICAL BACKGROUND TO THE RESEARCH	1	
1.1 INTRODUCTION	1	
1.2 BACKGROUND TO THE RESEARCH	3	
1.3 PROBLEM IDENTIFICATION		6
1.4 GOAL OF THE RESEARCH	7	
1.5 THESIS OUTLINE	7	
 CHAPTER 2		
FACTORS INFLUENCING THE DEVELOPMENT OF FIELD UNITS FOR USE IN THE TOWNSHIP	9	
2.1 INTRODUCTION	9	
2.2 TOWARDS AN UNDERSTANDING OF 'MARGINALIZED' PEOPLE .	11	
2.3 THEORETICAL FRAMEWORK: FIELDWORK, A VEHICLE TO EMPOWER	13	
2.3.1 Philosophical paradigms		

2.3.2.3	Critique of current SA curricula in terms of their potential to empower	
2.3.2.4	Need for syllabus reconstruction	
2.4	FIELDWORK FOR PUPIL EMPOWERMENT	26
2.4.1	An overview of geographical fieldwork	
2.4.2	Framework fieldwork	
2.4.3	The concept of "urban fieldwork amongst the poor"	
2.4.4	The empowering potential of fieldwork	
2.4.5	Recent research relevant to the thesis	
2.5	THE RELEVANCE OF THE SYLLABUS TO THE POOR URBANITE	40
2.6	A CASE FOR TOWNSHIP STUDIES	41
2.6.1	Alternative: Fieldwork for Third World people	
2.6.2	Bridging the gap between abstract geography (the syllabus and textbook content) and the concrete (the experiences that pupils bring with them into the classroom and fieldwork)	
2.7	SUMMARY	45

CHAPTER 3

RESEARCH METHODS AND PROCEDURES	46
3.1 NOTE ON STYLE OF REPORTING	46
3.2 INTRODUCTION	46
3.3 AN OVERVIEW OF THE RESEARCH APPROACH	47
3.3.1 Naturalistic versus rationalistic paradigm	
3.3.2 Validity and reliability	
3.3.3 Scientific approach	
3.4 RESEARCH APPROACH	50
3.4.1 Action research	
3.4.1.1 Characteristics and strengths	
3.4.1.2 Three action research paradigms	
3.4.1.3 Emancipatory action research	
3.4.1.4 The research process	

3.5	THE RESEARCH METHODOLOGY	60
3.5.1	Exploring the nature of the township and identifying potential field sites	
3.5.2	Developing a Resource Pack of field exercises	
3.5.3	Developing a fieldwork programme	
3.5.4	Development of a Teacher's Manual	
3.5.5	Implementation and evaluation	
3.6	ANALYSIS OF DATA	64
3.7	PROBLEMS ENCOUNTERED	66
3.8	SUMMARY	67

CHAPTER 4

IDENTIFICATION, DEVELOPMENT AND PRELIMINARY EVALUATION OF THE FIELDWORK PROGRAMME		69
4.1	INTRODUCTION	69
4.2	THE DUNCAN VILLAGE LANDSCAPE	69
4.2.1	The physical environment	
4.2.2	The socio-cultural environment	
4.3	THE IDENTIFICATION AND SELECTION OF FIELD UNITS ...	74
4.3.1	The identification of fieldwork units	
4.3.2	The viability of doing fieldwork in townships	
4.4	THE DEVELOPMENT OF A FIELDWORK APPROACH	82
4.4.1	Development of a Resource Pack	
4.4.1.1	Choosing fieldwork units	
4.4.1.2	Overall comments	
4.4.2	Development of a fieldwork programme	
4.4.2.1	Justifying the selection process	
4.4.2.2	Overall comments	
4.5	THE ACTUAL FIELDWORK APPROACH	89
4.5.1	Structure of the modules & units	
4.6	THE "SCHOOL TRAIL"	92
4.7	THE "TOWNSHIP TRAIL"	113
4.8	SUMMARY	138

CHAPTER 5

THE IMPLEMENTATION AND EVALUATION OF THE FIELDWORK

PROGRAMME	139
5.1 INTRODUCTION	139
5.2 DEVELOPING RELATIONSHIPS	140
5.3 THE FIELDWORK EXPERIENCE	142
5.3.1 The "School Trail"	
5.3.1.1 Introductory phase	
5.3.1.2 Actual fieldwork phase	
5.3.1.3 Follow-up phase	
5.3.1.4 Cessation of exercise	
5.4 OVERALL EVALUATION OF THE FIELDWORK EXPERIENCE	149
5.4.1 My own evaluation	
5.4.2 Findings of the non-participant observer	
5.4.3 The research's level of reliability and validity	
5.4.4 Concluding comments	
5.5 SUMMARY	161

CHAPTER 6

SUMMARY, LIMITATIONS, RECOMMENDATIONS AND CONCLUSIONS ..163

6.1 INTRODUCTION	163
6.2 HIGHLIGHTING KEY POINTS	166
6.3 LIMITATIONS OF THE STUDY	168
6.4 RECOMMENDATIONS	169
6.4.1 Short-term	
6.4.2 Medium-term	
6.4.3 Long-term	
6.5 AREAS FOR FUTURE INVESTIGATION	174
6.6 CONCLUSIONS	175

REFERENCES	177

APPENDICES	186
2.1 The role and value of fieldwork	186
4.1 The Resource Pack	187
4.2 The Teacher's Manual	247
4.3 An analysis of the D.E.T. Senior Secondary Syllabus	282
5.1 An example of the observation schedule	286

LIST OF FIGURES

Figure

1.1	Location of the research: Duncan Village	5
2.1	The framework for fieldwork	28
3.1	Deakin University action research model	58
3.2	McNiff's action research model	59

CHAPTER 1

THEORETICAL BACKGROUND TO THE STUDY

1.1 INTRODUCTION

In the last two decades of this century, teachers are increasingly being forced to grapple with the nature and point of the subject matter they teach. In South Africa at this time of transition, teachers are having to face their role as decision-makers by deciding on what should be taught and why? In this regard Baba Dioum's (1992) seminar comments are pertinent:

*In the end, we will conserve only what we love.
We will love only what we understand.
We will understand only what we are taught.*

The situation in South Africa is exacerbated by the fact that the majority of children currently at school are socio-economically underprivileged. Their background is also influenced by other factors like that of ongoing violence and polarization. None of the children of South Africa have been as adversely affected as the township child. The virtual collapse of education in the township is a symptom and a result of the political upheaval in the country.

Township children, consequently, face many difficulties in the area of education. Their firsthand experience is different to the theory they are exposed to in school which is based on a western, middle-class value system. They are also penalized by the language used at schools that often differs from their own. As a result of these conditions, the school curriculum needs to undergo changes to cater for all South Africans.

School geography needs to accommodate changes that are

occurring at a national level. This needs to be done through curriculum reconstruction. A new curriculum is needed to provide pupils with life skills, values and knowledge. This new curriculum should:

- i. Address the issue of relevant subject matter, pertinent to the demands of a changing South Africa;
- ii. Ensure that all citizens are gainfully employed; and
- iii. Give meaning to life.

Curriculum reconstruction is, however, a lengthy process if it is to be worthwhile and if it is to meet the needs of both the South African pupil and of Geography. As an interim measure, geographical fieldwork is capable of addressing many of the issues raised that adversely affect the successful teaching and learning of geography. It addresses the need for a more locally based and meaningful geography. This research explores the potential of using fieldwork, based in a township, as a vehicle to address issues of relevance and as a compensatory teaching method (Boqwana, 1991).

The use of a fieldwork approach is not without problems as Martinez and Paterson (1988), working in Malaysia, have mentioned. Their comments are pertinent since their experience is located in developing countries. They comment that not only is equipment in short supply but information and 'field-trip infra-structure' is not available to teachers. They warn that when introducing pupils to fieldwork, their language handicap needs to be acknowledged, it is thus necessary to constantly guide pupils through deductive processes, the formulation of hypotheses and the completing of work sheets.

1.2 BACKGROUND TO THE RESEARCH

As a lecturer at a teachers training college, I became interested in exposing my students to fieldwork as a part of studying geography. I realized that by exposing student teachers to fieldwork, with time there would be a gradual filtering of fieldwork ideas and concepts into secondary schools as students took up positions as teachers.

It became apparent that fieldwork was never done in township schools except when it was undertaken away from the township. What perturbed me was that this tended to further alienate students from their roots and their first-hand experiences. I consequently became interested in exploring the possibilities that existed for developing fieldwork exercises for use in a township.

Initially the College grounds were used to teach basic fieldwork skills, to encourage group work, to get students to start thinking critically and to undertake research projects. Students were enthusiastic about this exposure which made them feel that geography had merit and that it was academically relevant¹. As their level of expertise in fieldwork increased, field exercises became more open-ended and emphasized problem-solving skills.

The success of this exposure was illustrated when several second-year Secondary Teachers' Diploma (STD²) students did fieldwork lessons with their classes while on 'teaching practice'.

¹ It manifested itself by students feeling unthreatened academically by students studying the pure sciences - mathematics and physics.

² The Secondary Teachers' Diploma (STD) qualifies students to teach in high schools.

Fieldwork with College students emphasized its value as a teaching strategy and a method for students to learn geography. The firsthand experience of the value of fieldwork led to my interest in researching the topic of fieldwork. Hence, when my service at the College was terminated, giving rise to a number of problems, I decided to change the venue of research from Mdantsane, Ciskei to Duncan Village, East London (FIGURE 1.1). This necessitated that the research had to change its focus since I would no longer be working with third-year STD students (whom I knew and had taught for two years) encouraging them to become more competent in fieldwork. Instead, a new set of relationships had to be developed with people in Duncan Village.

Not having contacts in Duncan Village, I approached ITEC³ for assistance. Through an educationalist with credibility in the local area, contact was made with a high school.

From this contact a friendship developed with the geography teacher who was willing to be my collaborative partner. He agreed to use his Std 8 class for the implementation and testing of a part of the fieldwork programme. Before the programme which we discussed and developed could be implemented, the programme was abandoned due to internal problems at this school.

My collaborative partner, however, provided me with a contact teacher at another local high school. It was at this school that the previously developed field units were to be implemented and evaluated. Similarly, due to problems beyond my control, the fieldwork programme was terminated prematurely after the completion of only the "School Trail".

³ ITEC or the Independent Teacher Enrichment Centre provides resource material and support to teachers not catered for by the local Teachers' Centre.

EAST LONDON & SUBURBS

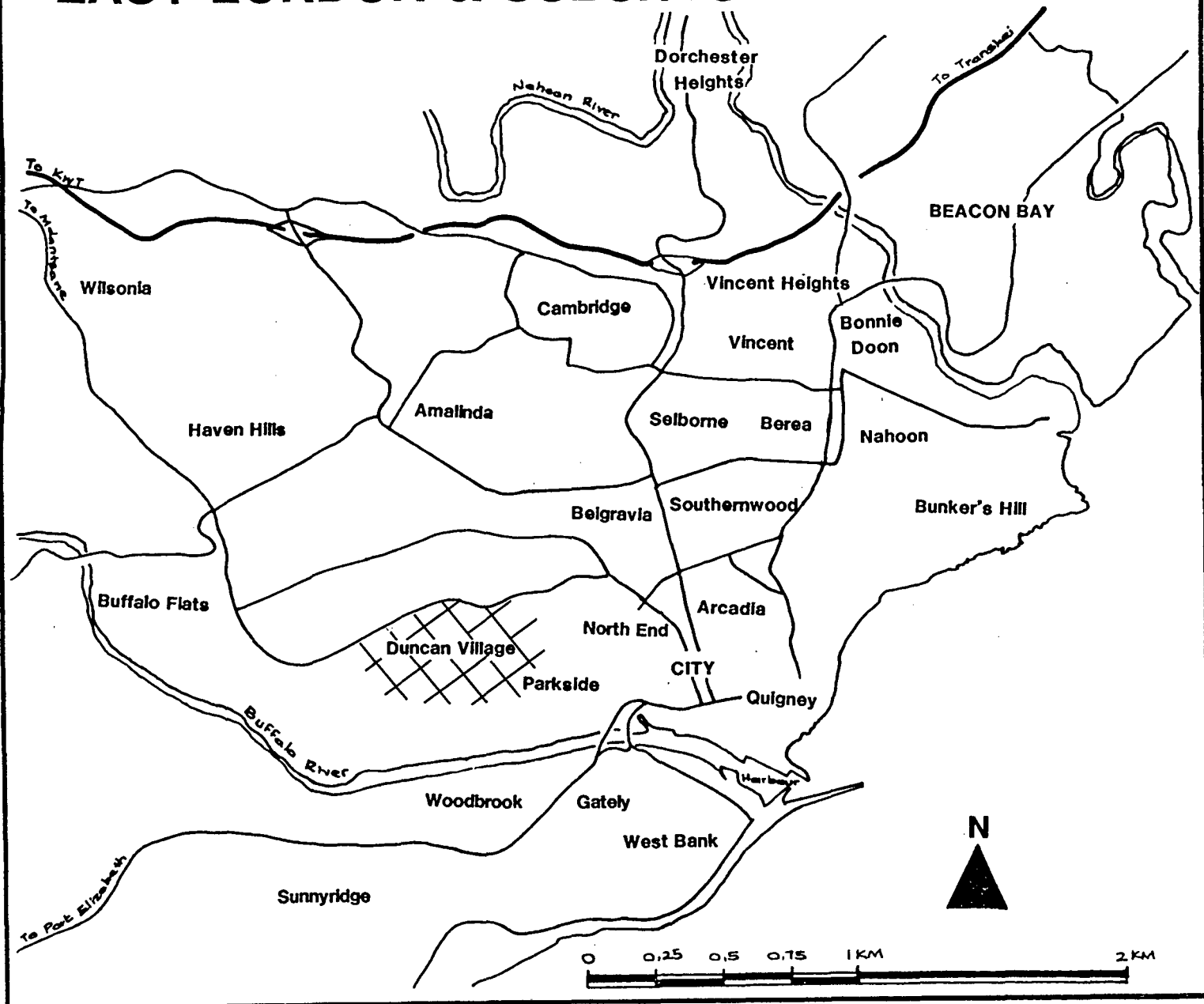


FIGURE 1.1
Geographical position of Duncan Village

As a result of the abovementioned changes, the research focused on the identification and development of fieldwork opportunities within the township environment so that the teaching of geography could be made more relevant and so assist pupils towards their own empowerment. Evaluation was restricted to reflecting on the suitability of field units, describing the relationships that developed and commenting on the experience of the "School Trail".

1.3 PROBLEM IDENTIFICATION

While lecturing at the Training College, I was exposed to numerous local school situations while observing students during practice-teaching sessions⁴. I became aware that the content of geography lessons appeared to be remote and irrelevant to the needs, interests and experience of township pupils. This situation is exacerbated by a syllabus designed for the needs of the dominant group, while ignoring those of the township (McDonald, 1988; Adler, 1991). Since teachers have been similarly marginalized by the syllabus, lack a personal understanding of its content, are often under-qualified and, therefore, unconfident, rote learning and textbook-orientated teaching have become the mode of imparting knowledge to pupils. This has given rise to a teacher-centred approach to schooling which has sidelined pupils to passivity.

The above issues, together with instability in townships, have produced a chaotic educational system. As a result, little effective teaching and learning occurs during the academic year (Samuel in Pimm & Love, 1991).

⁴ These sessions occurred three times a year when students visited schools to practise their teaching skills.

1.4 GOAL OF THE RESEARCH

In the light of my experience with the College students and my observations in township schools, the goal of this research was to identify, develop and evaluate fieldwork units at senior secondary level, set in a township context.

1.5 THESIS OUTLINE

The research commences with a literature review in which perceptual-conceptual issues, relevant to fieldwork based in a township, are highlighted. This necessitated my focusing on the following:

- i. The role and value of doing fieldwork in the local environment of the township;
- ii. Identifying the opportunities for doing township fieldwork;
- iii. The making of a case for township studies;
- iv. Determining the viability of using township fieldwork to teach aspects of the geography syllabus; and
- v. Noting the relevance of the syllabus to the above issues.

Chapter 3 deals with the methodology that is used to realize the above goals. The research is set within an emancipatory action research framework and attempts to reflect on the main processes as they occur.

Chapter 4 identifies the opportunity to do township fieldwork within the confines of the D.E.T. senior secondary geography syllabus. To this end a Resource Pack was developed consisting of a number of field exercises. A selection of these exercises resulted in the development of a fieldwork programme which was tested in Duncan Village.

Chapter 5 focuses on the implementation and the evaluation of the fieldwork programme in terms of the field units, the relationships that developed and the overall fieldwork experience.

In contextualizing the research it was acknowledged that the research process was contrived. It was, however, felt that the negative factors should not be allowed to obscure the positive effects of the study, that showed township fieldwork to have merit.

The final chapter, Chapter 6, highlights key issues raised in previous chapters, identifies limitations, makes recommendations as to the nature of future research and gives a summary of the research.

CHAPTER 2

FACTORS INFLUENCING THE DEVELOPMENT OF FIELD UNITS FOR USE IN THE TOWNSHIP

2.1 INTRODUCTION

For many pupils living in townships the content of various school syllabi remains largely divorced from the realities of everyday life (Rogerson and McCarthy, 1992) and "often conflicts with indigenous knowledge and felt needs" (Vulliamy, 1987, p15). The challenge facing the teacher is attempting to address subject relevance.

The chapter commences by defining a theoretical framework which articulates issues pertinent to 'marginalized' people (Apple, 1992; Popkewitz in Goodman, 1992; Shymansky and Kyle, 1992). An attempt is then made to determine what opportunities exist within the current secondary geography syllabus for the development of fieldwork units. The focus of this discussion is the use of fieldwork both as a compensatory teaching strategy (Boqwana, 1991) and as a means to provide teachers and learners with epistemological empowerment (Prawat, 1992). In so doing, a case is made for a more meaningful and interesting context for the subject.

The study of the township landscape as a fieldwork site is problematic as it raises several important issues, namely:

- i. Should theoretical aspects of urban geography be considered important in the study of cities? In other words, 'Is it relevant to use models to describe the nature of cities, especially when referring to how the poor live?'

- ii. How do the poor live in different parts of the world?
- iii. Are there any similarities with life in our townships?
- iv. What can be done to make geography relevant to the poor?
- v. What values and attitudes do we want to foster in the minds of our pupils about the poor, especially during this transitional period?
- vi. What do these disadvantaged pupils need to learn about?
- vii. Can geographical fieldwork assist in empowering pupils by providing them with knowledge, skills and values that give meaning to their lives?

Authors such as Johnston (1983), Popkewitz (1988), Shan & Bailey (1990), Stout (1991) and Fay, Foucault and Lather (in Goodman, 1992) have called on social science researchers to look beyond the mere description and interpretation of the dynamics of society, and to consider ways in which society can be changed. Lather (in Goodman, 1992) believes that society can be modified through the empowerment of human beings to work against social, economic, cultural and psychological constraints, and ideology (e.g. race, gender, class, language and culture) to create a more just and caring reality.

Having raised these issues, a study of the current Geography curriculum is made to ensure that concepts of dominance do not go unchallenged. Related to this is a concern for how forms of domination and power are maintained and renewed in our society. The latter issue is considered with regard to issues pertinent to the poor as a marginalized part of society.

2.2 TOWARDS AN UNDERSTANDING OF 'MARGINALIZED' PEOPLE

Apple (1992) claims that the crisis facing American society goes well beyond what happens in the classroom. This situation is equally true for South Africa (Luthuli, 1985; NEPI, 1992). It has been argued that the educational crisis we face in South Africa is one which has resulted from the fact that the dominant group provides educational conditions necessary for their increase of power and accumulation of capital (McDonald, 1988; Adler, 1991; McLennan, 1992; NEPI, 1992). Apple (1992, p182) argues for "redressing the imbalances in life chances of women, people of colour or labour...".

Despite the existence of 17 separate provincial or racially/ ethnically divided educational departments in South Africa, each is bound to a 'core' syllabus drafted in 1973 through input from university staff and the Geographical Society (Rogerson & McCarthy, 1992). After 20 years of teaching this highly technical and demanding syllabus (Nightingale and Ballantyne in Rogerson & McCarthy, 1992), teachers have recently been encouraged to interpret the syllabus in the widest possible terms and to employ pupil-centred learning activities (Gunn and Hurry in Rogerson & McCarthy, 1992). Assessment, however, remains by means of competitive examinations (Adler, 1991).

In the light of the above discussion, the curriculum strongly favours white pupils while penalizing black ones. Educational statistics provide supplementary evidence highlighting the disadvantage that black pupils face in education:

- i. Of every 10 000 black pupils who enter primary school, only 27 obtain a matriculation certificate to enter university;

- ii. Per capita expenditure in 1990 was R3 082,00 for white children, while only R765,00 for black children;
- iii. White schools have a teacher-pupil ratio of 1:16 compared to 1:41 in black schools; and
- iv. numerous black teachers are poorly qualified, which is not the case in white schools (Vos & Brits, 1990; Kramer, in Pimm & Love, 1991).

In the light of these facts, there is a need for research to focus on those individuals who are most often ignored - the poor and the disadvantaged - rather than on those having power and privilege (Foucault in Goodman, 1992). Popkewitz and Fay (in Goodman, 1992) address this issue by calling for research to be conducted within a theoretical emancipatory framework whereby 'marginalized' people are empowered, through critical debate, so that they "learn to speak with their own voices, to appreciate the language they are using and to mean what they say" (McLennan, 1992, p2). In this way people are helped to acquire skills for survival as well as to participate in democracy through day-to-day activities.

In recent years, a revolution in conceptual thinking has occurred within the social sciences as a result of the debate surrounding the place of the so-called 'marginalized' people in the social and economic development of the Third World (Falso-Borda, 1984; Stout, 1991). This debate has been crucial in raising issues concerning the process of knowledge creation and its connection to structures of power, both within countries and between developed and less developed countries. A plea has been made for the creation of a new theoretical framework based on 'marginalized' peoples' understanding of knowledge (Falso-Borda, 1984; Stout, 1991). This call has been made in an attempt to see the demise of dualism focusing on the dominant group in core-peripheral relationships.

A framework is needed to integrate both theory and practice. This has been accomplished by placing this research in an emancipatory framework (Bell & Schniedewind, 1987; Doll, 1989; Shymansky and Kyle, 1992) and within a post-modern paradigm⁵.

This study focuses on the disadvantaged community living in townships and seeks, through the exposure of pupils to fieldwork, to empower them (McDonald, 1988; Prawat, 1991; Morphet, 1992; Prawat, 1992; McLennan, 1992) by developing pertinent geographical techniques, skills and values. The focus of fieldwork is an attempt to: encourage teacher empowerment and to enable pupils to make better sense of their reality and so assist them to be creators of their own destiny (Cheung & Taylor, 1991; Chiras, 1992; McEwan, 1992).

2.3 THEORETICAL FRAMEWORK: FIELDWORK, A VEHICLE TO EMPOWER

Having acknowledged the existence of the 'marginalized' majority in our society, a theory is needed which gives value to views held by them. This is done by: identifying paradigms that give expression to 'marginalized' people and by considering ways in which people can be empowered.

⁵ Superficially, post-modernism has two key ideas that make it a suitable framework within which to locate this research, namely i) it is highly critical of modernism (eg. its acceptance of a rationalistic ideology to explain real-life events; the notion of 'objective' truth; and its claim to one metatheory to explain real-life events) and ii) it places an emphasis on marginalized groups by giving expression to transformatory change (Doll, 1989).

2.3.1 Philosophical paradigms: 'marginalized' people

The proliferation of thinking and writing about 'marginalized' communities in developed and less-developed countries (Stout, 1991; Goodman, 1992; Shymansky and Kyle, 1992) demonstrates a crisis of confidence, in which hitherto unquestioned assumptions (on which the traditional or modernist view rests) are being challenged.

Post-modernists have criticized the rigid dichotomies modernism has created between objective reality and subjective experience, fact and imagination, secular and sacred, public and private... Post-modernism's rejection of a single metatheory and a reliance upon the existence of impartial truth, opens the way to challenge accepted views and theories of production and superiority, thus giving articulation to 'marginalized' people. Further, by acknowledging the previously excluded 'other', post-modernism has ensured the development of new conceptions of knowledge. This has been done without attempting to deny real-life imperatives of power and superiority that inevitably function in the interest of given 'leaders', but rather "in an attempt to bring peripheral players into the power game" (Stout, 1991, p24). If this can be done, and sustained, then post-modernism could offer an alternative to the dualism of modern and dependency notions (e.g. core-periphery relations), and offer new theoretical parameters that incorporate a multiplicity of actors within continually transforming roles. The modernist view places little importance on issues like class, gender, ethnicity and other 'marginal' consciousness when describing society's organization.

The use of a post-modernist framework is not without its own problems. For example, social phenomenologists criticize the more traditional aspects of post-modernism which cling to 'scientific'⁶ methods instead of an understanding based on "prolonged and intimate participation" (Blumer in Goodman, 1992, p120). Critical theorists, on the other hand, challenge post-modernism for not going beyond simply recording 'what is out there'. These theorists argue for an analysis of the social, economic, cultural and psychological constraints and ideologies that keep people from creating a more just and caring reality (Lather and Fay in Goodman, 1992). Lastly, post-structural literary theory⁷ highlights the failure of post-modernists to focus on the production of meaning by highlighting the social context.

In spite of these and other criticisms, I believe that post-modernism has merit. It is flexible enough to accommodate aspects of other theories as well as providing valuable insights into what the real mechanisms of power are which have historically sidelined South Africa's majority.

Having identified a philosophical paradigm that gives expression to the views of disadvantaged people, attention needs to be directed at defining the concept of empowerment more clearly before focusing on ways in which fieldwork can lead to the empowerment of users.

⁶ Social science research is subject to scientific rigour, but it places a different interpretation on its observations and uses qualitative techniques rather than quantitative ones.

⁷ In post-structural literary theory, the 'marginalized' sectors are considered powerful and active subjects, invested with some measure of autonomy to articulate their own feelings, to develop alternative cultural paradigms and a political agenda that is not merely reactionary, but rather an original articulation of a distinct cultural identity (Stout, 1991).

2.3.2 The concept of empowerment

In an attempt to respond more creatively to the educational dilemma at hand, several educationists have made a plea for education to follow the example set by initiatives in the U.S.A. private motor-car industry. This industry has abandoned its highly centralized production methods and given greater autonomy and control to workers (Shanker in Prawat, 1991; Prawat, 1992). Influenced by the motor industry, the American educational system embarked upon a project to give greater freedom and responsibility to teachers (McDonald, 1988). Teacher and pupil empowerment was, therefore, seen to be crucial to achieve these ends.

2.3.2.1 Defining empowerment

Discussion about teacher empowerment usually centres around two important dimensions. The first is concerned with the context in which the process occurs, while the second relates to the agenda or focus. Discussion on the context of empowerment contrasts a personal approach with a more socially active one. The more personal approach - "conversation with self" (Prawat, 1991, p739) - implies that through reflection and inner debate, as well as dialogue with other people, people gain greater control or influence over their own thinking and so become more critical. In this way Prawat (1991) argues that people are better able to address the problems of social and political oppression more effectively. The second context, "conversation with setting" (Prawat, 1991, p739), is pro-active since power is seen to be something that is achieved rather than a right. Consequently, teachers through their own empowerment must actively and creatively stimulate pupils to pursue their own empowerment.

Discussion on agenda or focus centres around an understanding of an epistemological (knowledge orientated approach) and a socio-political form of empowerment (McDonald, 1988; Prawat, 1991, 1992). The former concept refers to the internal dialogue and reflection that one is involved in when deciding which type of knowledge one ought to regard as most valid (Prawat, 1991). The latter concept defines the goal of empowerment which is to enhance the teachers' ability to deal with oppression and those things which interfere with individuals' personal development (Prawat, 1992).

This dual meaning of teacher empowerment is well illustrated by McDonald (1988) in his reference to the "teacher's voice". He says: "...voice may refer to the right and power to have a say in policy but it may also refer to the content of what might be said and implicitly to what those who are empowered to speak know" (p472).

2.3.2.2 Teacher empowerment

The type of pre-service and in-service training given is crucial to ensure teacher empowerment, which is a prerequisite for pupil empowerment. The goals of pre-service training of teachers and in-service courses should be to ensure that teachers become an authority in their subject (i.e. the teacher needs to have a good understanding of the contents of the geography syllabus) as this will assist them to be in authority in the classroom (Stenhouse, 1975). The inability to cope with subject content most often results in a teacher having difficulty in controlling classes. In an attempt to have better control in the classroom, teachers are likely to resort to using an autocratic approach, to

teach according to the textbook and to emphasize rote learning. This is done rather than encouraging participation, interaction and inter-dependence between pupils themselves and between pupils and staff.

It is argued by McDonald (1988), Prawat (1991; 1992), Morphet (1992), McLennan (1992) and Goodman (1992) that the empowerment process occurs when the following are built into a teacher-education programme:

- i. The development of critical thinking with inquiry and reflection being the most basic skills needed to bring about empowerment. These skills are basic to solving problems, coming to an understanding of a particular situation beyond mere description and the ability to challenge things beyond their face value.
- ii. When teachers become full participants in scholarly discourse they debate and write rather than being mere consumers of finished products; they reflect images of being empowered (Van de Weghe, 1992). (Thus, in the case of fieldwork, teachers need to keep records of fieldwork observation so as to add to current research knowledge in the field and in the classroom.) Empowerment occurs when teachers write about their classroom experiences and when they participate in professional gatherings concerned with their own subject. From such participation, input is likely to be made into the development of curricula.
- iii. Each teacher needs to come to terms with his own experience of being exploited and learn how to 'de-personalize' the process by placing his experiences within a social/historical context. This is necessary if teachers are to assist pupils to do the same and not allow their muteness to continue to impede future opportunities and progress.

- iv. Teachers need to create a support environment where they can share inputs, resources and ideas.
- v. Teachers must acknowledge that all theories are tentative and not absolutes.
- vi. Teachers should be encouraged to view the world through new conceptual lenses by making use of alternative theoretical frameworks for thinking about the learning context.
- vii. An ethos of taking control and accepting the consequences for any action/lack of action must be built into the training programme for teachers. This application might, however, not be possible under current conditions in township schools. Nevertheless, teachers need to be exposed to what the calling of their profession entails.
- viii. Teachers need to be given assistance to strike a balance between commitment to self and to others. The commitment to self as a professional needs to take place in order that the teacher might be more effective in securing resources and in providing the necessary support to meet the needs of the pupils they serve.

The raising of the above 'keys to empowerment' highlights the vital role that should be played during the training of teachers and during in-services courses. If teachers are to be empowered and in turn empower others, they first need to know how empowerment occurs and to have reached towards empowerment themselves.

2.3.2.3 Critique of current SA curricula in terms of their potential to empower

During the current transitional period, there has been a "destruction of a learning culture" (Samuel in Pimm and

Love, 1991) in townships, since education and learning are seen to have little value. These conditions are in part due to the fact that classroom activities are divorced from the lived experiences of pupils. This has in turn produced a feeling of alienation amongst pupils (NEPI, 1992).

Luthuli (1985) argues the point further, stating that, by striving for equal opportunities, black people have failed to push sufficiently vigorously for the control of their own education. Instead, black educators have emulated their white counterparts and produced an education system that is judged to be irrelevant and meaningless, and which prevents black people from realizing their full potential.

Furthermore, the present competitive and academic syllabi allow little time and space for experimentation and change within the curriculum (Adler, 1991). Consequently, there is little opportunity for a more reflective, participatory and investigatory geography syllabus. This requires a less content-laden syllabus, together with an epistemological shift, to cater for a more interactive teaching approach. The reality of the situation is that the present geography curriculum at best reconstructs the existing power structures (Davidoff & Van den Berg, 1991; Adler, 1991). No opportunity exists for the empowering of the muted group. There is, therefore, an urgent need for curricula reconstruction.

2.3.2.4 The need for geography syllabus reconstruction

In the light of the above comments, and as a result of a major shift in education, growing public opinion favours overhauling the entire educational system (Prawat, 1991).

This is argued in order to bring about fundamental changes in course content, modes of instruction, teacher training, the assessment of pupils as well as the process of research (Adler, 1991; NEPI, 1992; Shymansky & Kyle, 1992).

The call for curriculum reconstruction in a South African context is made on the basis of: the high failure and drop-out rate amongst black pupils (Kramer in Pimm & Love, 1991) which has resulted in the alienation of a large portion of the school-going pupils population who have had their employment opportunities curtailed (NEPI, 1992); the lack of 'effective' education that is taking place in township schools (first-hand reports from various teachers and principals, Samuel in Pimm & Love, 1991); and from various statistics concerning resources spent on education under apartheid structures (Vos & Brits, 1990; Pimm & Love, 1991).

The rationale for geographical syllabus reconstruction is based upon two main issues:

- i. The need to work towards the demise of an educational system serving the interests of the dominant group (Adler, 1991; Apple, 1992; NEPI, 1992). Geography is in need of such reform.

Such a reconstruction needs to be inspired by:

- a) A new view of the geography syllabus to ensure geographical literacy for virtually all pupils, even the disadvantaged. Geography needs to be accessible to a new generation of pupils, the majority, and in such a way that there can be an application of geographical concepts to personal and societal issues. Geography should, consequently, follow an enquiry-based approach emphasizing the solving of problems and the

development of life-skills. It should also be related to the everyday context of pupils and built upon their innate geographical knowledge (NRC, 1989; NCTM, 1991; NEPI, 1992). In such a syllabus, fieldwork is able to service such requirements.

Doll (in Prawat, 1992) argues that there are three important assumptions on which a new approach to science curriculum development should be based (these are also relevant to geography), namely that:

- 1) The focus in the curriculum should be to get pupils to structure and organize their own experience.
- 2) The curriculum needs to provide time for pupils to mull over issues, attempting to find alternatives, time to disagree and to reflect. The net result of this reflection is that it promotes change (Editorial, 1981).
- 3) Important particulars of the curriculum need to emerge through a process of dialogue with pupils, making for a more interactive approach.

Doll's recommendations are radical in relationship to our reality, but his ideas have merit for the following reasons: the learning process is clearly centred around the pupil making sense of his reality, within a curriculum that has been developed by its users, teachers and pupils, and without the intense pressure of a heavy workload.

Such an approach would work against the common practice where "textbooks have become the de facto curriculum" (Tyson-Bernstein in NRC, 1989, p67).

To ensure the acceptance of innovative ideas, they need to be centralized in the curriculum and assessed by the national examinations (Vulliamy, 1987). Assessment is important since what is tested is what gets taught (NRC, 1989).

According to Luthuli (1985), the present curriculum for black people does not take into account calls for it to reflect a Black philosophy. This is despite statistics showing that by the year 2000, eight out of ten people will be black and the majority will be children (Stoker & Marsh, 1993).

- b) A new view is needed of the nature of the geography learner (no longer viewed as a passive subject, where the teacher prescribes and pupils transcribe) and the process of teaching (NRC, 1989, Prawat, 1992). Such a change is necessary to ensure that pupils develop into citizens capable of solving problems and thinking creatively, reflectively and critically.

In other words, pupils must construct their own geography. This happens most readily when geography encourages pupils to work in groups, using discussion and argument (NRC, 1989), self-discovery and the solving of problems, and when there is generous room for trial and error. Fieldwork provides geography with many such opportunities.

- c) A new view is also required of the role of the geography teacher. No longer should teachers see themselves as the sole authority and transmitter of knowledge.

Any chain breaks at its weakest link. Geography teachers are especially vulnerable to weakness in every standard, due to poor teacher training and under-qualification. The training of geography teachers, the provision of in-service training and up-grade courses needs attention. Further, to ensure professional growth upon qualifying, teachers should be afforded more time to share ideas with colleagues so that they can become active, reflective practitioners engaged as partners in curriculum development (Julie in Pimm & Love, 1991; Apple, 1992).

- ii. The need for geography to reflect a stronger emphasis on doing fieldwork. The value of this approach is that fieldwork can be done in the local environment and it is a creative, pupil-centred compensatory method.

Since February 1990 when the government declared its willingness to enter into negotiations concerning a new dispensation, the idea of a unitary educational system, under a single ministry, has become a possibility. Since then, much negotiation has taken place to determine the form education ought to take. This debate has been spurred on by the chaotic conditions in township schools (Samuel in Pimm & Love, 1991).

It has been suggested that, to ensure a more just, relevant and empowering form of education, the existing curriculum needs reconstruction. This reconstruction needs to be based on principles of enduring quality, and acknowledged by the wider community as being of value.

If one analyses APPENDIX 4.3 which highlights the core geography syllabus for senior secondary classes, one notes that the syllabus, in its present form, provides little opportunity to empower pupils.

I have argued and given justification for the need for geography syllabus reconstruction. The problem with this argument, however, is that time is needed for reconstruction to take place. Consequently, an interim approach is needed to provide momentum for future change. Fieldwork is an approach which can lead to empowerment - its strength being: the focus on the local environment; a strong co-operative learning approach; and its concern with real-life issues and problems.

2.4 FIELDWORK FOR PUPIL EMPOWERMENT

2.4.1 An overview of geographical fieldwork

Fieldwork is a teaching approach that is integrative in its aims and which is increasing in usage (Lenon & Cleves, 1986). Yet, despite its increasing popularity and its convincing benefits (Nightingale, 1978; Fien et al, 1984; Opie, 1989), it still remains a neglected methodology. This inertia could be the result of: numerous real obstacles; past negative experiences; a lack of exposure; pressure of external examinations; subject focus changes; or a lack of leadership from higher education (GA Sixth Form-University Working Group, 1984; Opie, 1989).

Fieldwork is an excellent teaching approach based on sound educational principles that are well suited for hands-on investigation. Consequently, it should be seen as a necessary part of geographical education and not an optional extra (Bailey, 1974; GA Sixth Form-University Working Group, 1984; Hurry, 1989).

South African geographers need to be reminded of the above issues to ensure that the subject retains its place in the syllabi in the "new" South Africa. A case for geography can only be made if geography attempts to meet the needs of the 'marginalized' population by empowering them. In this regard fieldwork can be utilized. In spite of fieldwork being a feature of the geography syllabus for the past 30 years, it has not been extensively utilized in South African schools. If fieldwork is considered to be so important, can we afford not to utilize it? This consideration is especially valid amongst deprived communities. Fieldwork is offered as an extra-curricula activity only in the more affluent 'Model C' schools, but there appears to be no fieldwork opportunities for the poor.

These factors emphasize the need for redress. Framework fieldwork is an approach that provides a context within which this is possible.

2.4.2 Framework fieldwork

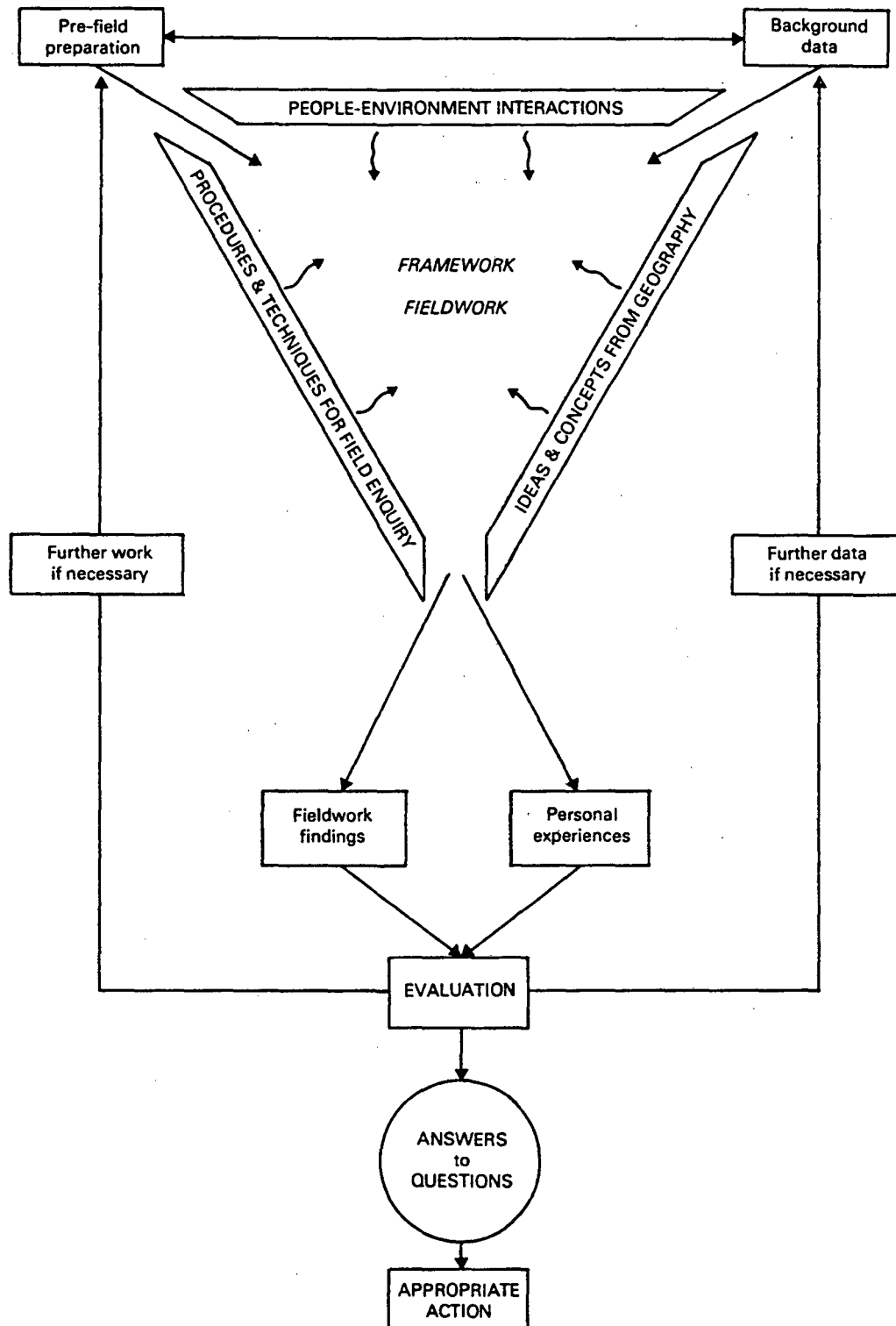
The strength of framework fieldwork⁸ is that it is the only fieldwork approach that is flexible, located in the real world and expresses both facts and values (Barton, 1985; Lenon & Cleves, 1986; Nettleship, 1987; Steer & Jenness, 1988; Martinez & Paterson, 1988; Hurry, 1989). This approach consists of three major components (Hart & Thomas, 1986): people-environment interactions; geographical ideas and concepts; and various procedures and techniques suitable for field enquiry (FIGURE 2.1).

The following discussion considers the characteristics of framework fieldwork:

- i. The most prominent feature of the analysis of people-environment interactions is that all issues are seen to have both a factual and an opinion or a value component. So, whether the issue under discussion is the provision of undeveloped land for the building of informal housing, or the fact that human effluent filters into nearby rivers and streams, two aspects are raised. Framework fieldwork generates evidence that

⁸ Fieldwork is not uniform in its purpose. Numerous classifications have been adopted by various authors at different times in the subject's history. The original approach, pre-1960's era, saw fieldwork as the teaching of geography in the field through observation or demonstration (Walford, 1973). In the 1970's, qualitative research was replaced by technique-orientated fieldwork based on scientific methods relying on measurement, the analysis of data and the testing of hypotheses. This transition accompanied the rise in popularity of an increasingly systematic and quantifiable form of geography. The 'scientific' emphasis came under increasing criticism in the quest for a more accurate human dimension to fieldwork. This saw the entry of framework fieldwork.

FIGURE 2.1
The framework for fieldwork



is scientifically accurate as well as being verifiable in terms of how the community feels about the issue at hand. No other fieldwork approach provides these two alternatives in an attempt to solve real-life problems in the local environment.

- ii. In this approach, field enquiry (the techniques and procedures of investigation), never dominates the field activity, causing the issue under investigation to become obscured. Instead, techniques for field enquiry simply remain the means by which information is gathered. Regardless of whether people are being interviewed or a vehicle-passenger count is being undertaken, the tool used is simply to provide data.
- iii. The collection of value-based information demands that recognition be given to the significance of subjective human responses. For example, pupils are challenged to clarify their own values and attitudes on particular issues. By studying local issues, pupils are likely to become more aware and involved in their local community. These comments further affirm the need for local fieldwork.
- iv. Lastly, this approach attempts to impart "both a sense of place and a sense of realism" (Hart & Thomas, 1986, p213) to field studies, since pupils are active in their own environment.

Having highlighted the strengths of framework fieldwork in terms of its factual and value-based components, the research investigates the need for fieldwork amongst the poor as a valid means of teaching geographical concepts, processes and inter-relationships.

2.4.3 The concept of "urban fieldwork amongst the poor"

Traditionally, urban geographers have tended to underscore the structure of cities by mapping their spatial patterns and translating these into models (Burgess, Hoyt and Harris-Ullman (Barke, 1982) ⁹). In the past it has been on the basis of various land-uses that an explanation of the city has been given.

Models have essentially been designed to simplify reality in order to aid understanding and yet allow for their application to the real world with all their complexities. The use of models, however, raises several problems, namely:

- i. the relating of the abstract back to reality (Kirby, 1981);
- ii. models seldom conform to the ideal situation as described by the model (Kirby, 1981); and
- iii. models do not explain the dynamic nature of cities (Barke, 1982).

Consequently, not everyone is satisfied that models adequately account for our understanding of the city. Alternative interpretations include the focus on issues like: exploitation; unequal distribution of resources; and conflicts that stem from these inequalities (Sibley, 1981). Others call for an understanding of the processes behind specified growth, reasons for particular locational preferences and the spatial consequence of land use and urban morphology (Barke, 1982).

⁹ For example, none of the abovementioned models are recognizable in South Africa; the apartheid city has it's own unique structure (Rogerson & McCarthy, 1992).

The two most clearly articulated alternatives to the functionalist view of the city are given by Marxists and social anthropologists. Marxists focus on the discord between capital and labour, noting the way in which this is expressed in the built form of the city. Social anthropologists, on the other hand, focus on dominant and muted groups, viewing things from the bottom-up rather than the top-down (McDonald, 1988), and working against ethnocide.

Anthropologists like Ardener and Hardman (in Sibley, 1981; McDonald, 1988), highlight issues pertaining to social relationships. Writing in the U.K., they believe that society is not simply divided along class lines but also between groups that are in some ways antagonistic to each other. A dominant and muted group has been identified.

The dominant group exercises control over the muted group through the control of how resources are allocated. In South Africa the dominant group has been, first the English, and later the Afrikaans sector of the white population group. These minority groups have thrust apartheid structures on the majority to service the needs and interests of their own community. This has affected the life opportunities of the muted group, preventing them from realizing their full potential. The net effect of this relationship is that the muted group has been penalized in terms of resources, e.g. clinics, housing, education, recreational resources and consequently opportunities.

Current polarization in South Africa has created an alarming situation in townships since residents are not only dominated by white interests but also by groups from within

the township itself. Sometimes these groups are young thugs exploiting the 'have nots', at other times opposition political groupings and possibly even what is called the "third force".

Sibley (1981) contends that the muted or marginalized group is noticeably affected in the urban environment. For example, housing stock for the poor will be in short supply due to resistance by lending institutions and local authorities to back anyone outside the dominant white male middle-class group (Sibley, 1981). This has been the case in Duncan Village where services have been kept to a minimum and no extension to the formal housing stock (Gompo Council Report, 1992) has occurred in an effort to artificially restrict the inflow of people to this township (Reintges, 1992).

Similarly, children of the muted group are penalized since little thought and resources have been given to developing safe play areas for them (Sibley, 1981). It is normal for these children to creatively adapt to the built environment and so put themselves at risk by playing in streets, using busy sidewalks and even playing on rubbish dumps. This is true in Duncan Village.

Although there is a preponderance of black people in our cities, it has been white people who have written about the city (Rogerson & McCarthy, 1992). I, therefore, believe that this township research needs to reflect more than structure or spatial patterns.

Consideration needs to be given to the impact of culture, the economic climate, local politics and other less obvious subtleties (Rogerson & McCarthy, 1992).

Furthermore, the concepts of dominant and muted groups have particular relevance in a South African context when analyzing the way in which culture and ideology have shaped society and cities.

In the context of this research, the fieldwork approach is utilized because of its acknowledged value (APPENDIX 2.1) in an attempt to contribute towards the empowerment of both teachers and pupils.

2.4.4 The empowering potential of fieldwork

Numerous authors have raised various fieldwork possibilities pertinent to Third World contexts and consequently relevant to township settings. These options are discussed in terms of their potential to empower teachers and pupils.

- i. Gardner (in Proctor, 1987) has identified graphicacy as one of five basic intelligences. For him, spatial skills can be developed through the use of maps, diagrams, graphs, field sketching, photographs and written accounts. He, therefore, recommends that teacher assessment must be based on requiring pupils to use these skills within a scientific method of enquiry, including the collection and analysis of data, the solving of problems, and the testing of hypotheses.

The aim of this section would be to ensure that pupils are graphically literate i.e. able to interpret and understand various visual graphical forms.

- ii. Through accurate observation of "real life" (the physical and urban fabric), pupils must be encouraged to discover patterns and relationships in real life

and to recognize them as geographical concepts learnt in the classroom. Through observation, pupils acquire useful skills that remain useful after the completion of schooling, i.e. it becomes a case of "education for life".

A 'look and see' approach (Martinez & Paterson, 1988) has value since it draws on pupils' first-hand experiences.

- iii. The study of the local environment (Stephenson & Burbidge, 1991) is pertinent to township pupils since it focuses on an environment familiar to them; it provides examples that they can relate to and understand; and there is also a possibility that pupils can become agents of change.

The benefit of using the local environment is that pupils have difficulty in translating and transferring experience from a field-trip into different contexts since this requires triple transference. According to Walford (in McPartland & Harvey, 1987), the fieldwork experience firstly needs to be translated by pupils on return to the classroom, into their notebooks. The second transfer occurs when pupils fit these field-notes into the prescribed syllabi.

Thirdly, they are required to apply what they have written up in their notebooks and learnt, to the context of the examinations. Fieldwork becomes less of a problem (Walford in McPartland and Harvey, 1987) when pupils are familiar with the study area and can apply patterns observed in the field to interpretative questions occurring in the examinations.

- iv. Fieldwork that encourages active enquiry on the part of pupils is valuable (Morris, 1988). The advantage of this approach is that a teacher's hidden or unacknowledged bias is limited, while pupils autonomy is encouraged. This approach also ensures that it is the pupils themselves who decide upon what will be the outcome of each learning experience. Such an approach is particularly useful when the teacher and pupils are from different language, cultural or socio-economic groups.
- v. Fieldwork concerned with topical issues embracing attitudes and values, and drawing on an understanding of socio-economic and political processes, provides exciting fieldwork opportunities (Steer & Jenness, 1988). Such an approach is possible through the development of issue-based local studies. This is an important approach since the local area is most often observed primarily in terms of physical outcomes, ignoring the process of change (decay and conflict) and problems faced by decision-makers.

As with active enquiry, this approach should develop spirally to allow for a progression of various types of questions, increasing pupil activity and an increasing level of skills. All of these should be incrementally developed with the rate of progression being determined by the teacher. The teacher needs to ensure that pupils develop beyond observation, and are able to discuss, evaluate, solve problems and formulate their own set of attitudes and values (Steer & Jenness, 1988).

Such an approach, although very stimulating, is fraught with political issues sensitive to community members from both the left and the right of the political spectrum.

The above discussion has highlighted various possibilities that can be used in a township context to empower users. In an attempt to strengthen the case for township fieldwork, an analysis is made of what strategies have been employed in different parts of the world to accommodate the aspirations of the 'muted' group.

2.4.5 Recent research relevant to the thesis

The township has been the focus of numerous socio-economic and political studies (Wilsworth, 1980; Wilson & Ramphele, 1989; Smith, 1992; Gomo Council Report, 1992; Reintges, 1992; Rogerson & McCarthy, 1992). Recently, several studies have provided valuable insight into the effectiveness of using fieldwork as a teaching tool for black pupils (Boqwana, 1991; Adonis, 1992). I have, however, found no evidence of research having been undertaken in South Africa, centred on the township as a site for the teaching of high school geography through fieldwork.

Opportunities do, however, exist for comparative case studies, comparing conditions in the township to circumstances under which the poor live in different parts of the world, e.g. the inner city areas of Britain, the ghettos of the U.S.A. and 'squatter' settlements of the Third World.

Most of the poor in Britain and America live in inner city areas or ghettos (Morris, 1988; Bowery, 1989; Musgrove, 1989). The socio-economic nature of these areas has a direct impact on the educational performance of pupils. For example, as a result of the sub-culture of poverty, schools have limited resources which tend to inhibit pupils' study skills (Bowery, 1989). A possible explanation for this low value placed on education is the irrelevance of geography and other subjects to pupils' life experiences.

In less developed countries, urbanization is occurring at an alarming rate as migrants move from rural areas to urban centres in large numbers to look for jobs and hoping to improve their standard of living (Musgrove, 1989). Consequently, urban authorities in these countries have the problem of providing housing, education, sanitation, refuse removal, water, electricity, transport and work for these new arrivals. Most subjects taught tend to be divorced from the realities of life and are often in conflict with traditional knowledge (Rogerson & McCarthy, 1992).

From the above it becomes evident that school subjects, including geography, are seldom applied to the contexts in which the poor live. Only isolated attempts have occurred contrary to this. There is a similar lack of appropriate teaching emanating from less developed countries. Education has largely embraced the content of the former colonizer without any revision to reflect more accurately current needs and conditions. The net consequence of this has been an emphasis on an academic school structure which has emulated Western education and produced a dual society in disharmony with itself (Luthuli, 1985).

The conditions under which the poor live in less developed countries, are reflective of some of the worst conditions found in South African townships. Although examples may not be identical, they do reflect abject poverty, with little prospect for meaningful improvement due to people being caught in the vicious cycle of poverty.

Data of a different nature, yet relevant, is obtainable by reviewing how curricula development in mathematics and science has responded to changes in South Africa. In the past, both mathematics and science have been used as the primary filters for the selection of prospective pupils for university placement and later for employment in the market-place. Current rejection of this discriminating role has resulted in attempts to make these subjects more relevant and accessible to the majority of pupils. Geography can learn much from the reflection and restructuring that has occurred in mathematics and science in an attempt to broaden their relevance for the majority of South Africans (NRC, 1989; Adler, 1991; NCTM, 1991; NEPI, 1992).

Evidence suggests that there is an urgent need for geography classes to reflect conditions in townships more effectively.

In the light of minimal appropriate research from less developed countries, care needs to be taken so as not to explore the township environment from a Western perspective (the milieu I'm most familiar with). Instead, fieldwork needs to be aimed at empowering the disenfranchised (Luthuli, 1985). In the light of these issues, attention is focused on clarifying the needs and interests of township pupils so that fieldwork modules can be developed that stimulate and build on pupils' innate understanding.

The point has been made that syllabi are out of touch with the needs and interests of those they ought to be educating. It has been suggested that the local environment has enormous potential (Nightingale, 1978; Fein et al, 1984; Stephenson & Burbidge, 1991) for educational purposes since it draws on the wealth of pupils' first-hand experiences (Clacherty & Clacherty, 1990) and highlights issues in the community that pupils are aware of and which may be controversial (Machow in Bailey & Binns, 1987).

An approach that addresses itself to the concern for relevancy and that is based in the local environment is what has been termed "teenage popular culture" (Swift & Serf, 1993, p7). At the heart of 'teenage popular culture' is the notion that pupils' interest and needs should be central to the learning process and not what those tasked with curricula development view as important to study. The purpose of pupils input is an attempt to: empower learners; to focus their attention on environmental issues and concerns; to ensure that content is intellectually stimulating and relevant; and to maintain momentum of present innovation into the future (Swift & Serf, 1993).

Some topics explored by teenagers are as follows: locational skills using tour details of a pop group or soccer team; using song lyrics to explore environmental issues; and the analysis of media reporting on AIDS etc.

2.5 THE RELEVANCE OF THE SYLLABUS TO THE POOR URBANITE

In most societies throughout the world, the aspirations of the 'marginalized' or muted group are largely ignored. This 'oversight' is reflected in various ways, including the school syllabi, where the attainment levels and needs of the dominant group are focused upon, while ignoring the

needs of the muted group. These comments are equally applicable to South Africa.

Although the *modus operandi* of this research is the seeking of fieldwork opportunities within the existing syllabus, this does not mean that the syllabus is seen to be unproblematic. In the light of the previous discussion, it is essential that careful consideration be given to redress inherent bias in the syllabus, as well as the organizational structure of education.

Having called for the reconstruction of the geography syllabus, I, however, believe that opportunities do exist for doing township fieldwork within the scope of the present D.E.T. syllabus. Although these opportunities are limited, they need to be fully exploited. As will be discussed in Chapter 3, the Std 10 part of the senior secondary geography syllabus contains the most opportunities for township studies. In syllabus reconstruction, a more fruitful fieldwork programme should be introduced at a junior secondary (Std 6 and 7) level.

These opportunities are explored more fully in Chapter 4.

2.6 A CASE FOR TOWNSHIP STUDIES

The case for doing township fieldwork rests upon the following points: the majority of school-going children are township dwellers; the use of one's local environment for investigation is educationally sound; local studies develop

a sense of belonging in pupils, a greater sense of participation and caring for their community; and, lastly, classroom instruction is often too theoretical and academic in comparison to pupils' first-hand experiences.

By making a case for township fieldwork, one also needs to motivate for appropriate curriculum reform. A more appropriate curriculum would provide the opportunity for the wider implementation of township studies.

2.6.1 Alternative: Fieldwork for Third World people

In motivating for a fieldwork approach that is suitable for use in a Third World context, it is necessary that the teacher builds upon pupils' innate knowledge. By doing so teachers should emphasize 'street geography' which explores pupils' own personal geography and what influences their thinking about people and places (Swift & Serf, 1993). It is equally important to recognize the prevailing cultural heritage at hand, as well as stressing positive attitudes.

It is fundamental that the core geography curriculum highlights the following:

- i. The need to provide all pupils with access to a geographical knowledge, including the most important concepts, contents and processes.
- ii. The development of pupils' problem-solving skills, useful to and appropriate to daily life and specifically the work place.
- iii. The focusing of pupils' critical facilities to enhance their effective participation in civic life.

(Adler, 1991)

To address these issues school geography needs to encourage critical reflection and the use of geographical skills in the social world. To ensure the development of these characteristics, geography needs to be based upon enquiry, co-operation and participation in a non-threatening and non-competitive environment. Geography should promote the empowerment of pupils by basing its syllabus on 'street' or 'everyday' geography and constantly referring to current local socio-political and economic happenings.

2.6.2 Bridging the gap between abstract geography and reality

Opportunities do exist for bridging the gulf between pupils' experiences and the requirements of the syllabus. This is possible by making use of a range of creative teaching approaches, such as: simulation exercises (Walford, 1969; Scarfe, 1971; Nightingale, 1981; Taylor, 1983); role play activities (Day & O'Brien, 1990); the use of issue-based geographical projects (Rawding, 1987; Steer & Jenness, 1988; Bamber & Ranger, 1990); through active learning (Selmes, 1989; Van Harmelen, 1991; Stephenson & Burbidge, 1991); integrated studies (Cloke et al, 1981); through skills teaching (Shevill, 1985); and local fieldwork (Arnold & Foskett, 1979; Barke, 1982; McPartland & Harvey, 1987; Martinez & Paterson, 1988; Bowery, 1989; Trudgill et al, 1990; Skelton, 1991).

Another approach is to raise pupils' level of understanding of the content of particular subjects. Two crucial concepts that need to be more fully explored are: 'zone of proximal development'; and 'scaffolded' learning.

Vygotsky (in Cole, 1978) coined the term 'zone of proximal development' to describe how children come to adopt or emulate adults through interacting with them. He noted that there were shifts in control, responsibility or behaviour due to such association. This concept highlights "the difference between a child's actual development as determined by independent problem solving and the higher level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky in Cole, 1978, p155). It is crucial that teachers understand this concept since it provides insight into how, by arranging the environment in a particular manner or through novel teaching approaches or with particular exercises, worksheets etc., pupils can be assisted to reach higher or more abstract attainment levels from which further reflection can take place.

Contextualizing this concept within the research, pupils were initiated into fieldwork through a series of teaching sessions, periods of reflection and a "school trail" before finally going on the "township trail". Each stage prepared pupils for the subsequent activity culminating in the "township trail".

Another means to lessen the abstract-reality gap in geography is to provide pupils with 'scaffolding' information (Palincsar, 1986). Prior to the mastery of a new skill, technique or conceptual system, the teacher performs the crucial function of reducing the number of options that the pupils must manage in the task, and the teacher fills in the rest. This allows pupils to master some routine before attempting to use this newly acquired skill to build a higher order assembly.

In this research, pupils were provided with scaffolded information in terms of first having fieldwork units explained to them and then undertaking the "school trail" where application was restricted to the school environs and where variables were limited. My involvement centred around assisting pupils whenever this was necessary.

Other inputs that are valuable in stimulating and directing efforts to bridge the gap between pupils' reality and course content are as follows: Dewey (in Prawat, 1992) favours an approach where course content is based on pupils' present experience; Swift & Serf (1993) favour the introduction of a component called "teenage popular culture" to stimulate pupils interest in geography; teachers also need to know their pupils and the cultural background from which they come so that they can spark interest more effectively; etc.

2.7 SUMMARY

In our country, where the majority of its citizens are in a disadvantaged position, this marginalized state is perpetuated by education (Adler, 1991). This has arisen since curricula have been developed for the benefit of the white minority. This research attempts to challenge the status quo by calling for the recognition of an authentic alternative view - that expressed by marginal people.

The research acknowledges constraints imposed by the present curricula and that such change although necessary, are unlikely to occur in the foreseeable future. While making calls for curriculum reform, a pragmatic stance is taken. It was felt that something needed to be done immediately, within the constraints of the existing curriculum, to address the matter at hand.

Based on the above issues, it was felt that township fieldwork could be used as a vehicle to empower users, address the issue of relevance and provide pupils with opportunity for greater involvement in the community. To this end framework fieldwork was used. Past experience revealed that fieldwork has the potential to empower. On these issues a case was made for township fieldwork.

A review of literature highlighted an absence of research pertinent to fieldwork in ghettos, inner city areas and informal housing areas around the world. This implies that disadvantaged pupils are ignored worldwide and that education maintains the status quo. This research uses township fieldwork as an approach to assist in making geography more relevant and interesting to pupils while promoting pupil empowerment.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 NOTE ON STYLE OF REPORTING

I have written this research in the first person, hoping that teachers might find it easy to read and so make use of ideas and exercises developed in the research. Whitehead (in McNiff, 1988, p37) believes that unless the "living I" is kept in educational discussions, action research will lose touch with reality and become an academic exercise. "The 'I' is a living, pro-active entity" (Whitehead in McNiff, 1988, p37) which needs to be acknowledged in academic research, focusing on interpersonal relationships and the need to bring about change. Various authors have commented on the benefits of doing this when undertaking action research (Cohen and Manion, 1989; Blumer in Goodman, 1992; Ashwell, 1993).

3.2 INTRODUCTION

In this section an overview is given of what factors were considered in establishing a philosophical and a methodological paradigm suitable to the needs and interests of the disadvantaged.

The chosen research approach, action research, is discussed in Section 3.4.1. Action research has been utilized since the research represents an intervention on the part of the researcher into a township classroom situation in an attempt to both understand the situation and improve the teaching of geography, using a fieldwork approach. An emancipatory action research approach was used in the research.

Section 3.5 highlights the research methodology employed in the identification of potential fieldwork sites in the township; the development of a Resource Pack; the development of a fieldwork programme consisting of two modules; the development of a Teachers' Manual; and the testing of part of the fieldwork programme.

The final section reflects briefly on the analysis of data and identifies problems encountered before re-iterating key issues raised.

3.3 AN OVERVIEW OF THE RESEARCH APPROACH

Subsequent discussion places the research enquiry within the orbit of social scientific research and describes the nature of such enquiries.

3.3.1 Naturalistic verses rationalistic paradigm

The principal interest of contemporary educational science investigation has been to move away from strict measurement, prediction and control towards the increased use of description, narratives and explorations rooted in understanding (Lewin in Keeves, 1988). The naturalistic paradigm has, therefore, been used in this research in preference to the rationalistic paradigm since the fundamental assumptions upon which the latter rests distort the role of people by making them objects (reacting according to natural laws) of enquiry, causing them to lose their creative nature.

3.3.2 Validity and reliability

In contemporary educational science research, rigour is not derived from using any particular technique of observation or analysis but from the logical, empirical and political coherence of interpretations during the stage of observation and reflection, and the logical, empirical and political coherence of proposed action during the planning and acting stage (Kemmis in Keeves, 1988).

Validity and reliability must, therefore, be sought by other means than enquiries resting on quantification. One suggestion is to use a three-pronged system to evaluate educational research (Kemmis in Keeves, 1988):

- i. The level of scientific discussion researchers are involved in, in drafting and explaining their own practical theories.
- ii. The level of enlightenment in terms of the degree to which researchers are involved in self-reflection, applying and testing their own practical theories in their own action and in their own situations, i.e. the classroom.
- iii. The level of organization of action that arises in an attempt to resolve practical problems and challenge the social order.

Problems of bias and subjectivity, i.e. the primacy given to feelings, narratives and values of subjects in their settings, will be discussed in greater depth in Section 3.6 and in Chapter 6.

3.3.3 Scientific approach

Social science enquiry takes a less empirical view of researching society than the traditional positivistic scientific approach (Cohen and Manion, 1989). This is because social science research claims that society and life cannot be replicated in the laboratory. Blumer supports this position by saying that one comes to know social reality through prolonged and intimate participation in it rather than "adhering to scientific protocol" (in Goodman, 1992, p120).

The only way the scientific approach can be 'applied' in social science research is in terms of 'rigour'. Blumer (in Goodman, 1992) takes this point further by claiming that social science enquiry fulfills the basic requirements of science in the following way:

- i. It confronts the social world being studied directly and raises questions about this world;
- ii. This is done to establish relations between categories of data;
- iii. From here propositions are formulated about these relations;
- iv. These propositions are then organized into analytical schemes; and
- v. The testing of questions, data, relations, propositions and analysis occurs through the examination of the social world.

The above interpretation is central to the research approach and subsequent discussion.

3.4 THE RESEARCH APPROACH

Research that produces nothing but books will not suffice (Lewin, 1946, p14)

... research must of itself be educational. It must help teachers try to make sense of their normal, everyday practice. (Whitehead in McNiff, 1988, p38)

This research necessitated the choosing of a philosophical approach meaningful to the needs of the disadvantaged. Similarly, a methodological approach was needed to give expression to a philosophy that empowers the disadvantaged.

Carr and Kemmis (1983, p158) provide criteria for a methodology that seeks to be at the 'cutting edge'. They argue that all educational science, and consequently contemporary educational research, must attain these requirements in order that it be regarded as adequate and coherent. These requirements are, namely:

- i. A methodology that rejects positivism and its notion of rationality, objectivity and truth.
- ii. There must be an acceptance of qualitative interpretations by teachers and participants.
- iii. It must be capable of differentiating between ideas and interpretations that are distorted by ideology from those that are not.
- iv. The approach must expose sectors of the social order that perpetuate the status quo by frustrating rational change.
- v. It must recognize the need to inform practice.

I was influenced by these comments by Carr and Kemmis in selecting action research as the preferred approach to study a classroom situation in order to improve the teaching of geography. Subsequent discussion develops Carr and Kemmis's argument in order to contextualize, clarify and justify the research methodology used in the study.

3.4.1 Action research

Lewin (in Keeves, 1988) presaged three important characteristics pertinent to contemporary action research, namely: its participatory nature; its democratic impetus; and its concurrent contribution to social science and social change.

The definition of action research given by Carr and Kemmis (in Walker, 1990, p58) below, is seen by Walker as being the most widely accepted:

Action research is a form of self-reflective enquiry undertaken by participants (for example teachers and pupils) in social (including educational) situations in order to improve the rationality and justice of a) their own social or educational practices, b) their understanding of these practices, and c) the situations in which these practices are carried out.

I particularly like this definition since it focuses attention on social justice. This is particularly appropriate when considering action research based in a township context in South Africa where social transformation has long been ignored.

Another definition that describes the nature of action research more fully is:

Action research is the reflective process whereby in a given problem area, where one wishes to improve practice or personal understanding, inquiry is carried out by the practitioner - first, to clearly define the problem; secondly, to specify a plan of action - including the testing of hypotheses by application of action to the problem. Evaluation is then undertaken to monitor and establish the effectiveness of the action taken. Finally, participants reflect upon, explain developments, and communicate these results to the community of action researchers. Action research is systematic self-reflective enquiry by practitioners to improve practice (McKernan, 1991, p17).

Action research can be carried out in two phases (Cohen and Manion, 1989), namely: the identification of problems and the provision of insight into how practice can be improved. According to Kemmis (in Dane, 1990), "practice" represents some action or practical response to what has been identified as a practical problem. It is also described as being self-reflective research since the practitioner undertakes research into his/her own practices (Verma & Beard, 1981; Kemmis in Dane, 1990).

3.4.1.1 Characteristics and strengths

According to Cohen and Manion (1989), Kemmis (in Keeves, 1988), Tripp (1990) and McKernan (1991), the key characteristics covering the family of action research are:

- i. The examination of what practitioners define as being problems, not as single factors divorced and isolated, but within the context that gives them meaning and without any attempt to control setting variables.
- ii. Such problems are deemed to be solvable via practical action and so bring about lasting benefit.
- iii. It is collaborative in nature as well as emphasizing a high degree of participation by those involved in the research.
- iv. Action is based on prior analysis and definition of

- the situation, which is then monitored over time and by a variety of mechanisms (diaries, interviews, questionnaires etc.) ensuring feedback that can be translated into changes during the research process.
- v. Action research aims to improve the researcher's understanding of the problem, the quality of human action and its practice.
 - vi. Perceptions and beliefs are reported using a case study approach.
 - vi. Everyday language is considered to be appropriate to record everyday discourse.
 - vii. Validity is via unconstrained dialogue by the participants, especially that of triangulation.
 - viii. It is essential that a free flow of information takes place between support groups and between actors in the project.
 - ix. It is scientific in that it attains to the rigour of defining problems, formulating action hypotheses, carefully planning how data is to be collected, analyzing results and reformulating hypotheses

The abovementioned characteristics of action research can be reduced to six key elements, namely:

- i. Critical analysis is encouraged throughout the research processes and not just at its termination.
- ii. The approach encourages active involvement on the part of pupils.
- iii. Action research is positive in initiating and helping to bring about change or improvement.
- iv. By using the classroom as the study area, the natural behaviour of people is accommodated.
- v. As a research framework, it is adaptive and flexible.

- vi. Action research describes relationships as they develop over time and accommodates changes in thinking which reflect mutations occurring in the study's context.

In spite of the appearance of action research being a uniform mode of enquiry, this is not the case. Variations occur due to the existence of three diverse paradigms in action research.

3.4.1.2 Three action research paradigms

All action research aims to understand and solve particular problems; it does not, however, fit into one recognizable form. Action research rather gives expression to a variety of perspectives on how reform relates to educational research. In other words, approaches to educational research have different theories of educational change which underpin them (Kemmis in Keeves, 1988). These assumptions are examined in order to assess the most appropriate form of action research for a township study.

Habermas's comprehensive theory of knowledge (in McKernan, 1991) provides such a framework for discussion. Habermas identified three basic cognitive interests, namely: "technical", "practical" and "emancipatory", which can be seen as constituting three types of scientific approaches by which knowledge is organized.

- i. "Technical" knowledge emphasizes rule following, is positivistic in nature and attempts to maintain the status quo (McKernan, 1991). Lewin (in Keeves, 1988) refers to this as scientific action research. Educational events, practices and relationships are seen to be "phenomena" and consequently capable of objective assessment. Such action research is and how best can I do it?" (Lewin, 1946). This approach has

given rise to empirical-analytical research.

- ii. "Practical" knowledge in educational research has given rise to interpretive research which emphasizes the need to describe and understand interactions (McKernan, 1991). It most commonly asks the following questions: "What should I do and why ought I to do it?" (Lewin, 1946). Proposals for such action stress the need to be intelligent rather than correct and to provide guidance rather than direction (McKernan, 1991). The researcher has the responsibility to determine which knowledge is legitimate. This approach has given rise to hermeneutics and is based on the humanistic model. Lewin (in Keeves, 1988) referred to this research as practical-deliberate action research.
- iii. Critical social action research is a radical alternative mode grounded on "emancipatory" knowledge (Lewin in Keeves, 1988). This type of action research goes beyond asking questions pertaining to the social assumptions on which technical and practical actions are based. Instead it attempts to promote critical consciousness in the realm of politics as well as the solving of problems (McKernan, 1991). It attempts to make explicit the assumption that there is a conscious commitment to social critique which is realized through changes to practice (Tripp, 1990). The guiding ethical code of this paradigm is that of freedom, equality and justice (Lewin, 1946). Its interests rest with the disadvantaged in an attempt to redress social concerns of domination and power (Popkewitz and Foucault in Goodman, 1992) and to transform society into something more democratic than it is (Kemmis in Keeves, 1988; Tripp, 1990; Walker, 1990).

3.4.1.3 Emancipatory action research

It is important to stress that the emancipatory approach is a social critique as well as being action research (Tripp, 1990).

This research attempts to improve the teaching of geography in townships by using a fieldwork approach. In researching this topic I found socially critical questions continually emerging which necessitated personal reflections on my own socio-political views. As the research progressed it became evident that an understanding of the social context and social effects needed to be incorporated into a 'practical' model. Tripp (1990) claims that in his experience, few teachers set out to embark upon socially critical action research but that this happens out of their desire to more fully understand the initial situation or practice. It was in this indirect way that this research took on a more socially critical stance.

The critical-emancipatory action research model devised by Kemmis and his colleagues at Deakin University was modified slightly as a result of criticism by McNiff (1988). In the 'Deakin model', the research process is centred around four self-reflective spiral elements, namely: planning, acting, observing and reflecting (McKernan, 1991; Lewin in Keeves, 1988; McNiff, 1988). This process is followed by re-planning... in an attempt to solve problems (FIGURE 3.1). A dilemma arises when Kemmis highlights an issue (the disruptive element in the class) without responding to it or solving it. Refinement of the model is consequently needed to accommodate novel situations within the main focus and in order that it be more useful to educational practitioners.

This refinement is accommodated in McNiff's model (1988) of action research (FIGURE 3.2) which allows the main focus to be kept while allowing for the handling of practical side issues simultaneously. This appears to conform to reality since life is never single tracked.

3.4.1.4 The research process

The senior secondary D.E.T. geography syllabus was studied in terms of the potential of using Duncan Village as a site for doing fieldwork. The initial task was to determine whether the township had merit as a fieldwork venue. On finding a rich, albeit somewhat different, range of fieldwork opportunities, I, together with my collaborative partner, developed a number of fieldwork units to highlight specific features of the township landscape. To prepare pupils to undertake fieldwork in the township, it was necessary to teach them basic fieldwork concepts. This was done by providing pupils with hands-on experience of applying key geographical field techniques like determining slopes, classifying soils or assessing the quality of an environment. To familiarize pupils with fieldwork, field exercises were developed for use within the school environment. Thereafter, pupils would be in a position to apply similar field techniques in the township.

My collaborative partner provided invaluable insight into the most suitable units to incorporate into the fieldwork programme and first-hand knowledge of life in the township. Before the fieldwork programme could be tested, the research was switched to another local secondary school.

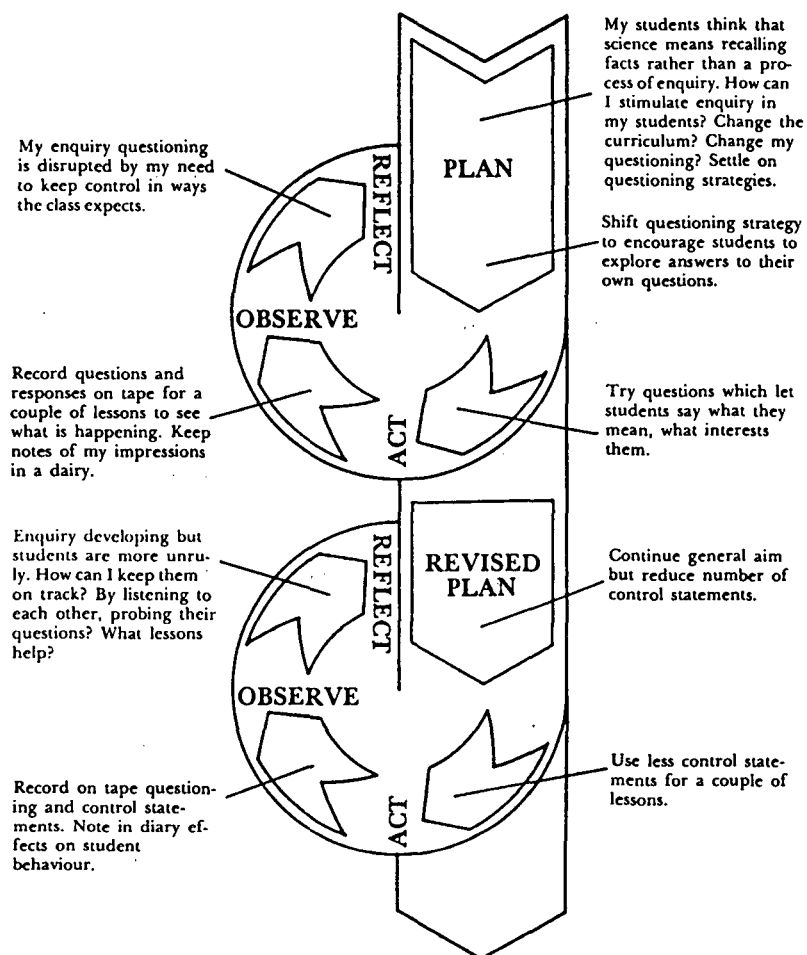


FIGURE 3.1

Deakin action research model (in McNiff, 1988)

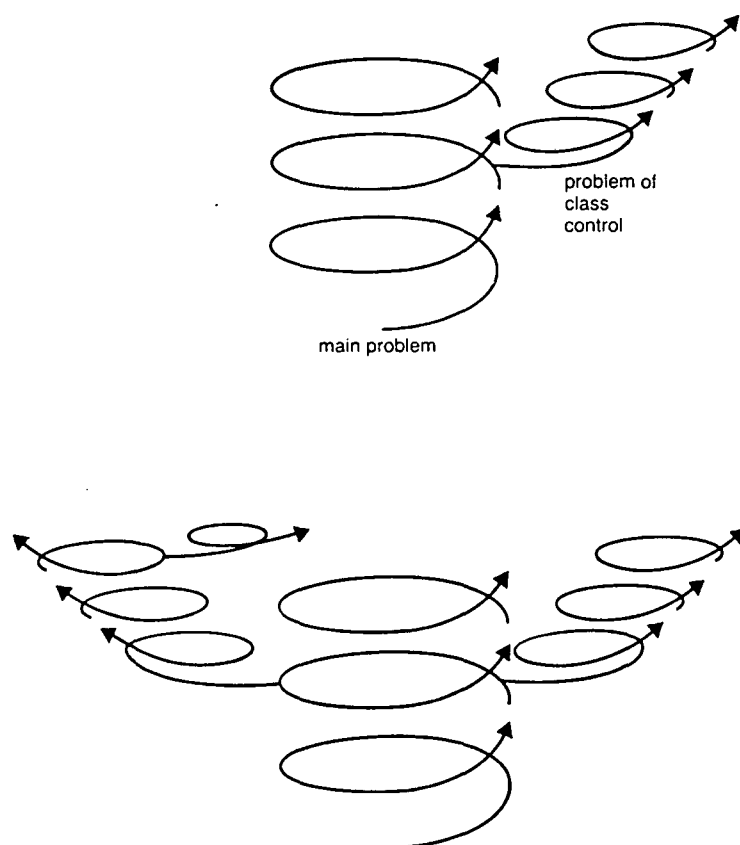


FIGURE 3.2
McNiff's action research model (1988)

At this new school the research process commenced by exposing pupils to theoretical aspects of fieldwork techniques. Thereafter, fieldwork was done within the school grounds.

Unforeseen events caused the termination of the research prior to the commencement of the "Township Trail". During the testing stage data was analyzed and interpreted using triangulation techniques.

3.5 THE RESEARCH METHODOLOGY

The study proceeded through five discrete stages:

- i. The exploration and identification of the potential to do fieldwork in the township,
- ii. The development of a Resource Pack consisting of two components with numerous field exercises, the first set within the school grounds, the other, in the wider township,
- iii. From exercises contained in the Resource Pack, a selection was made for testing as a fieldwork programme consisting of a "School Trail" and the "Township Trail",
- iv. To give support to teachers initiating fieldwork, a Teachers' Manual was developed, and
- v. The refinement, implementation and evaluation of a part of the fieldwork programme.

The subsequent discussion focuses on describing the abovementioned stages.

3.5.1 Exploring the nature of the township and identifying potential field sites

On riding through Duncan Village on my first in situ inspection, I was left wondering what could be constructively taught in such a disadvantaged milieu. In spite of my initial response, I believe that every environment is capable of being studied through a fieldwork approach. The environment was merely different to that which I was accustomed to. I, consequently, had to refocus past fieldwork experiences, apply relevant data from a review of literature, make use of first-hand experience gained in doing fieldwork in Mdantsane and seek collaborative input. The collaborative input was gained from community members, my collaborative partner and from the non-participant observer.

Informal interviews and discussions were held with: representatives from the Black Sash, Corplan, ITEC and Duncan Village Residents' Association, a local social worker, school principals and teachers, ministers of religion and the Township Engineer. Much of the insight gained into the Duncan Village landscape was as a result of input made by these persons.

3.5.2 Developing a Resource Pack of field exercises

Having explored the township and identified potential fieldwork sites, a number of field exercises were developed for use within the school grounds and in the township itself.

The following procedure was used in developing the Resource Pack:

- i. Key concepts in the various subdivisions of geography were identified in D.E.T. syllabi (APPENDIX 4.3 and TABLE 4.1). These concepts were broken down into various ideas.
- ii. These were then translated into a number of tasks.
- iii. Lastly, each task was broken down into potential activities, the testing of specific skills, the development of values and attitudes, as well as various geographical techniques.

Activities were kept simple because pupils were not likely to have had any previous fieldwork experience.

Although the Resource Pack is an essential part of the research, it is not the focus of the study. Consequently, its analysis and evaluation is not considered in the scope of the research.

3.5.3 Developing the fieldwork programme

A selection of field units was made from the Resource Pack to allow for the development and testing of the fieldwork programme. The fieldwork programme consisted of two parts: Part A provided background or introductory information pertinent to each exercise, while Part B consisted of field sheets for completion in the field by pupils during the actual field experience.

The selection of units for the fieldwork programme was based primarily on: basic skills, values and techniques that would provide the foundation for a basic level of competency to allow for subsequent fieldwork.

3.5.4 Development of a Teacher's Manual

The shift in the research location from the Training College to a high school broke the continuity of the research. While the research was located at the Training College, I was in a position to sustain interest amongst student teachers by doing fieldwork with them on a regular and on-going basis. I could also provide support to students on graduating from the College since I was locally based.

In moving the research to the second high school, the issue of sustaining interest in the research became a matter of concern. I believed that one way of addressing the issue was by developing a manual for teachers. In the development of this manual, recognition was given to the fact that teachers were uninformed about fieldwork and were, therefore, unlikely to undertake field activities without the necessary support. The Teacher's Manual was, therefore, aimed at providing such support.

3.5.5 Implementation and evaluation

Having matched elements in the syllabus to skills, values, attitudes and various field techniques, the fieldwork programme was implemented. This was done using a seven-phased plan which is in accordance with strategies suggested by Lewin, Kemmis, McKernan and McNiff and as discussed in Chapter 4.

Evaluation occurred at three levels, namely:

- i. Self-evaluation: I kept a diary in which I recorded details of interactions, interviews and communications; my impressions of the class' attitude; difficulties experienced; the willingness of students to learn new things; and the attitude of teachers and the principal. Van de Weghe (1991, p51) refers to this as "kid watching".
- ii. Peer-evaluation: This was done by a non-participant observer who evaluated the "School Trail" session and completed an observation schedule.
- iii. Learner-evaluation: Observation schedules were designed so that pupils could, at the end of both the "School Trail" and the "Township Trail", rate their experiences. This, however, did not take place since the project was abandoned prematurely.

3.6 ANALYSIS OF DATA

The analysis of data generated in this research is less statistically orientated and more descriptive in nature, describing the uniqueness of the research context (Cohen & Manion, 1989; Lewin in Keeves, 1988; Goodman, 1992).

Before entering into a discussion on the analysis of data, it is necessary to address criticism by Cohen and Manion (1989) that, although action research has a methodology for the generation of data, it does not have one for the interpretation of generated data. For Cohen and Manion action research gives no clear guidance to how the techniques can or should handle the data collected. For them, the problem is that of reliability¹⁰ and validity¹¹.

¹⁰ Reliability refers to the extent to which studies can be replicated in terms of their procedures and findings (Weirsmas, 1986)

From a literature review of action research, a counter argument suggests that reliability and validity are not necessarily a problem (Lazarus, 1985; McKernan, 1991; McNiff, 1988; Kemmis in Keeves, 1988; Tripp, 1990). These issues are only problematic, while action research is assessed by means of quantifiable measures. Since this research is conducted in a naturalistic setting, focusing on processes and the description of phenomena, and not on the tabulation of the frequency of events and cannot be replicated, another form of evaluation is needed.

For Weirisma (1986) in studies such as this one, reliability and validity can be assessed by considering how well it measures up to four criteria relevant to social science research, namely:

- i. Internal reliability is dependent upon the extent to which two or more observers agree on what they saw and how they interpreted what they saw.
- ii. The use of multiple data collection procedures and triangulation enhance internal reliability.
- iii. Extensive description provides further opportunity to assess the research's reliability. Any lack of observer agreement is identifiable from descriptions, providing an opportunity to resolve any disagreement through discussion.
- iv. By determining the level of co-operation reflected in the research, an indication of the degree of sharing and discussing of interpretations and insights can be gauged.

¹¹ Validity defines the degree to which the results can be interpreted and generalized (Weirisma, 1986).

This research's level of reliability is assessed according to Weirsmas's criteria in Chapter 5.

3.7 PROBLEMS ENCOUNTERED

Five major problems were encountered in applying the research method and its procedures. Briefly, these were:

- i. On finally implementing the research, I was an 'outsider' using 'outside' initiated classroom research in an attempt to improve the practice of teaching geography. As a result, the project tended to reproduce my own concerns rather than drawing upon the first-hand experience of the teacher at the school where the research was based (Lewin in Keeves, 1988). By imposing the research on the concerned teacher, I restricted her personal and professional growth (Ballantyne, 1982; Walker, 1990) and ensured that she bore little influence on the innovation. It is, therefore, unlikely that she will be active in implementing field work studies under her own initiative.
- ii. The consequence of the abovementioned point was that the research was not sustainable and relationships were weak.
- iii. The tentative nature of relationships between myself and pupils produced a poor response from pupils to fulfill their commitment to the research. This resulted in the premature cessation of the fieldwork programme.
- iv. The value of the research would have been increased had similar studies been undertaken at schools in other townships.
- v. The nature of a half-thesis resulted in no assessment being done of the Resource Pack and the Teacher's Manual.

3.8 SUMMARY

The research commenced by qualifying the need for using the first person in reporting. This was done to ensure that the research remained as 'user friendly' as possible, relevant and usable by teachers wishing to initiate fieldwork exercises in townships. In response to Lewin's (1946) call for research to be worthwhile, by using a less restrictive and prescriptive research mode, yet practising scientific rigour, action research was used as the research method.

Having contextualized the research as being that of action research, the main features of this approach were discussed. This was followed by an analysis of emancipatory action research which most accurately reflects a philosophical view valid for the empowerment of marginalized communities.

The potential for doing fieldwork in the township was investigated by: in situ visits; relevant community figures were interviewed; a literature review of conditions evident in deprived communities within and outside of South Africa was undertaken; a number of tested fieldwork units undertaken in Mdantsane were adjusted and incorporated into the research; aerial photographs and topographical maps were studied; and input was made by my collaborative partner and the non-participant observer. Out of this process a number of potential fieldwork sites and opportunities were identified.

The research method attempted to capitalize on the identified potential of doing fieldwork by developing a Resource Pack and a fieldwork programme. Two modules of the fieldwork programme were developed: the "School-" and "Township Trail". The former functioned as an introduction to fieldwork where skills and techniques taught in the class were applied prior to undertaking the "Township Trail".

It was mentioned that teacher training underplayed the value of fieldwork. In an attempt to redress this matter and to provide teachers with support (Martinez & Paterson, 1988) a Teacher's Manual was developed.

The research concluded with a discussion on the analysis of data, its evaluation and the identification of problems encountered during the research process.

CHAPTER 4

IDENTIFICATION, DEVELOPMENT AND PRELIMINARY EVALUATION OF THE FIELDWORK PROGRAMME

4.1 INTRODUCTION

This chapter discusses the following aspects:

- i. The nature of the Duncan Village landscape;
- ii. The potential to do fieldwork in the township;
- iii. The development of a Resource Pack and fieldwork programme; and
- iv. The preliminary testing of the fieldwork programme.

4.2 THE DUNCAN VILLAGE LANDSCAPE

The nature of the township landscape is described in terms of its physical environment and the socio-cultural landscape. Information was gathered through interviews and informal discussions¹², from previous research, from in situ inspections and in consultation with my collaborative partner and the non-participant observer.

4.2.1 The physical environment

The township manifests:

- i. Chronically overloaded essential services: Services have been provided based upon the number of houses multiplied by the average household size. Services have thus been provided for an estimated

¹² Representatives from each of the following organizations were interviewed: Corplan (planning consultants), the Black Sash and Duncan Village Residents' Association (DVRA); while personal communications were held with: The Township Engineer, a social worker, two principals, a number of teachers and a minister of religion.

population of 20 000 people. However, over 150 000 live in the township, most of them in temporary shelters.

Sewerage disposal varies from the bush for shack dwellers, to the bucket system, to communal toilets, to a water-borne system in Gompo. Roads are narrow and in some areas houses impinge right into the roadway. The refuse removal service is inadequate and electricity cuts are normal.

- ii. Severe overcrowding: While local government remains in limbo about the need to develop sites for low cost housing, the most lucrative form of farming, that of 'shack farming', has worsened the already overcrowded conditions in the township. 'Shack farming' occurs where shacks are constructed on plots originally measuring 200 square meters to accommodate family members/relatives and boarders so as to supplement the monthly income.

The above information was derived from interviews with Corplan, the Township Engineer, a member of Duncan Village Resident's Association and the Black Sash and through informal discussions with a number of community members; Gompo Council Report, 1992; Reintges, 1992).

The physical environment of Duncan Village has been influenced by a combination of factors. The most important of these are:

- i. A deliberate government policy to restrict the size of Duncan Village and so promote the resettlement to Mdantsane in the Ciskei (Reintges, 1992).

- ii. The local authority has limited funds, in part due to a rent and service boycott that dates back to 1985. Finances have thus only been available to maintain essential services (Pers Com).
- iii. The depressed economy in the Border/Eastern Cape Region has resulted in limited employment opportunities. This has resulted in poverty. According to a survey, the average income per household was R275,00 (the Township Engineer reporting on a survey done by Vista University, 1989). This report claimed that between 80 - 90% of Duncan Village residents earn less than R50,00 per month.

Every environment has a profound influence on its inhabitants, either for their good or detriment. The Duncan Village landscape similarly has an impact on its residents.

4.2.2 The socio-cultural environment

The feeling of being discriminated against and consequently penalized, has resulted in people sublimating their inner feelings to protect themselves. Some Duncan Village residents have established a coping mechanism by placing a high value on social interaction and mutual support. Others have been unable to cope with disappointments, frustration and a sense of hopelessness. This has given rise to a number of social problems, which include:

- i. A gang sub-culture which is associated with poor communities throughout the world, not just in Duncan Village. Gangs place a low value on life, thus raping, mugging, stabbing etc. become a way of life. The imposition of 'States of Emergencies' is reported to have resulted in the breakdown of gang cohesion which has resulted in youths reverting to

crime, vandalism and despondency (Black Sash, 1993; Pers Com).

- ii. Crime is another serious social problem. Respondents mentioned drunkenness, the smoking of dagga and physical abuse/physical aggression as major areas of concern. Mention was made that a feeling of hopelessness amongst young people, of not being able to find work, was often at the heart of these problems (Pers Com).
- iii. The emergence of a young 'educated' population (although with a low level of education) with high expectations has created its own problems. Some of these expectations are politically based, while others are based on new needs, desires and economic opportunities. Many might be difficult to realize even under a new dispensation.

The new range of choices before these young people, e.g. buying a house, will require them to grapple with numerous "new" issues like: being exploited by construction companies; needing to pay electricity connection fees; interest charged on bonds, etc. In spite of these problems, they will need to make use of new opportunities and face these experiences as they present themselves (Corplan, 1993).

iv. Government and local authorities, by talking to civic leaders and prioritizing plans, have brought a different problem to the surface. This being that civics lack experience in development work, since their teeth were cut on resistance politics. With the demise of old local authorities and the setting aside of outstanding payments, there is said to be evidence of 'political players' jockeying for new 'posts' (Corplan, 1993). This has produced an awkwardness since players are not wanting to offend potential voters by making enemies.

Central to the above discussion is the fact that township pupils are at a distinct disadvantage when it comes to schooling. Western child rearing allocates substantial resources and energy to the nurturing of children in their early years and developing in them a strong work ethic.

This gives white pupils a head start in comparison to their township counterparts. Township pupils, on the other hand, commence their formal schooling career with a deficit of nurturing due to limited resources and because mothers return to full-time employment soon after the birth of their infants. Township children, however, come to school with a rich experience of social contact. Many have not ever been alone during these early years since grandparents or a non-working family member would be charged with child-minding for the extended family. Children, therefore, grow up with members of the extended family of a similar age (DVRA, 1992).

4.3 THE IDENTIFICATION AND SELECTION OF FIELD UNITS¹³

There has been no previous research which considers the township as a setting for fieldwork. According to Nightingale's Resource Perception Model (1978), a site becomes a resource only after it is seen by man as being valuable to him. Adonis (1992) in pioneering fieldwork in Transkei settings affirmed the need to encourage a view that all environments are capable of being studied. Some sites might, however, be more interesting than others.

The identification of field sites in Duncan Village was done by: examining the syllabus; by undertaking in situ inspections; researching various reference materials; studying maps and aerial photographs; and in consultation with gate-keepers and research assistants (as previously mentioned).

The identification of potential field sites began with an examination of the D.E.T. senior secondary school syllabus. This was done in an attempt to capitalize on any opportunities capable of being explored using a fieldwork approach. The process involved dividing the syllabus into its major sections; fieldwork activities were then identified applicable to the various sections by standards (i.e. Std 8 - 10).

A summary of this process is given below in TABLE 4.1 and the more extensive analysis (by standard) is given in APPENDIX 4.3.

¹³ In the research the terms 'unit' and 'exercise' are interchangeable.

TABLE 4.1

Key opportunities in the geography syllabus for fieldwork

U N I T	MAIN DIVISION	DESCRIPTION & TOPIC
1	<u>General Geographical Techniques</u> Techniques: collecting, processing & presenting data Fieldwork in urban areas	Applied to all exercises in the Resource Pack The following topics were covered: Housing study (Topic 26) Township transect (Topic 25) Character of an area (Topic 24) Traffic counts (Topics 10 & 23)
2	<u>Climatology</u> Elements of weather Local climates	Weather watch (Topic 3) Weather watch (Topic 3) Valley micro-climate (Topic 19)
3	<u>Geomorphology</u> Weathering Fluvial processes Drainage area & slope types	Evidence of weathering (Topic 5) Stream study (Topic 21) Slopes (Topic 14 & 15) Soil types (Topic 7 & 17) Vegetation (Topics 8 & 16) Infiltration rates (Topic 18) Micro-climates (Topic 19)
4	<u>Human Geography</u> Human activities	Shopping survey (Topic 22) Hawking survey (Topic 11)
5	<u>Demography</u> Basic understanding	Population & their movements (Topic 13)

6	<u>Ecological geography</u> Soil profile Ecosystems & ecological processes Man's influence	Soil studies (Topic 7 & 17) Pollution register (Topic 4) Ecology of paved areas (Topic 6) Quality of the environment (Topics 9 & 27)
7	<u>Settlements</u> Urban growth Internal structure	Population & their movements (Topic 13) Township transect (Topic 25) Character of a township (Topic 24) Quality of an environment (Topic 9 & 27) How well is your school placed? (Topic 12)

TABLE 4.1 indicates the major opportunities that can be explored in a township, using a fieldwork approach. They are briefly: Techniques in the gathering, processing and presentation of data; fieldwork in urban areas; fluvial processes; slopes, drainage areas and infiltration rates; ecology; and the internal structure of cities. What is noticed from APPENDIX 4.3 is that most fieldwork opportunities occur in the Std 10 syllabus. This supports the call for curriculum reconstruction so that fieldwork can be introduced at an earlier level than in pupils' final year of schooling.

Fieldwork is not a metatheory and, therefore, cannot be used to supplement classroom teaching in all sections of the syllabus. For example:

- i. The use of topographical maps and aerial photographs were not included in exercises since township schools do not possess maps and aerial photographs and, secondly, they are costly to purchase. Emphasis was, therefore, laid on the need to draw a map of the school and on doing field sketching.
- ii. Climatology is not easily taught in the field, outside of a visit to a weather station. Weather instruments are non-existent and expensive to purchase.

TABLE 4.1 summarizes the most important aspects pertinent to township fieldwork. A more comprehensive form is not included in this text but as APPENDIX 4.3 since these aspects have been previously researched (Boqwana, 1991; Adonis, 1992).

Apart from finding opportunities within the syllabus for doing fieldwork, a number of people were consulted, aerial photographs and topographical maps were studied, in situ inspections were made of the township and information was gathered by collaborative input.

4.3.1 The identification of fieldwork units

The township landscape was found to provide a wide array of opportunities for doing fieldwork. It has much in common with land uses found in towns and cities. Differences do, however, occur in the quality and type of amenities, the irregularity of most services and the evidence of poverty and over-crowding. Although there are numerous topics that are common to both the township and residential areas, there are also clear differences such as: 'shack farming; informal economic activities occurring from within homes, e.g. shebeens, hair salons, motor mechanics and panel beaters.

These differences need increasingly to be explored to produce field exercises that are pertinent to township pupils, and, hopefully, to non-township pupils in the future.

On the basis of the abovementioned procedures, the following field units were identified as the first part of a Resource Pack (APPENDIX 4.1) for use by teachers exploring :

i. The school grounds

1. Simple mapping
2. Field sketching
3. Weather watch
4. Pollution register
5. Looking for evidence of weathering
6. The ecology of paved areas
7. Examining the soil
8. The calculation of various slopes
9. Vegetation analysis
10. Quality of the environment
11. Pedestrian and traffic movement
12. Economic study on hawking
13. How well is your school placed?
14. Exercise on population and their movements

Of these units six units selected for testing during the "School Trail" which was the first part of the fieldwork programme.

The second part of the Resource Pack consisted of thirteen units which explored the township landscape. The following units were contained in the second part of the Resource Pack:

ii. The township context

15. Valley transect: Slope analysis
16. Valley transect: Vegetation
17. Valley transect: Soil analysis
18. Valley transect: Infiltration rates
19. Valley transect: Micro-climate
20. Field sketching
21. Stream study
22. Shopping survey
23. Daily traffic flows
24. Capturing the character of an area
25. Township transect
26. Housing study
27. Quality of the environment

Of these units, eight were selected for testing in the research as part of the fieldwork programme.

The above twenty-seven field units were contained in the Resource Pack.

The development of a Resource Pack for use by teachers and pupils has great educational value (Deer et al, 1977: Atkinson et al, 1987). A Resource Pack provides teachers with the necessary exposure, support and creative ideas to initiate fieldwork, while pupils are provided with a step-by-step sequence of tasks that need to be completed during the field trip.

4.3.2 Reflecting on the viability of doing fieldwork

On the strength of developing twenty-seven field units, it has been shown that there are numerous opportunities for doing fieldwork in Duncan Village. The realization of this potential is, however, more problematic than the identification of field activities and sites.

Having re-emphasized the point that township fieldwork is possible, an explanation is needed as to why this potential has not been realized in township schools. The following have mitigated against the implementation of a fieldwork programme in the township:

- i. One of the most problematic aspects preventing fieldwork from occurring in township schools is that teachers are unfamiliar with the practices and techniques of fieldwork. This point emerged from discussion with geography teachers and was attributed to inadequate exposure during their training¹⁴, or the fact that teachers have received limited training. This absence of exposure to fieldwork has occurred despite a long history of fieldwork being part of school geography syllabi.
- ii. The present "destruction of a learning culture" (Samuel in Pimm & Love, 1991, p155) in township schools makes serious education demanding, the implementation of innovative ideas very difficult, and the task of sustaining these, virtually impossible. Political strife of an on-going nature, teacher threats of 'chalk downs', disruptive action by student organizations and high absenteeism is a consequence of a low value placed on education by the community. The net outcome of these disruptive activities is that pupils are unmotivated and generally disinterested in schooling. Such conditions have produced a monster - far removed from what the purpose of schools 'ought'

¹⁴ In the past teachers learnt how to do fieldwork from colleagues and by doing fieldwork as part of their teaching. Currently, tertiary institutions have started to take the lead in emphasizing the value of fieldwork. It is, therefore, likely that in future more student teachers will be given the experience of doing fieldwork during their formal training period.

to be.

- iii. Depriving people of political status for forty years has produced a sense of apathy and a suspicion of motives behind any local authority and government initiative. It is with this background that pupils come to school; consequently their academic aspirations, attitudes and attainment levels are permeated by apathy (Walker, 1990; Adler, 1991; McLennan 1992; Pers Com).
- iv. In discussions held with various parties, mention was made of the appalling conditions that people live in and the perception that residents have that they are a neglected community. For example, Duncan Village has no internal economic base, yet it's population equals that of Greater East London. In spite of its size, Duncan Village is squashed into an area one tenth the size of Greater East London (Corplan, 1993).

A case was made for township fieldwork by identifying opportunities applicable to the syllabus and applying these to the local environment. An account was given as to why fieldwork has not been a favoured approach used in township schools. It is in the light of these issues that a fieldwork programme was developed.

4.4 THE DEVELOPMENT OF A FIELDWORK APPROACH

In moving the research from the Teachers' Training College, I felt that the value of the research, in terms of the long-term influence on subsequent geography teaching, could not be sustained. In an attempt to promote interest in doing township fieldwork, the fieldwork approach set out to:

- i. Develop a Resource Pack of field units applicable to the context of a township; and
- ii. Design and test a fieldwork programme in the field.

4.4.1 The development of a Resource Pack

In the research location of Duncan Village, I believed that a way to sustain interest in fieldwork was to develop a Resource Pack consisting of a number of exercises based in the township.

The purpose of developing the Resource Pack of fieldwork exercises was to teach township pupils a geography that was pertinent to their experience and understanding (Atkinson et al, 1987). It was argued in Chapter 2 that geography, like many other school subjects, is irrelevant to the poor and disadvantaged who make up the majority of South Africans. Township fieldwork is, therefore, an attempt to challenge the status quo which has relegated the muted group to its marginal position.

As stated previously, central to the development of field units was the concern that the fieldwork experience needed to be viable.

4.4.1.1 Choosing fieldwork experiences

In selecting fieldwork units, I was assisted by the non-participant observer and my collaborative partner. The criteria on which our selection was based was:

- i. Fieldwork units had to be rooted in a school syllabus. In this case the current D.E.T. syllabus was used since schools in Duncan Village follow this structure.

Exercises were, therefore, selected because they conformed to the requirements of the senior secondary geography syllabus. Adonis (1992), in doing fieldwork research in the Transkei, found that there was a strong correlation between pupil interest and work that was directly related to the syllabus and, consequently, tested in the external examination.

- ii. Field units were also selected on the grounds that they provided pupils with a basic level of expertise (a skill, technique or values and attitudes) necessary for subsequent meaningful fieldwork.
- iii. Exercises needed to reflect both physical and human geographical components and to expose pupils to the use of qualitative and quantitative field techniques.
- iv. Field exercises that required the use of basic apparatus were chosen so as to incur minimum costs to subsequent users.
- v. These exercises had to be relevant to people living in the Third World.

- vi. Since the "School Trail" was intended to provide pupils with practical experience in doing fieldwork prior to undertaking the "Township Trail", there needed to be a measure of overlap between these two modules.

Exercises contained in the "School Trail", therefore, needed to provide pupils with the necessary exposure to enable them to complete the "Township Trail" with a measure of competency.

- vii. Field exercises needed to be directly applicable to conditions in other townships, so that teachers would not be required to do any major adaptation themselves.
- viii. My unfamiliarity with Duncan Village in terms of its physical nature and its socio-economic and political workings placed me at a disadvantage in comparison to my experience of Mdantsane. Further, the experience of getting dismissed from Ciskei on the grounds of my perceived political views, made me cautious of getting involved in any controversial issue. Thus, no controversial issue-based studies or problem-solving exercises were developed.

4.4.1.2 Overall comments

In addition to the educational value of developing a resource pack (as previously mentioned), the following advantages became evident:

- i. The Resource Pack consists of a number of 'ready-to-use' exercises;

- ii. All units are able to stand on their own without any adaptation for different townships and without needing to follow any particular sequence;
- iii. The units save teachers on preparation time;
- iv. The units are easy to implement; and
- v. Exercises are suitable for use by inexperienced teachers for whom fieldwork is a new experience.

Since the Resource Pack proved too bulky for testing, a selection was made from these exercises for the development, implementation and evaluation as a fieldwork programme.

4.4.2 The fieldwork programme

The fieldwork programme was made up of two components, the "School-" and "Township Trail". To provide supplementary support to teachers, a Teacher's Manual was developed for teachers for use alongside fieldwork exercises designed for pupils.

4.4.2.1 The justification of the selection process

Having selected fieldwork units for the Resource Pack, a selection was made for testing in the field. This resulted in the development of the fieldwork programme. The fieldwork programme consisted of:

- i. Six units which were selected from the first part of the Resource Pack: 'The school grounds' and developed into the "School Trail".
- ii. Eight units which were selected from the second part of the Resource Pack: 'The township context' and developed as the "Township Trail".

In selecting the units for the fieldwork programme, each unit had to justify its place in the programme. The non-participant observer, my collaborative partner and I agreed that the most important reason for exposing pupils to fieldwork was the development of certain skills and values. For the "School Trail", the following skills (and values) were considered to be valuable:

TABLE 4.2		
"School Trail": Key field skills		
U N I T	SKILLS REQUIRED	PURPOSE OF EXECISES
1	Identifying key features, drawing, maintaining proportions & labeling	Increases pupil's graphical skills
2	Applying knowledge, comparing sample collections, drawing of conclusions & graphing results	Classifying soils to determine soil type, infiltration & fertility rates & rates of erosion.
3	Using a clinometer, working in groups, measuring distances & angles, & drawing a graph	To determine characteristics of various slopes & the impact & potential of erosion occurring
4	Observing, measuring, recording, sketching & graphing	Increasing awareness of vegetation cover & relating this to the likelihood of erosion occurring
5	Clarifying values, classifying, completing a matrix & graphing results	To discover the quality of an enviroment & to realize that man either improves or degrades an area
6	Responsibility, counting, drawing up of tables & solving problems	Identifying whether conflict areas occur between pedestrians & vehicles; understanding the traffic flow patterns by graphing peaks & lows during the day

The development of skills and values were seen to be most crucial to ensure the justification of fieldwork and the relevancy of geography. Graphicacy, a skill unique to geographers, was developed in Units 1 - 5. Unit 5 was selected since it required pupils to qualify their opinions on 'the quality of the environment' in the face of peer assessment while Units 2 - 6 required group effort which emphasized the development of human interaction skills.

TABLE 4.3

"Township Trail": Key field skills

U N I T	SKILLS REQUIRED	PURPOSE OF EXERCISES
7	Same as for Unit 1	As for Unit 1; provide additional practice but in a different setting
8	Same as for Unit 3	As for Unit 3; provide additional practice set in the township
9	Same as for Unit 2	As for Unit 2; provide additional practice in a different environment
10	As for Unit 4	As for Unit 4; provide additional practice, but in the township
11	Integrative skills to link Units 8, 9 & 10	To determine: The relationship between infiltration rates, slope, soil type & vegetation cover; What relationship exists with rainfall type, & the likelihood of erosion occurring
12	Same as for Unit 6	As for Unit 6; provide additional practice in a different setting
13	Identify the character by taking photographs of the township; justifying choice; & drawing up a written commentary describing what the photograph showed	Developing individual interpretations & having to justify basis of selection
14	Same as for Unit 5	As for Unit 5: provide additional practice in the context of the township landscape

The "Township Trail" was designed to reinforce the skills developed during the "School Trail" in the more complex environment of the township.

4.4.2.2 Overall comments

It has repeatedly been mentioned that the crucial question is not whether there is potential for doing fieldwork in the township but rather, can these fieldwork opportunities be realized in the face of current forces evident in township schools? This necessitated the testing in the field of the "School Trail" and the "Township Trail".

Time and logistical constraints necessitated the selection, development and evaluation of a part of the Resource Pack in the form of the fieldwork programme.

The rationale for developing the fieldwork programme was:

- i. The need to test the viability of implementing a fieldwork programme in a township; and
- ii. To allow for testing to occur, the number of units needed to be reduced.

4.5 THE ACTUAL FIELDWORK PROGRAMME

In developing a township fieldwork programme, it needs to be acknowledged that most pupils have never had prior exposure to any form of fieldwork. In accordance with strategies suggested by Lewin (1946), Kemmis (1988), McNiff (1988) and McKernan (1991) a seven-tier system was devised and implemented:

- i. pre-fieldwork teaching session: "School Trail"
- ii. "School Trail" where basic skills previously taught were applied
- iii. post-fieldwork session to clarify responses and to answer any questions raised
- iv. pre-fieldwork session: "Township Trail"
- v. "Township Trail": applying skills to the local environment
- vi. post-fieldwork session
- vii. evaluation and suggestions

The essence of this approach was that pupils were initiated into fieldwork by first doing fieldwork within the school grounds prior to undertaking fieldwork in the township.

4.5.1 Structure of modules and units

The fieldwork programme consisted of two modules, the "School Trail" and the "Township Trail". The following exercises were chosen to form the "School Trail":

- field sketching
- examining the soil
- slope surveying
- vegetation analysis
- quality of the environment
- vehicle movement

The second module, the "Township Trail", was based on direct experiences gained by pupils during the "School Trail". It was designed for implementation during two afternoon sessions. The first five units stressed skills and techniques similar to those used during the "School Trail", while units twelve to fourteen stressed the more qualitative aspects of fieldwork. The second-last exercise, however, required no specific previous skills for its completion and was not undertaken previously.

The following topics were covered in the "Township Trail":

- field sketching
- slope surveying
- soil analysis
- vegetation analysis
- infiltration rates
- traffic flows
- capturing the character of an area
- quality of the environment

Having identified the structure of the fieldwork programme with its two modules, the "School-" and "Township Trail", it is necessary to mention that the field units were developed in two parts:

- Part A - 'Pupils' introductory notes': These notes provided pupils with background information to each unit
- Part B - 'Field sheets' had to be completed by pupils as part of the field experience

Part A: 'Pupils' introductory notes' were divided into the following sections:

- i. An introduction containing background information which explained the context for each exercise;
- ii. General and specific goals were identified which gave clarity of purpose to each exercise;
- iii. Skills needed for each exercise were identified.
- iv. The method of investigation was clarified in order to assist pupils to accomplish tasks.
- v. Instructions were given regarding the presentation of results.
- vi. The analysis and explanation of findings were highlighted, and
- vii. Follow-up opportunities that could be undertaken in subsequent fieldwork were identified (Deer et al, 1977; Share-Net (undated)).

Part B consisted of pupils' field sheets containing only the most essential data required directly during the fieldwork experience for the completion of exercises, e.g. data required to classify soils.

4.6 THE "SCHOOL TRAIL"

This text was written to assist the inexperienced teacher to undertake fieldwork within the environment of the school. Two sets of notes were used during the fieldwork programme¹⁵: the first provided an overview of each exercise, while the second gave pupils a step-by-step guide on how to complete the field sheets. A Teacher's Manual was also developed (APPENDIX 4.2). TABLE 4.1A to TABLE 4.6B are the actual field units developed and implemented during the research.

¹⁵ The numbering system used for the field exercises was as follows:

- i. The suffix A following numbers 1-6 indicates notes given to pupils during the initial introductory phase of the "school trail" while exercises with a suffix B indicate actual worksheets used during this phase.
- ii. Exercises 7-14 were developed as part of the "Township Trail". Units with a suffix A refer to introductory notes while the B indicates actual field sheets used by pupils during the field trip.

TABLE 4.1A
UNIT 1A: INTRODUCTION - FIELD SKETCHING

Introduction: A field sketch is a sketch of a landscape or a landform made in the field. To draw a field sketch, look carefully at the landscape or features before you. Field sketching is an alternative to taking photographs. Unlike photographs, which show all detail, field sketches merely highlight the main features. The perspectives should, however, be recognized as being the same. Field sketches must have labels to indicate key characteristics.

General aim: To get the experience of drawing field sketches.

Specific aims: To provide an opportunity of drawing a field sketch of the school and its environment.

Skills: Identification of key features, drawing, proportions and labelling.

Method: Choose a perspective within the school grounds that you want to draw. Determine the frame for your sketch, i.e. what borders do you want to make - where will your sketch end on the left and right hand side and at the top and bottom? Within your framed area draw an imaginary line that divides the picture into half vertically and another line that does the same horizontally (as indicated in the sketch).
Now draw in each quarter what you see within the frame. Label key features.

Note: Your sketch should show depth and should reflect only what is seen.

Presentation: A labeled field sketch.

Analysis: Is the field sketch recognizable? Be sure that it is not a plan view nor a two-dimensional drawing.

Follow-up: Field sketching can be used to show various landscapes during a field trip, i.e. coastal features, river or buildings in the city.

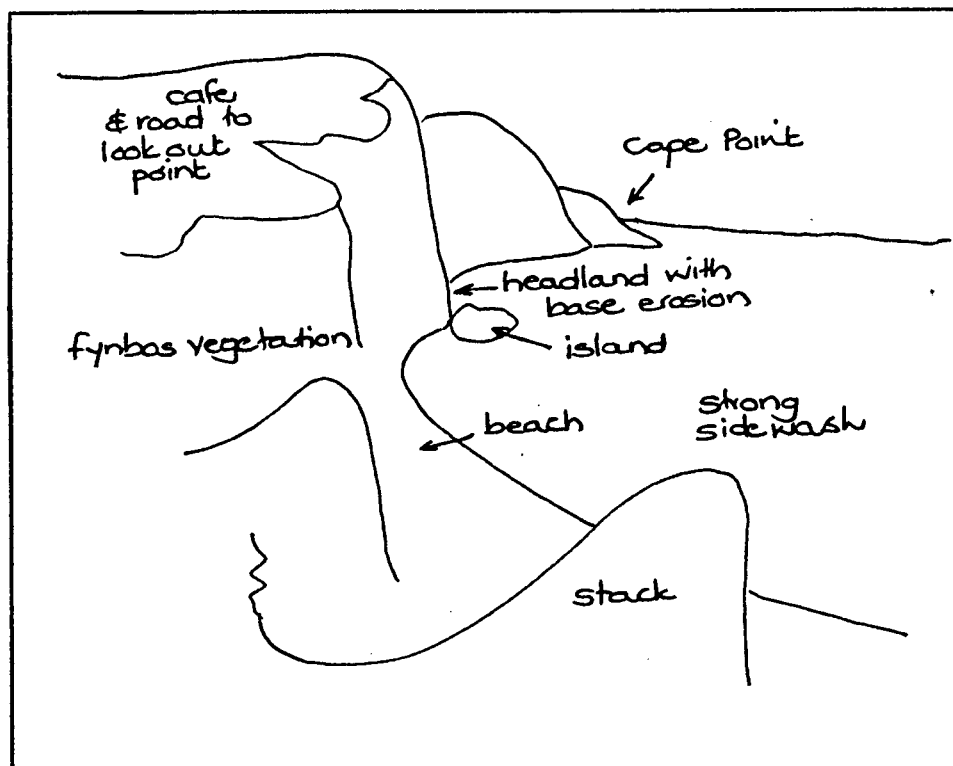


TABLE 4.1B

UNIT 1B: FIELD SHEET - FIELD SKETCH

TABLE 4.2A

UNIT 2A: INTRODUCTION - EXAMINING THE SOIL

- Introduction:** An understanding of soil is important, since soil supports much of earth's life. The relationship between soil, vegetation and climate is complicated. For example, the wrong use of soil or the destruction of vegetation can have disastrous results during flooding and drought conditions. Soil starts from solid rock, which is then broken down into tiny bits. To the soil is added organic matter - dead plants, roots and earthworms. Remember that water and air is found between sand particles.
- General aim:** The aim is to determine the texture of the soil.
- Specific aim:** The texture of the soil will be determined by the "feel test" in the field and the "particle size analysis" back in the classroom.
- Skills:** Collecting samples, applying knowledge, comparing, drawing of conclusions, graphing.
- Method:** To determine soil texture using the "feel test", take a pinch of soil and rub it between your thumb and forefinger. How does it feel? Use TABLE 1 (Barton, 1985, p27; Sauvain, 1989, p91) to find out which characteristics apply to your soil - is it clay, sand or silt?

To test your field results in another way, take a sample of soil back to the classroom and apply the "particle size analysis" test. This test shows how much clay, sand and silt the soil sample contains. While in the field put 5 tablespoons of dry, weighed soil into a glass jar nearly filled to the top with water. After screwing the top on tightly, shake the jar and allow the sediment to settle. After 1 or 2 days, measure the depth of each type of particle as it has settled in the jar. Then calculate the depth of each of the 3 particles and express these as a percentage of the whole jar. TABLE 2 shows an example of the use of this method.

TABLE 1

INSTRUCTIONS. Take a pinch of soil and rub it between your thumb and forefinger, how does it feel? Now follow the directions below to find out which applies to your soil.		
GRITTY FEEL	You can also see small grains like sand in the soil. When dry this soil is loose and is not at all sticky when wet. Particle size:- 2.00 to 0.05mm.	SANDY SOIL
SOAPY FEEL	Some people say this soil feels smooth and silky. Particle size:- 0.05 to 0.002mm.	SILTY SOIL
STICKY FEEL	When damp this soil can be rolled into shapes and it will take good finger-prints. Particle size:- 0.002mm or less.	CLAY SOIL
A LOAM SOIL has EQUAL AMOUNTS OF SAND, SILT AND CLAY. It moulds into shapes when wet and sticks to the fingers, but, if you roll it into threads and then try and bend the threads into rings it will break and crumble. It is possible to find clay loams, sand loams and silt loams. They have a mix of all three mineral particles but one is dominant eg. clay loam (more clay than sand or silt).		

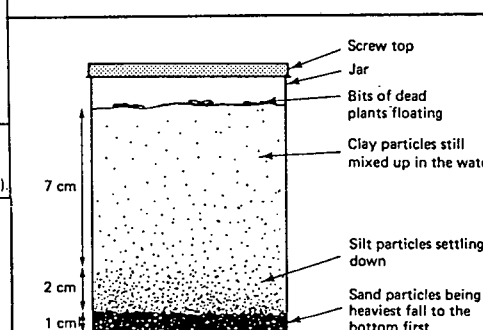


TABLE 2

Presentation: From the percentages determined for clay, silt and sand, draw a pie diagram.

Analysis: What kind of soil do you have: clay, sand, silt, clay loam, sand loam, silt loam or true loam?

Follow-up: Determine how soil type will influence infiltration. (After Brown, 1975; Barton, 1985; Peterhouse, 1991: Share-Net, (undated))

TABLE 4.2B

UNIT 2B: FIELD SHEET - EXAMINING THE SOIL

Method 1: To determine soil texture using the "feel test", take a pinch of soil and rub it between your thumb and forefinger. How does it feel? Use the provided space to record your information.

Findings:
.....
.....
.....

Method 2: To test your field results using the "particle size analysis" test, put 5 tablespoons of dry, weighed soil into a glass jar nearly filled to the top with water. After screwing the top on tightly, shake the jar and allow the sediment to settle. After 1 or 2 days, measure the depth of each type of particle as it has settled in the jar. Then calculate the depth of each of the 3 particles and express these as a percentage of the whole jar.

For this second method, only one sample will suffice for the entire group. A discussion will be held during the report-back stage to discuss findings, allowing sufficient time for the sediment to settle.

Presentation: From the percentages determined for clay, silt and sand using the "particle size test", draw a pie diagram.

TABLE 4.3A

UNIT 3A: INTRODUCTION - SLOPE SURVEYING

Introduction: The slope of any site is important since it determines the ultimate end usage of the land. If slopes are steep, the slope can only be used for a limited number of functions since the slope will be vulnerable to erosion. However, gentle slopes are able to be utilized by a greater variety of activities as the likelihood of erosion occurring is low.

General aim: By making use of a home-made clinometer¹⁶, the steepness of a slope can be calculated.

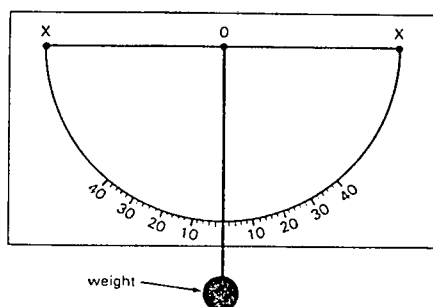
Specific aim: The aim is to measure various slopes.

Method: Proceed in the following manner:

- i. Two people each hold a pole vertically with the end of each pole resting on the ground.

¹⁶

How to make a home-made clinometer:



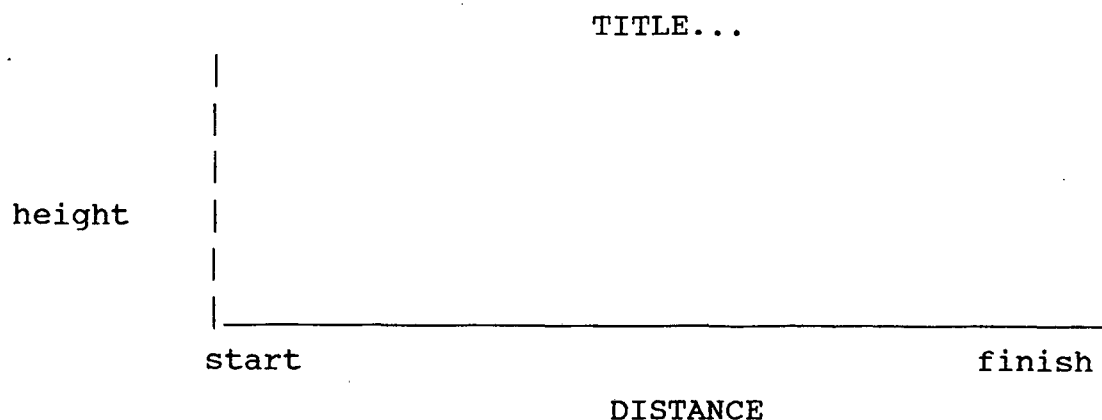
- 1 Trace a protractor onto a sheet of paper and mark on degrees as above.
- 2 Glue the paper to a sheet of card.
- 3 Thread some string through a hole at the point marked 'O'. Secure with a knot and fix a weight to the loose end.
- 4 Push two drawing pins through the points marked 'X' from behind. These serve as sights to help align the clinometer.

- The poles should be placed at both ends of the slope to be measured.
- ii. The clinometer is then viewed from a chosen height on one pole to the same level on the other pole and the angle of the slope is read off in degrees.
 - iii. The distance between the poles is then measured. The accuracy of this method increases the shorter the distance between the poles.
 - iv. Record data and draw up a Table as shown below:

SLOPE MEASUREMENTS

Slope no.	Length of slope	Angle of slope
1		
2		
3		
4		
5		

Presentation: Plot the resulting measurements onto graph paper so that the slope can be constructed. It should be remembered that the length measurements are along the slope and not horizontally. Be sure to give your graph a heading and indicate the scale for your distances, i.e. 2m on the ground is represented by 1cm on the map.



Analysis: How prone to erosion will the slope you have just measured be when there are heavy rains? How will the vegetation influence erosion and how do different types of land use on a slope influence erosion?

Follow-up: Determine what slopes are suitable for the building of schools, shopping centres and low cost housing.

(After Lenon & Cleves, 1986)

TABLE 4.3B
UNIT 3B: FIELD SHEET - SLOPE SURVEYING

Method: Proceed in the following manner:

- i. Two people each hold a pole vertically with the end of each pole resting on the ground. The poles should be placed 2m apart.
- ii. The clinometer is then viewed from a chosen height on one pole to the same level on the other pole and the angle of the slope is read off in degrees. Record this value.
- iii. Do similar measuring four more times, each a further 2m up the slope, and record data.

Draw up a Table as shown below:

SLOPE MEASUREMENTS		
Slope reading	Length of slope	Angle of slope'
1		
2		
3		
4		
5		

Presentation: Plot the resulting measurements so that the slope can be constructed. It should be remembered that the length measurements are along the slope and not horizontally. Be sure to give your graph a heading and use a scale of 1cm to represent 2m.

start

finish

SLOPE VARIATION OVER DISTANCE

TABLE 4.4A
UNIT 4A: INTRODUCTION - VEGETATION ANALYSIS

Introduction: Geographers are interested in vegetation since plants adapt and respond to their environment. The type of vegetation is influenced by the micro-climate, altitude, aspect, soil type and the activities of man and animals.

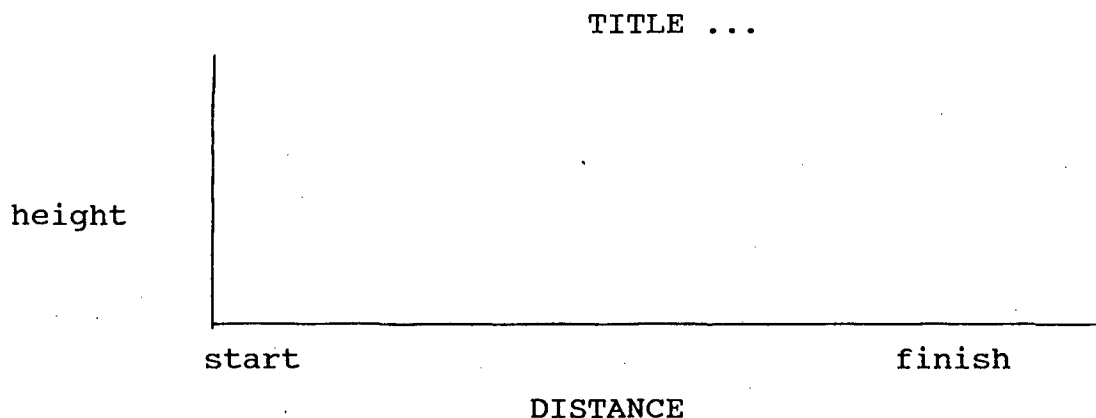
General aim: The aim is to discover the variation of vegetation along a transect within the school grounds.

Specific aim: Draw a vegetation transect by identifying vegetation samples along a route.

Skills: Observing, recording, graph drawing, sketching.

Method: Choose any route (straight line of approximately 30m in length) that can be used as a transect to provide insight into vegetation. Make a key: i.e. T tree; B bush/shrubs; and G grass. From your starting point, walk, note and record the vegetation that occurs every 1m along the route.

Presentation: Using the records of vegetation for the transect, draw a transect:



On the transect drawn in Topic 3A, locate the position of vegetation and indicate the relevant heights of plants.

Analysis: Comment on the distribution of vegetation along the transect just drawn. Attempt to identify what factors have caused vegetation to vary.

Follow-up: If needed draw two other transects to get a clearer picture as to how the vegetation varies within the school premises.
(After Lenon & Cleves, 1986; Nettleship, 1987)

TABLE 4.4B

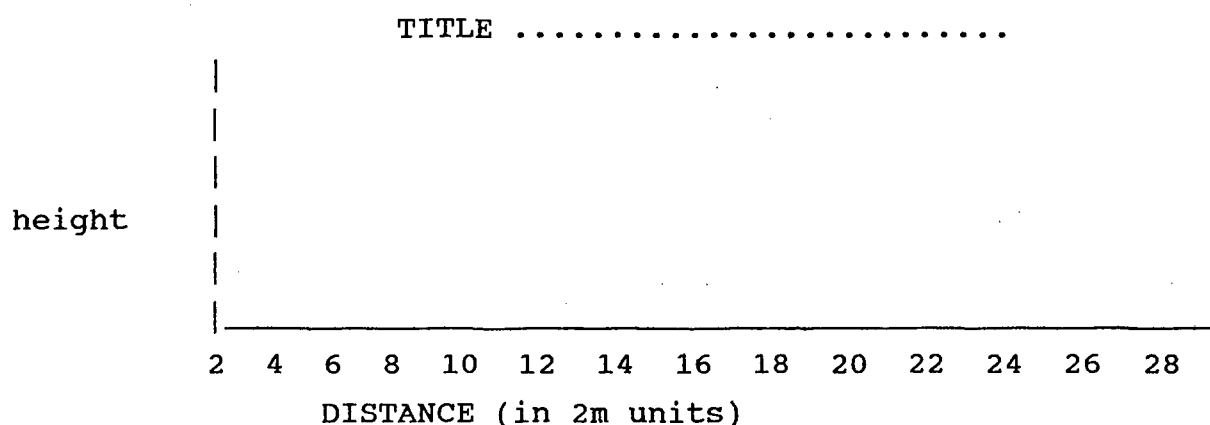
UNIT 4B: FIELD SHEET - VEGETATION ANALYSIS

Method: Choose any route (straight line of approximately 30m in length) that can be used as a transect to provide insight into vegetation. Make a key: i.e. T tree; B bush/shrubs; and G grass.
From your starting point, walk, note and record the vegetation that occurs every 2m along the route.
Record of results: Write down only the code.

RECORDS OF THE VEGETATION TRANSECT

1.	2.	3.	4.	5.
6.	7.	8.	9.	10.
11.	12.	13.	14.	15.

Presentation: Using the records of vegetation for the transect, draw a transect:



Make a copy of the transect drawn in Unit 3B and indicate the vegetation identified. Do so by drawing a diagram at the respective point and indicate its relevant height.

TABLE 4.5A

UNIT 5A: INTRODUCTION - QUALITY OF THE ENVIRONMENT

Introduction: The character of an area can be assessed by rating the environment using a simple 5-point scheme. This implies that pupils need to make judgments concerning the environment. This rating scheme enables subjective ratings to be quantified.

General aim: The aim is to discover what the quality of the school environment is.

Specific aim: To assess the quality of the school environment and to encourage pupils to see the role that they can play in maintaining the status quo or improving it.

Skills: Clarify values/responsibility, graphing, using point classification system, completing a matrix.

Method: Walk around the school to get a feel of the whole school environment. During this time consider the various categories included in the check sheets.

After this has been done, the check sheets need to be completed. Rate the following using the 1 to 5 ratings - cross out only one value!

RATING THE QUALITY OF THE SCHOOL ENVIRONMENT						
	poor	1	2	3	4	5 good
Litter		1	2	3	4	5
Broken windows		1	2	3	4	5
Peeling paint		1	2	3	4	5
Broken roof/eaves		1	2	3	4	5
Paved areas		1	2	3	4	5
Pollution/smoke		1	2	3	4	5
Trees/shrubs		1	2	3	4	5
Noise		1	2	3	4	5
Overall maintenance		1	2	3	4	5
Fencing		1	2	3	4	5

Presentation: Complete the matrix and draw a graph for the eleven categories with their respective scores. Use the horizontal axis for the categories and the vertical scale for the rating of quality. Label the graph.

Analysis: Do people seem to enjoy the school environment? What are your own likes and dislikes about this area? What can be done to improve it?

Follow-up: Make comparative studies of other school premises and try to account for any major differences.

TABLE 4.5B

UNIT 5B: FIELD SHEET - QUALITY OF THE ENVIRONMENT

Method: The group is required to walk around the school before allocating scores for the various categories. After this has been done, the score sheets must be completed.

RATING THE QUALITY OF THE SCHOOL ENVIRONMENT						
	poor	1	2	3	4	5 good
Litter		1	2	3	4	5
Broken windows		1	2	3	4	5
Peeling paint		1	2	3	4	5
Broken roof/eaves		1	2	3	4	5
Paved areas		1	2	3	4	5
Pollution/smoke		1	2	3	4	5
Trees/shrubs		1	2	3	4	5
Noise		1	2	3	4	5
Overall maintenance		1	2	3	4	5
Fencing		1	2	3	4	5

Presentation: Complete the matrix and draw a bar graph for the ten categories. Label the graph.

THE QUALITY OF THE SCHOOL ENVIRONMENT

R	5										
T	4										
I	3										
N	2										
G	1										
S											
		L	B	P	B	P	S	T	N	M	F
		I	R	E	R	A	M	R	O	A	E
		T	O	E	O	V	O	E	I	I	N
		T	K	L	K	E	K	E	S	N	C
		E	E	I	E	D	E	S	E	T	I
		R	N	N	N		/	/		E	N
				G		A	S	S		N	G
			P		R	R	M	H		A	
			A	P	O	E	O	R		N	
			N	A	O	A	G	U		C	
			E	I	F	S		B		E	
			S	N				S			
				T							

TABLE 4.6A

UNIT 6A: INTRODUCTION - PEDESTRIAN AND TRAFFIC MOVEMENT

Introduction: Traffic is an interesting topic since it causes numerous problems: traffic jams, pollution, noise, danger, as well as providing us with opportunities for travel.

General aim: The aim is to determine if there is conflict between pedestrians and vehicular traffic immediately outside the school gate.

Specific aim: To determine whether there is a need for scholar patrol marshals or robots immediately outside the school gate.

Skills: Raises issues of responsibility, duty, counting and recording, drawing up of tables, interpretation of tables and the solving of problems.

Method: This may not be a real problem at your school, if not, consider this exercise for a school which is situated on a busy road i.e. Ebenezer Majombozi.

To establish if the above need exists, undertake a traffic count before, during and after school. Record pedestrian movement on either side of the school gate, i.e. have two people counting pedestrians, one on either side of the gate. Have someone else counting the number of vehicles passing the school.

Draw up a schedule like the one provided and fill in the general particulars. Every time a vehicle or pedestrian passes the recorder, a mark (vertical line |) is made in the appropriate column. When the 5th vehicle or pedestrian is recorded, draw a diagonal line through the previous four lines i.e. 5 vehicles are recorded as .

Undertake the count every 15 minutes for a 5 minute period. The count should cover a total of 45 minutes immediately before school starts and 45 minutes after the last bell of the day rings. Also do a reading during the long lunch-break period.

TRAFFIC COUNT SCHEDULE:

PEDESTRIANS	VEHICLES
From EL/From Mdantsane	From EL/From Mdantsane

Be sure to differentiate the direction of movement of vehicles and pedestrians.

Presentation: Draw up a table to record results.

	TIME	TOTAL NO. VEHICLES	TOTAL NO. PEDESTRIANS
AM	1. ....	.....	.....
	2. ....	.....	.....
	3. ....	.....	.....
BREAK	4. ....	.....	.....
	5. ....	.....	.....
	6. ....	.....	.....
PM	7. ....	.....	.....
	8. ....	.....	.....
	9. ....	.....	.....

Analysis: Is there evidence of conflict between pedestrians and vehicular traffic? When is the problem most serious? What action would you regard as being most appropriate? What do you conclude about your school's position?

Follow-up: Do a similar survey outside the gates of another two schools. Also undertake a survey (questionnaire) of pupils, hawkers and taxi drivers in proximity to these schools to determine their feeling towards a controlled crossing. If your results point to the need for a controlled crossing point, then see DVRA and the Town Clerk or Engineer.

(After Barton, 1985)

TABLE 4.6B

UNIT 6B: FIELD SHEET - PEDESTRIAN AND TRAFFIC MOVEMENT

Method: Since the school is located in a quiet part, go to the main road and do a brief traffic count there. Have two people counting pedestrians, one to record movement in one direction and another in the other direction. Likewise do the same for vehicles.

Use the provided schedule and fill in the general particulars. Do only two counts, each for a duration of 5 minutes.

Name
 Time Date
 Name of road
 Direction of traffic movement
 Length of count

TRAFFIC COUNT SCHEDULE:	
PEDESTRIANS	VEHICLES

Presentation: Draw up a table to record results.

	TIME	TOTAL NO. VEHICLES	TOTAL NO. PEDESTRIANS
Count	1. ....	.....	.....
Count	2. ....	.....	.....
	3. ....	.....	.....
	4. ....	.....	.....
BREAK	5. ....	.....	.....
	6. ....	.....	.....
	7. ....	.....	.....
PM	8. ....	.....	.....
	9. ....	.....	.....

Overall comments on the "School Trail"

Field units used in the "School Trail" were syllabus-based, appropriate to the experience and first hand knowledge which pupils had and developed basic fieldwork techniques necessary for further field investigation. Field units also emphasized a variety of skills, especially graphicacy and the identification of attitudes related to the quality of the school grounds. The use of problem-solving and issue-based activities which have scope for extensive application in fieldwork, were not developed beyond the inclusion of Unit 6. This was done intentionally for the reasons already stated.

4.7 THE "TOWNSHIP TRAIL"

By the time pupils were ready to start on the "Township Trail" they had had the following exposure to fieldwork: pre-fieldwork introductory session, the "School Trail" and a post-fieldwork session. They had consequently acquired a rudimentary level of skills enabling them to undertake fieldwork in the more complex environment of the township. Prior to undertaking the "Township Trail", pupils were subjected to an introductory lesson.

TABLE 7A to TABLE 14B are the field units developed but not tested due to the cessation of the research.

These units also consisted of two parts,
Part A: Pupil's introductory notes and
Part B: Pupil's field sheets.

TABLE 4.7A

UNIT 7A: INTRODUCTION: VALLEY TRANSECT - FIELD SKETCHING

Introduction: Prior to going on the township trail, an opportunity was given to draw a field sketch within the school grounds. You are now required to make a field sketch of the valley, with the city sky-line in the background.

General aim: To get experience in drawing field sketches.

Specific aims: To provide you with an opportunity of drawing a field sketch of the valley, river, portion of the township and with the city in the background.

Skills: Identification of key features, drawing, proportions and labeling.

Method: Choose a perspective that you want to draw. Remember to determine the frame for your sketch, i.e. what borders do you want to make? - where will your sketch end on the left and right hand side and at the top and bottom? To do this, draw an imaginary line within your framed area that divides the picture into half vertically and another line that does the same horizontally (as indicated in the sketch). Now draw in each quarter what you see within the frame. Label key features.

Note: Your sketch should show depth and should reflect only what is seen.

Presentation: Draw a labeled field sketch.

Analysis: Is your field sketch recognizable? Be sure that it is not drawn in two dimensions only!

Follow-up: A field sketch can be used to draw many landscapes during a field trip, i.e. coastal features, river or buildings in the city.

TABLE 4.7B

UNIT 7B: FIELD SHEET: VALLEY TRANSECT - FIELD SKETCHING

TABLE 4.8A

UNIT 8A: INTRODUCTION: VALLEY TRANSECT - SLOPE SURVEYING

Introduction: The slope of any site is important since it determines the ultimate end usage of the land. Steep slope can only be used for a limited number of purposes since the slope will be vulnerable to erosion. Gentle slopes, however, are able to be utilized by a greater variety of activities since the likelihood of erosion occurring is low.

General aim: By making use of a home-made clinometer, the steepness of a slope can be calculated.

Specific aim: The aim is to measure various slopes.

Method: Details for making a clinometer are given in FIGURE 5 of the Resource Pack.

- i. Two people must each hold a pole vertically with the end of each pole resting on the ground. The poles should be placed at both ends of the slope to be measured. Make this distance between 2 - 5m. Make five readings.
- ii. The clinometer is then viewed from a chosen height on one pole to the same level on the other pole and the angle of the slope is read off in degrees.
- iii. The accuracy of this method is influenced by the distance between the poles, i.e. accuracy increases the shorter the distance between the poles is.
- iv. Record data and draw up a Table as shown below:

SLOPE MEASUREMENTS		
Slope reading	Length of slope	Angle of slope
1		
2		
3		
4		
5		

Presentation: Plot your results on to graph paper so that the slope can be constructed. It should be remembered that the length measurements are along the slope and not horizontally. Be sure to give your graph a heading and indicate the scale for your distances.

Analysis: How prone to erosion will the slope you have just measured be when heavy rains fall? How will the vegetation, different types of land use and slope variations influence the rate of erosion?

Follow-up: Do some research to determine what slopes are suitable for the building of schools, shopping centres and low cost housing.

(After Lenon & Cleves, 1986)

TABLE 4.8B

UNIT 8B: FIELD SHEET: VALLEY TRANSECT - SLOPE SURVEYING

Method:

- i. Use the clinometer to read off the slope in degrees.
- ii. Make five readings using a distance of 2 meters between the poles in each instance.

iii. Record data and draw up a Table as shown below:

SLOPE MEASUREMENTS		
Slope reading	Length of slope	Angle of slope
1		
2		
3		
4		
5		

Presentation: Plot the resulting measurements so that the slope can be constructed. NOTE: Begin at "start".

SLOPE VARIATION OVER DISTANCE

start	finish
Distance	

Analysis: How will the land use and vegetation density of this area influence run-off and therefore erosion?

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(After Lenon & Cleves, 1986)

TABLE 4.9A

UNIT 9A: INTRODUCTION: VALLEY TRANSECT - SOIL ANALYSIS

General aim: The aim is to determine the texture of the soil.

Specific aim: The texture of the soil will be determined by the "feel test" at three positions on the valley slope.

Skills: Applying knowledge, collecting samples, comparing, drawing of conclusions, graphing

Method: Determine the soil texture at the three points along the valley transect using the "feel test".

Take a pinch of soil and rub it between your thumb and forefinger. How does it feel? Use the provided unit 2A to find out which applies to your soil - is it clay, sand or silt?

Presentation: Draw up a Table to show the soil texture for the three sites.

Analysis: What kind of soil do you have: clay, sand, silt, clay loam, sand loam, silt loam or true loam? Is there any difference in texture as one moves down slope?

Follow-up: Determine if there is a relationship between soil type, rate of infiltration and density of vegetation.
(After Barton, 1985; Peterhouse, 1991)

TABLE 4.9B
UNIT 9B: FIELD SHEET: VALLEY TRANSECT - SOIL ANALYSIS

Method: Take three soil samples (call the positions A, B and C) and determine the respective textures of each sample by rubbing the soil between your fingers (After Barton, 1985).

Presentation: Complete the given Table and note the position of each sample (in meters) from the start of your transects.

SOIL SAMPLES		
Soil sample	Soil type (texture)	Distance from start of transect
A		 meters
B		 meters
C		 meters

Analysis: What kind of soil do you have: clay, sand, silt, clay loam, sand loam, silt loam or true loam? Is there any difference in texture as one moves down slope?

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TABLE 4.10A

UNIT 10A: INTRODUCTION: VALLEY TRANSECT - VEGETATION ANALYSIS

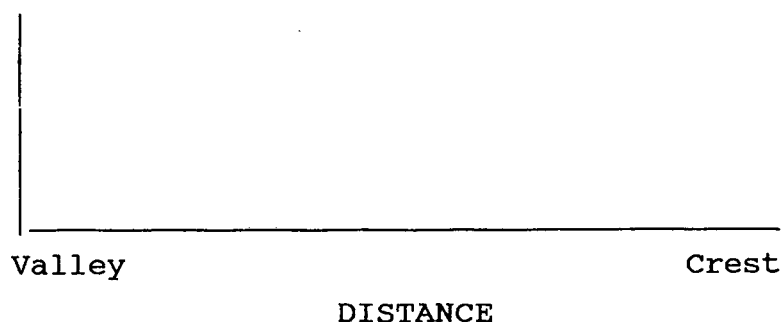
General aim: The aim is to discover the variation of vegetation along a transect from the bottom of the valley to the crest of the hill.

Specific aim: Draw a vegetation transect to reflect vegetation along a route.

Skills: Observing, recording, graph drawing, sketching

Method: Each pupil is required to draw a transect from the river to the crest of the hill. Choose any slope for your profile. Use the same key as was used in the exercise completed within the school grounds, i.e. T tree; B bush/shrubs; and G grass. From your starting point, record the vegetation that occurs every 1m along the route. Share your results with another two pupils and get their results in return. Fill data in on the provided Table.

Title ...



On the graph indicate the vegetation identified by drawing a diagram at the respective points and indicate the relevant height.

Presentation: Using the records of vegetation draw the transect using the following guidelines:

Complete the provided matrix that links vegetation to soil and to the micro-climate.

FACTORS INFLUENCING VEGETATION				
Features:	Routes:	A	B	C
1. Highest plant (m)				
2. Density (high/medium/low)				
3. No. of species				
4. Plant adaptation				
5. Soil texture				
6. Soil moisture				

Analysis: Comment on the distribution of vegetation along the transect drawn. Attempt to identify what factors have caused vegetation to vary.

Follow-up: Do a similar study elsewhere in Duncan Village.
(After Lenon & Cleves, 1986; Nettleship, 1987)

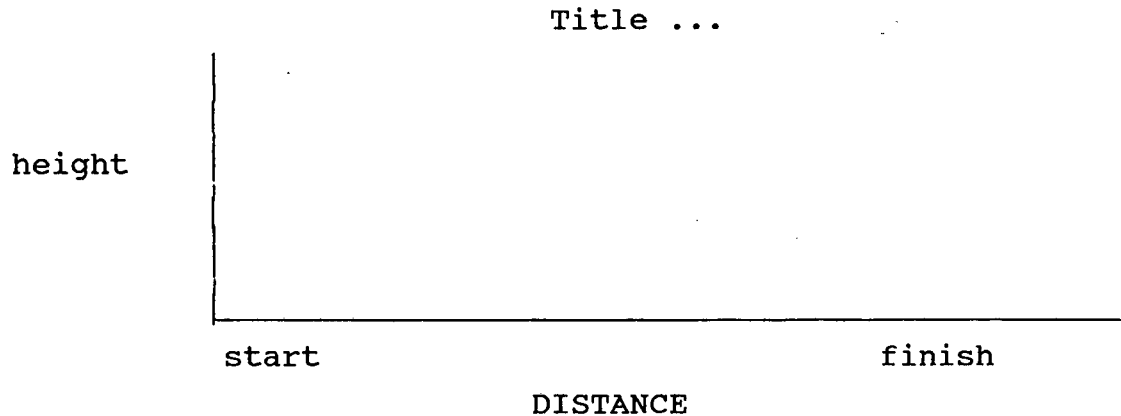
TABLE 4.10B

UNIT 10B: FIELD SHEET: VALLEY TRANSECT - VEGETATION ANALYSIS

Method: Use the same transect you drew to indicate the various slopes and on which you located your soil samples. Making use of the following key: T tree; B bush/shrubs; G grass; and NIL when there is no vegetation, show how vegetation changes along this profile.

From your starting point walk, note and record the vegetation that occurs every 1m along the route.

Presentation: Make a copy of your slope transect and fill in vegetation data on it.



Indicate the relevant heights and position of plants on the profile.

Analysis: Comment on the distribution of vegetation along the transect drawn. Attempt to identify what factors have caused vegetation to vary.

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(After Lenon & Cleves, 1986; Nettleship, 1987)

TABLE 4.11A

UNIT 11A: INTRODUCTION: VALLEY TRANSECT - INFILTRATION RATES

General aim: The aim is to indicate that infiltration rates vary according to the nature of the slope.

Specific aim: To prove that steep slopes have a lower rate of infiltration than level slopes.

Skills: Hypothesis testing, analysis, synthesis, recording

Method:

- i. Identify three different sites: near the crest; halfway down the slope; and at the bottom of the valley.
- ii. Measure the slope at the three positions using the clinometer and record these angles.
- iii. Examine the plant community in each site and calculate the percentage plant cover per square meter for each site.

Presentation: Draw up a table to correlate percentage vegetation cover relative to the slope.

FACTORS AFFECTING INFILTRATION RATES			
	At crest	Halfway up	Valley
Slope			
% plant cover			

Analysis: What conclusions can you draw from this data?
What will the likely effect be on each site when heavy rains are experienced?

Follow-up: Determine the infiltration rates for the soil of the three different sites.
(After Lenon & Cleves, 1986; Peterhouse, 1991)

TABLE 4.11B

UNIT 11B: FIELD SHEET: VALLEY TRANSECT - INFILTRATION RATES

Method:

- i. Complete the provided matrix from data previously collected in the field.
- ii. Attempt to identify how erosion is influenced by the steepness of a slope, vegetation and soil texture.

Presentation: Complete the provided matrix linking vegetation to soil and to slope.

FACTORS AFFECTING INFILTRATION RATES				
FEATURES:	POSITION:	A	B	C
1. Angle of slope				
2. Soil texture				
3. Land-use classification				
4. Vegetation type				
5. Density (high/medium/low)				
6. Likely infiltration				

Analysis: What conclusions can you draw from this data?
What will the likely effect be on each site when heavy rains fall?

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.....
.....
.....

(After Lenon & Cleves, 1986)

TABLE 4.12A
UNIT 12A: INTRODUCTION - DAILY TRAFFIC FLOWS

Introduction: Duncan Village is very close to the centre of East London where work, shopping and other services are available. East London is also the end-point of numerous transportation routes for the entire Border region.

General aim: With half of East London's population living in Duncan Village, it is obvious that the transport routes between East London and Duncan Village will be well developed.

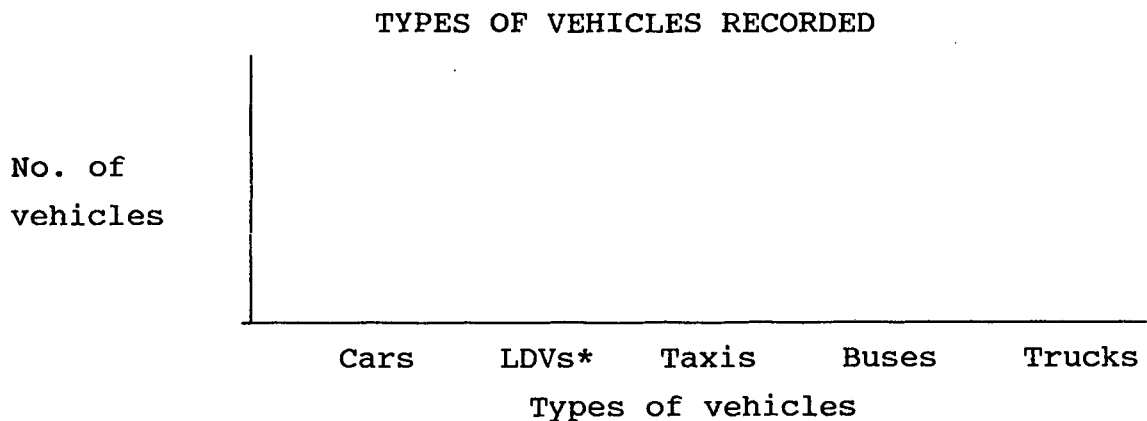
Specific aim: To determine what the actual volume of traffic is between East London and Duncan Village in terms of its direction, the number of vehicles and its peak periods.

Method: Using a traffic census form, count the number of vehicles according to their type and their direction of origin during specified 5-minute periods.

Two pupils are required to complete the forms for vehicles traveling out of Duncan Village towards the city, two to record vehicles entering Duncan Village from East London's direction and one person is to be the group's official timekeeper, monitoring the start/finish of the recording periods.

Recording should commence early enough to identify persons traveling to work but also late enough for those returning home from work in the evening. Suggested recording times could be: 07H00 - 07H05; 07H30 - 07H35; 08H00 - 08H05; 11H00 - 11H05; 13H00 - 13H05; 15H00 - 15H05; 16H00 - 16H05; 17H00 - 17H05; 17H30 - 17H35.

Presentation: Each group is required to add the number of vehicles according to type to get a cumulative total and then to draw a bar graph to indicate these totals.



*Light delivery vans

Your group is also required to tabulate the total number of vehicles (in both directions) for the various allocated time periods. From this table a bar graph can be drawn with the times placed on the horizontal axis and the volume indicated on the vertical axis.

Graphs showing the number of vehicles moving in specific directions can also be plotted on this graph. Plot these values next to the bar showing the total number of vehicles and colour the additional graphs in different colours to denote incoming and outgoing traffic.

Analysis: From the data collected, several questions may be answered:

- i. When are the peak periods of traffic?
- ii. Which type of vehicle is most frequently used?
- iii. How does traffic vary in its direction of flow during the day?
- iv. What causes these peaks?
- v. When is the quietest period during daylight hours? Why is this so?
- vi. Suggest what likely variations in flow might occur at night and over the weekend.

Follow-up: This survey could be extended to cover passengers and pedestrians and by determining volumes over a longer time period. The Township Engineer could be approached for data recorded for other time periods that could be used for a comparative study.

Another study could be undertaken to determine the origin of people disembarking from taxis. The level of accessibility for Duncan Village in terms of its position with regard to places of work, shopping facilities, services etc. could be determined.

TABLE 4.12B
UNIT 12B: FIELD SHEET - DAILY TRAFFIC FLOWS

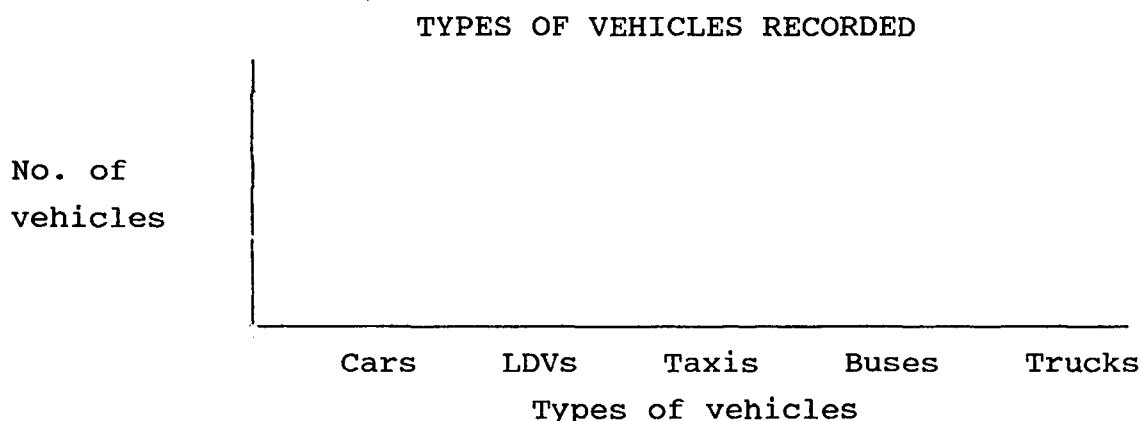
Method: Using the provided traffic census form determine the number and type of vehicles as well as the direction in which vehicles move during a specified 5-minute period. Do the same exercise for pedestrians.

Name
 Time Date
 Name of road
 Direction of traffic movement
 Length of count

TRAFFIC SCHEDULE:	
PEDESTRIANS	VEHICLES

Presentation: Draw up a table to record results.

TRAFFIC COUNT				
	Time		Total no. vehicles	Total no. pedestrians
Count	1.	.....	.....	.....
Count	2.	.....	.....	.....
Count	3.	.....	.....	.....
Count	4.	.....	.....	.....
Count	5.	.....	.....	.....
Count	6.	.....	.....	.....
Count	7.	.....	.....	.....
Count	8.	.....	.....	.....
Count	9.	.....	.....	.....
Count	10.	.....	.....	.....



- Analysis:** From the data collected, several questions may be answered:
- i. When are the peak periods of traffic according to your bar graph?
 - ii. Which type of vehicle is most frequently used?
 - iii. How does traffic vary in its direction of flow during the day?

- iv. What causes these peaks?
- v. When is the quietest period during daylight hours? Why is this so?
- vi. Suggest what likely variations in flow might occur at night and over the weekend.

TABLE 4.13A

UNIT 13A: INTRODUCTION - CAPTURING THE CHARACTER OF AN AREA

General aim: The aim is to observe and describe any part of the township that you feel is worthy of mention.

Specific aim: Each group is required to capture the character of a part of Duncan Village on film and then to describe what the photographs show and why they chose to take them.

Method: Within the area allocated to your group, walk the area to get familiar with it before taking two photographs that best capture the character or spirit of Duncan Village. Describe these two photographs and explain the reason for their selection.

Presentation: Each group should make a poster on which it pastes their two photographs, accompanied by the written text highlighting the main features of the photographs and qualifying the reasons for their selection.

Analysis: This will be included in the presentation.

Follow-up: A large poster combining all the different groups' efforts could then be made to give a visual representation of the character of Duncan Village.

TABLE 4.13B

UNIT 13B: FIELD SHEET - CAPTURING THE CHARACTER OF AN AREA

Method: Within the area allocated to your group, take two photographs that best capture the character or spirit of that area. Each group is then required to describe their two photographs and explain the reason for their selection.

Presentation: The photographs will be developed and each group needs to make a poster on which they highlight the main features of the photographs and give the reasons for selecting each photograph.

TABLE 4.14A

UNIT 14A: INTRODUCTION - THE QUALITY OF THE ENVIRONMENT

Introduction: Amongst other things, fieldwork provides an opportunity for the expression of one's likes and dislikes about a place or landscape. This expression can be communicated in poetry or in a field sketch.

General aim: The aim is to discover what variation there is in the quality of the Duncan Village environment.

Specific aim: To determine the overall quality of Duncan Village's environment and to establish whether areas differ greatly from each other in quality.

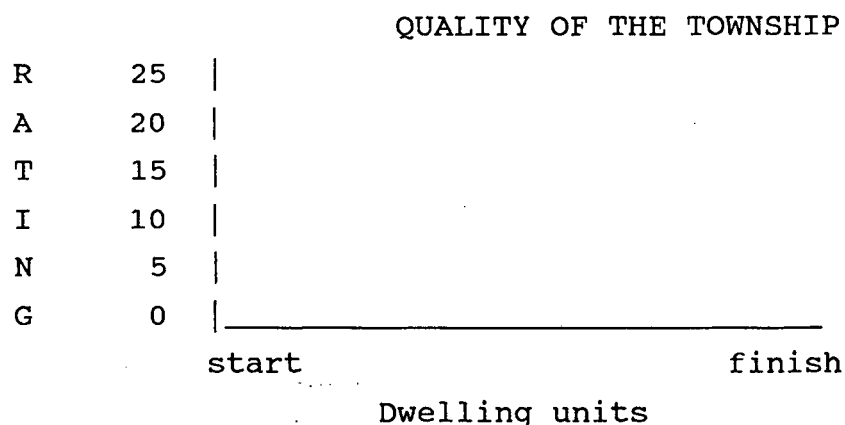
Method: Each group is required to assess the environmental quality of its sub-section. Note should be made of the quality of the environment by using the provided indicators and allocating appropriate points (1 - 5) for every fifth housing unit on both sides of the road.

QUALITY OF THE TOWNSHIP ENVIRONMENT					
INDICATORS:	SEVERE	MARKED	SOME	LITTLE	NONE
	1	2	3	4	5
a) Peeling paint	1	2	3	4	5
b) Broken/cracked windows	1	2	3	4	5
c) Garden rubbish	1	2	3	4	5
d) Overcrowding	1	2	3	4	5
e) Use of iron sheets/wood	1	2	3	4	5

Note the materials that each building is constructed of i.e. bricks/blocks, corrugated iron, wood etc.

Add the total scores for each unit surveyed and give your overall index. Note the poorer the condition of the environment, the lower the score is to zero; the better the environment, the closer the score is to 25!

Presentation: Using graph paper to represent the route taken, mark off every 5mm to represent 1 house unit. Mark in the respective environmental index you have just calculated on the vertical axis for each dwelling.



Analysis: Do your findings indicate that there are sections that enjoy a higher level of environmental quality than others? What could be the reason for this variation? By adding the scores of all units in your sub-section, compare these scores with those from other groups. Do you think there is anything that residents could do to improve the quality of their environment?

Follow-up: Your group could investigate the reasons for the poor quality of the environment. Think of ways in which the "problem" could be overcome - think in terms of collective responsibility and involving all sectors of the community and other actors.

TABLE 4.14B

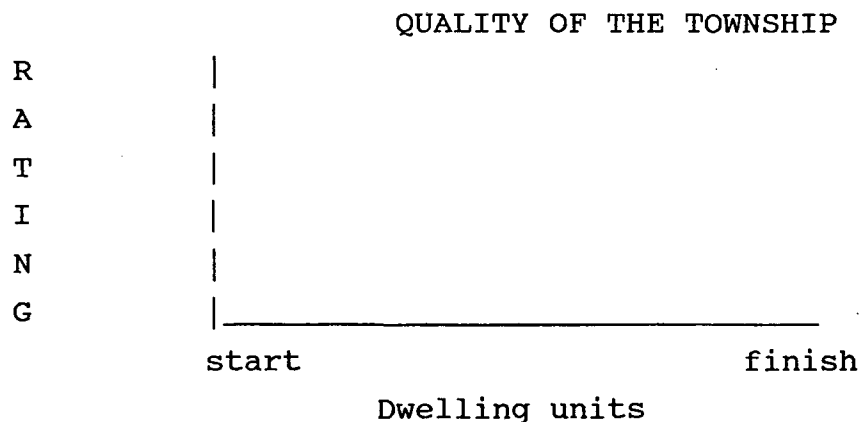
UNIT 14B: FIELD SHEET: THE QUALITY OF THE ENVIRONMENT

Method: Each group is required to assess the environmental quality of its sub-section by allocating an appropriate point score (1 - 5) for every fifth housing unit on either side of the road.

QUALITY OF THE TOWNSHIP ENVIRONMENT					
Indicators	Severe	Marked	Some	Little	None
	1	2	3	4	5
a) Peeling paint	...	...	...	...	...
b) Broken/cracked windows	...	...	...	...	...
c) Rubbish in garden	...	...	...	...	...
d) Overcrowding	...	...	...	...	...
e) Use of iron sheets, wood or plastic	...	...	...	...	...
TOTAL SCORE:					

Note the poorer the condition of the environment, the lower the score is to zero; the better the environment, the closer the score is to 25.

Presentation: Using graph paper to represent the route taken, mark off every 5mm to represent 1 unit.



Analysis: Do your findings indicate that there are sections that enjoy a higher level of environmental quality than others? What could be the reason for this variation? By adding the scores of all units in your sub-section, compare these scores with those from other groups. Do you think there is anything that residents could do to improve the quality of their environment?

Overall comments on the "Township Trail"

Field units contained in the "Township Trail" were based on previous exercises completed within the school grounds, i.e. six of the eight units overlapped with the "School Trail". Pupils were required in the more complex setting of the township to perform tasks similar to those done within the school grounds. This strategy was used to reinforce skills, values and attitudes, and the use of field techniques previously learnt.

The two 'new' units were:

- i. Unit 11 which investigated infiltration rates. This Unit was included in an attempt to link exercises dealing with slope, soil and vegetation cover.

- ii. Unit 13 explored the township landscape by capturing its character. This exercise required no previous 'conceptual baggage' (Vygotsky in Cole, 1978). The unit was included as an open-ended exercise to encourage pupils to describe and justify, in the form of two photographs and through the written media, whatever aspect they felt best captured the character of Duncan Village.

4.8 SUMMARY

The research was born out of a belief that geography taught in schools is irrelevant to the township child. This study set out to provide an alternative perspective to the teaching of geography to the township child. This was done by emphasizing a fieldwork approach based in the local environment of the township. To this end a number of fieldwork exercises was developed in the form of a Resource Pack (APPENDIX 4.1). From these exercises a manageable number was selected for implementation and evaluation as the fieldwork programme.

It must, however, be acknowledged that if fieldwork is to become a viable option, teachers need to be provided with some assistance. This statement is valid since fieldwork has been part of the syllabi for several years. As a result a Teacher's Manual (APPENDIX 4.2) was developed alongside the fieldwork programme. To provide teachers with additional assistance, the pupils' manual was divided into two parts: the first functioned as an introductory note while the second comprised field sheets. This sequence was completed for the "School Trail" as well as for the "Township Trail".

In this Chapter, units pertinent to a township were identified, developed and implemented as the fieldwork programme.

CHAPTER 5

THE IMPLEMENTATION AND EVALUATION OF THE FIELDWORK PROGRAMME

5.1 INTRODUCTION

This chapter describes the processes I was involved in, in implementing and evaluating the "School Trail" which was one aspect of the overall fieldwork programme. The chapter analyzes the research process as well as the responses to the process.

At the onset, the following aspects must be highlighted:

- i. It was recognized that the research process, and what eventually emerged, was contrived;
- ii. The contrived nature was due to the change in the location of the research brought about by chaotic conditions in township education (discussed in Chapter 2). The research was initiated in response to identified needs evident amongst geography student teachers. By the time the research was implemented, a Resource Pack and a fieldwork programme had been developed, however, I had no research population. What ought to have been an empowering process, sustainable and collaborative in nature did not materialize. This made the research process contrived. It was not the methodology that was at fault nor was the spirit of the research questionable. The problem was: doing research as an outsider instead of empowering respondents. Consequently, it transpired that, in the research, I spoke on their behalf (Janse van Rensburg, 1993).

In spite of the abovementioned negative factors, the following benefits emerged from the study:

- i. The township landscape was found to have value as a fieldwork site;
- ii. The fieldwork methodology was able to empower;
- iii. Through fieldwork, issues of relevance and suitability in school geography could be addressed;
- iv. Useable resource material applicable in a township context were developed; and
- v. A module of the fieldwork programme was tested in the field.

Despite the abovementioned negative factors, it was, therefore, felt that the positive effects of the research should not be allowed to be obscured. Hence, in the light of the overview given, it was felt that there was merit in the research.

5.2 DEVELOPING RELATIONSHIPS

The problems described in Chapter 3 in terms of the research location, necessitated the construction of relationships, which are essential to the successful implementation of an action research programme such as this.

A contact from ITEC assisted in locating the research in Duncan Village¹. During this stage, field units from the Resource Pack were considered, debated and finally a selection was made from the fieldwork programme. During this stage I was assisted by my collaborative partner and the non-participant observer.

Before the fieldwork programme could be implemented, the school closed because of internal difficulties. This situation lasted almost two months. After a frustrating waiting period (characterized by a daily expectation that the situation would be 'normalized'), my collaborative partner thought it best to introduce me to a geography teacher friend, teaching at another school. It was at this school that the fieldwork programme was implemented using a Std 9 class. This was approved by the principal. My entry into this school was problematic since I entered as a research specialist who simply wished to apply a research programme, developed elsewhere, and then withdraw².

The teacher at this second school never sat in on any of the "lessons" for more than five minutes (I had hoped to have used her as a participant observer). Yet, despite my problematic entry into this school and the limited time spent with pupils, pupils accepted me and seemed to be eager to start the programme. My inability to communicate with them in their home language and their lack of confidence to speak English to an English-speaker did not allow the relationship to realize its full potential.

¹ I was informed that this school had been selected for its stability and discipline (The community had agreed to the locking of the school's gates during school hours to ensure that pupils attended classes. This measure had been implemented in an attempt to improve the end of the year matriculation results).

² In negotiating my entry into Duncan Village, my research was tied to my being willing to assist with Saturday classes at the first school. These classes never materialized.

Nevertheless, an open and pleasant atmosphere characterized our interaction.

The development of a trusting relationship (with principals, teachers and pupils) was essential to ensure the implementation of the fieldwork programme. These relationships did, however, tend to become weaker as I was forced to change from the College to the first school and then to a second school. Cordial relationships also had to be fostered with community members who needed to be informed of my activity in the township and consulted on their insight into the nature of life in Duncan Village.

The relationships that developed during the research process were tentative, largely because of the existing conditions. There was, however, evidence of goodwill.

5.3 THE FIELDWORK EXPERIENCE

The following section describes the fieldwork experience from its introduction to its cessation. The 7-point plan suggested by Lewin (1946), Kemmis (1988), McNiff (1988) and McKernan (1991) and referred to in Chapter 4 was not implemented as discrete stages, instead there was a measure of overlap³ between certain phases.

³ For example, feedback on the "school trail" experience and the introduction to the "township trail" were planned to co-incide rather than occur as two discrete stages.

On meeting pupils for the first time, I was given the opportunity to convince them of the value of their participation in the research process. On the grounds of an expectation of benefiting geographically from their participation, pupils committed themselves to the research.

5.3.1 The "School Trail"

Prior to implementing the "School Trail" pupils were exposed to a number of exercises in order to teach them certain basic skills, to apply several fieldwork techniques and to expose them to various attitudes.

The introductory lesson occurred during the second meeting⁴ I had with pupils and lasted approximately one and a half hours. After this exposure pupils were ready to do the "School Trail".

5.3.1.1 Introductory phase

The switching of the research to the second school suited the study in two respects:

- i. The Std 9 syllabus has more potential for doing fieldwork than the Std 8 syllabus;
- ii. Std 9 pupils had a wider geographical knowledge allowing for a broader application of field exercises than the Std 8 group of pupils with no prior geographical exposure.

⁴ This research had to be conducted with pupils after their normal school day which ended at 14H30.

The preparatory phase was the most demanding phase since fieldwork was a new experience for all pupils. Forty pupils attended the preparatory teach-in session, almost the entire class. At the start of the session, pupils were all issued with introductory notes to the first module, the "School Trail".

The various concepts and techniques were methodically taught and reference was continually made to the need to apply skills. With the completion of the introductory lesson which included an overview of the tasks that had to be undertaken during the "School Trail", the fieldwork programme was implemented.

5.3.1.2 Actual fieldwork phase

The "School Trail" was undertaken on the third meeting with pupils. On this occasion the non-participant observer⁵ accompanied us. The session was conducted in the following way:

- i. Pupils were reminded of key principles, techniques and skills needed in the first exercise;
- ii. These were briefly explained and time was allowed for questions to be asked;
- iii. The first unit of the fieldwork programme was then undertaken;
- iv. After this had been completed, pupils returned to the

⁵ I presumed that the teacher would have attended the teach-in sessions and would, therefore, have provided a valuable input as a participant observer. This did not occur due to my lack of clarity in requesting her involvement and because she appeared to be busy each time I came to her Std 9 geography class.

The non-participant observer was a lecturer friend from an in-service training facility in the Ciskei. The task of this institution is to upgrade the skills of teachers in Mdantsane and the surrounding area by offering them regular up-grade courses.

classroom to finish off their field work and to hear the brief for the second exercise.

This sequence was continued until all six units had been completed.

Only fourteen of the original group plus two 'new' pupils completed the "School Trail". The mood of the group was positive and pupils were eager to begin the exercises. I was informed that domestic commitments had kept the others away⁶.

The following issues, in tabulated form, serve as a record of my own observations made during the teach-in session, the actual field trip and as pupils completed their worksheets.

⁶ The geography teacher excused herself from the "School Trail" but we were joined by the principal during one of the exercises. He expressed delight at the conscientiousness of the pupils as they collected and recorded data.

TABLE 5.1
Observations made during the "School Trail"

U N I T	OBSERVATION	POSSIBLE EXPLANATION
1	I noticed that pupil had difficulty doing the field sketching & that few could draw competently.	Recent exposure to the concept of 'conceptual baggage' made me realize that difficulties were due to a lack of previous exposure & that with practice sketches would improve. My discussion could have been too quick, causing gaps in pupils' understanding.
2	Pupils appeared to be confident in completing this exercise.	No previous unfamiliar skill was required to complete this exercise. It posed no problems to pupils.
3	I felt this exercise was a bit boring.	The uniformity of the school environment which consisted only of grass, required pupils to methodically proceed with the measurement and recording of a vegetation profile.
4	Pupils worked together, each with their own job. Pupils had some difficulty in managing to read off angles but seemed to find the exercise a challenge.	Some refinement of the clinometer was necessary to ease the reading of angles.

5	Pupils seemed most comfortable when working in groups rather than independently. Pupils had no problem arriving at a collective value-based rating for the quality of the environment.	The fact that pupils appeared to be more secure when working in groups was noted.
6	This exercise was done most enthusiastically & a sense of empowerment was evident in the form of pride.	Pupils appeared to appreciate the more visible profile when doing this exercise. It is possible that pupils felt that they were doing something relevant in the real world.

From TABLE 5.1, the following were noticed:

- i. Pupils appeared to gain confidence by doing fieldwork exercises which required repetitive measurement and recording (i.e. Unit 3).
- ii. Pupils worked amicably together in groups without the evidence of there being any power struggles. It appeared that each pupil was assigned a specific task and that group members checked on each other.
- iii. Pupils performed tasks competently (except for Unit 1, field sketching). This encouraged a positive attitude towards doing fieldwork. Pupils appeared to enjoy doing the Unit 6 the most while Unit 5 generated much heated discussion.

Having completed the "School Trail" in just over two hours, a date was set with pupils for a follow-up session and to give them background information concerning the "Township Trail".

5.3.1.3 Follow-up phase

As a result of feedback from the non-participant observer, plus my own assessment on how the "School Trail" progressed, I planned to clarify certain aspects during the follow-up session (TABLE 5.2). This was necessary in order to improve subsequent fieldwork exercises. The following areas were identified as being problematic and I planned to address these concerns in the following manner:

TABLE 5.2 The ironing out of problems identified in the field	
PROBLEM	POSSIBLE SOLUTIONS
Field sketching	Clarify: the difference between 2-and 3-dimensional drawings & the purpose of using the grid framework to divide the view to ease drawing; to give pupils the opportunity to get more practice in drawing field sketches.
Soil classification	Provide pupils with a greater variety of soil samples to classify.
Measuring slopes	Adapt the clinimeter to simplify the reading of angles; adjust the protractor to read from 0 in the vertical to 90 horizontally. Pupils also need to be reminded that the measuring pole needs to be kept parallel to the plumb-line.

These issues were scheduled to be addressed during the follow-up session planned to coincide with the preparatory phase for the "Township Trail". This session never took place.

5.3.1.4 Cessation of the exercise

In confirming arrangements for the follow-up session, I was informed that pupils could not honour their commitment. This placed the programme on hold for two weeks. It was further delayed by another two weeks on account of the vacation period. Then a 'teacher go slow' campaign prevented contact with pupils. The SADTU-called strike delayed the research by a further few weeks. It was not possible to restart the programme after these delays since pupils were placed on an "8am to 5pm" study programme, with classes even on Saturdays. The final problem that prevented the research from being completed was the end of the year examinations which were scheduled to commence as early as the 27 October 1993. Pupils consequently wanted to make maximum use of their limited time for study purposes.

In the wake of the abovementioned problems, I had to accept the fact that I could not complete the fieldwork programme as envisaged. I, therefore, had to adapt the research by focusing on only one aspect of an overall fieldwork programme.

5.4 OVERALL EVALUATION OF THE FIELDWORK EXPERIENCE

In evaluating one aspect of the overall fieldwork experience, the "School Trail", one needs to acknowledge how the emphasis of the research was forced to change as a result of outside influences. In its final form, the research set out to test two issues:

- i. What opportunities existed for the implementation of a township fieldwork programme; and
- ii. To evaluate this implementation.

The Resource Pack and the Teacher's Manual were additional material introduced in an attempt to sustain the interest of township fieldwork, and were therefore not evaluated in the research.

The following discussion evaluates the development of fieldwork exercises, the fieldwork experience and the degree to which pupils were stimulated.

5.4.1 My own evaluation

My evaluation was a amalgam of what I learnt while "kid watching" (Van de Weghe, 1992) together with impressions gained during the research process.

5.4.1.1 The development of fieldwork units

A literature search of fieldwork experiences produced many examples of fieldwork being applied in the Developed World, a few examples contextualized within the Third World but nothing applicable to fieldwork amongst disadvantaged urbanites. The contextualization of field exercises and the selection of suitable units, therefore, had to be undertaken in consultation with my collaborative partner who had first-hand knowledge of township life, in the light of my past experience of doing fieldwork in a township context and after a number of site visits. Thereafter, the units were shown to the non-participant observer for his comments.

The fieldwork programme was conceived to develop sequentially. For example, the teach-in session was crucial for the development of a number of skills, techniques and values to ensure the fruitful undertaking of the "School trail". Exercises chosen for the "School Trail" formed the foundation for the subsequent "Township

Trail" (The criteria for the selection and subsequent justification of these units were discussed in Chapter 4).

5.4.1.2 A general overview

From field observations it became evident that some exercises were completed more successfully than others because of the nature of previous exposure required by those units. For example, exercises that required knowledge of a general kind (doing a traffic count) were completed more successfully than Unit 1. Field sketching tended to deflate pupil interest due to the fact that it required pupils to have mastered basic drawing skills before it could be successfully completed. Units 2 - 6, however, seemed to give pupils an immediate sense of confidence and a feeling of well-being.

TABLE 5.3 summarizes the nature of experiences required for the completion of each unit of the "School Trail".

TABLE 5.3 Background understanding needed to complete units	
UNIT	PREVIOUS EXPERIENCE NEEDED
1	Prior drawing skills are an advantage since sketches improve with subsequent practice.
2	None, both classification systems are straight forward and user friendly.
3	Reading angles from a protractor.
4	Not essential
5	None
6	Nil

Recent unpublished research (Boqwana, 1992; Adonis, 1992) has shown that particular field activities succeed because certain prior knowledge that is needed for the completion of a task has already been acquired by the participants. This prior knowledge is referred to as 'conceptual baggage'. On the other hand, other pupils do not succeed with these same tasks simply because this conceptual knowledge is not part of their prior 'baggage'. The same issue applies to different field exercises. For example, field sketching was the only exercise that required prior knowledge and/or skill that pupils might not have acquired previously. Pupils consequently experienced a measure of difficulty in doing field sketching.

This insight articulated what I intuitively felt from previous experience of teaching field sketching to College students. An understanding is based on the application of Vygotsky's concept of "scaffolding instructions" (discussed in Chapter 2). I came to believe that the exposure was more important than the immediate mastering of the skill. In doing field sketching, I provided students with the opportunity to draw sketches, gave them individual assistance in the field and exposed them to sketching various landscapes. With practice, their end results improved.

In classifying soils, surveying slopes and doing a vegetation transect, pupils appeared to be assertive and confident. These units appeared to have matched pupil ability to their interest.

Group work was valuable since pupils gained support and encouragement from each other. In determining the quality of the environment, the need for group consensus on scores for each category ensured debate which resulted in the recording of realistic scores.

The traffic count exercise was done most enthusiastically. The higher public profile seemed to spur pupils on. Also, the notion that they were generating data they understood and that geography could be applied in the real world made pupils positive about this exercise.

In the teaching environment there is often a gap between where pupils are and where the teacher wants them to be. This is especially evident in cross-cultural work. In the context of township education, cultural deprivation places pupils at a distinct disadvantage when it comes to mastering certain aspects in the syllabus. Similarly, the socialization process evident in townships emphasizes social interaction more highly than skills like drawing, colouring in and cutting out. Problems related to how one's culture influences what one knows cannot be addressed simply through a one-off intervention.

5.4.1.3 Comments on teacher and pupil empowerment

In this research I was engaged in "kid watching"⁷ (Van de Weghe, 1992, p51) by observing and monitoring classroom activities. In this way a database was developed with empowering consequences for myself, since I was in a position to say: "I know this works: Let me show you to illustrate what I mean" (Van de Weghe, 1992, p51). Since teacher participation in the research was limited, teacher empowerment did not occur. The only empowerment possible is if teachers make use of the Resource Pack and the Teacher's Manual and undertake field exercises in the township. This would hopefully result in their asking probing questions, listening, observing and taking notes. In this way, empowerment could be realized.

My input⁸ which lasted just over three and a half hours, was so marginal that it is irrelevant to determine whether pupil empowerment occurred as a result of doing fieldwork. For fieldwork to have a challenging and lasting effect, it is necessary to expose pupils continually to this approach and not use fieldwork as a one-off exercise introduced by an outsider. Furthermore, it is difficult to empower; empowerment is not an outside person giving a voice to people but the people themselves finding their own voice. Stated differently, empowerment in an educational sense is not something that is given but something that rather emerges as people discover for themselves and as they interact with others. True empowerment occurs when it is difficult to assess "who is empowering whom?". Sentiments

⁷ 'Kid watching' occurs when teachers interact with their pupils and monitor class activities in order to better understand the nature of teaching.

⁸ The first meeting lasted about 10 minutes, the second which consisted of an introduction to fieldwork, a little over an hour and a half and the third meeting, the "school trail", lasted just over two hours.

raised by this question are developed by Janse van Rensburg (1993, p1):

To the Well-Intentioned: You say you would like to give me a voice. I think you mean that you would like to hear me speak. If so, don't shout at me, and don't stare at me in silence. No one-way communications from above, no facilitation for fake ownership. Converse with me. Really listen, and really talk. No more monologues from the rulers, no more expert speeches failing to reform. No more silences from the margins, or poorly articulated mumblings. You and I both need to develop our voices.

Having discussed my evaluation of the implemented fieldwork programme, attention focuses on the evaluation by the non-participant observer.

5.4.2 Findings of the non-participant observer

The following comments were made by the non-participant observer:

5.4.2.1 Fieldwork units

Soon after developing the various fieldwork units in collaboration with my partner and drawing on past experience of township fieldwork, the non-participant observer was asked to comment on these units. This was done since the non-participant observer had served at an in-service training institution in the Ciskei for a number of years. He was consequently acquainted with fieldwork and had experience to assess suitable levels at which to pitch both the pupils' handouts as well as the Manual for teachers. His input was valuable and ensured the refinement of a number of field units.

In their final form, the non-participant observer found the set of exercises to be "most relevant and concise" and that they formed an adequate foundation for the later "Township Trail". He attributed a score of 172 out of a possible 180 for the development of various field exercises (APPENDIX 5.1).

5.4.2.2 The fieldwork experience

Time was spent with the non-participant observer discussing and re-defining the observation schedule prior to its use, to ensure that both parties shared a common understanding of what was required.

In his observations, the non-participant observer identified three areas of concern:

- i. Concern was directed at the limited reference made to the relevance of fieldwork and its application to the real world.

This occurred during the introductory/preparatory phase when time was taken to provide a contextual framework for doing fieldwork. In seeking the involvement of pupils in the fieldwork programme, it was necessary to convince them of what gains they could expect to derive from their participation. The value of fieldwork was, consequently, stressed at this stage rather than during the "School Trail" itself when time was at a premium. Adjustment ought to have occurred in the observation schedule.

- ii. The non-participant observer identified that pupils had particular difficulties in doing field sketching. His detailed comments in this regard are contained in APPENDIX 5.1. In his concluding comments he mentioned that he felt that more time was required to teach this concept than was warranted by the research. In the light of these comments, further clarification was planned during the subsequent feedback session.
- iii. The non-participant observer identified an average level of pupil enthusiasm and interest; he attributed this to possible shyness on the part of pupils. His observation reflected the tentative nature of relationships between myself and pupils.

5.4.2.3 Stimulating and empowering pupils

In assessing the level to which pupils were stimulated and/or empowered, the non-participant observer made the following comments concerning 'teacher-pupil interaction':

- i. An average rating to pupils' enthusiasm/interest and spontaneity;
- ii. Mention was made that it was difficult to differentiate between shyness and a lack of interest on the part of pupils; and
- iii. The research was commended for its involvement of pupils.

From observations made over a limited period in the research process, it is not possible to get a clear picture as to what the impact this brief exposure to fieldwork had on pupils. What was reflected was that pupils were actively engaged in exercises and that the pitching of these exercises appeared to be at a suitable level for their comprehension.

5.4.3 The research's level of reliability and validity

In Chapter 3 reference was made to Weir's (1986) criteria for judging the level of reliability/validity of research. In the subsequent section, an analysis is given of this research's reliability/validity in terms of these criteria.

The research reflects a high degree of agreement between observations made by the non-participant observer and those made by myself. In part this was due to the fact that a consistent methodology was applied throughout the research. For example, the observation schedule (APPENDIX 5.1) was negotiated with the non-participant observer prior to its use; and the fieldwork units of the overall fieldwork programme had either been previously tested or were developed in consultation with my collaborative partner and the non-participant observer.

The way in which the research developed was due to circumstances beyond my control. Initially, the interaction with my students revealed a need to encourage fieldwork in an attempt to promote greater interest and understanding of geography. The research, however, ended up being applied to a class of Std 9 pupils in an attempt to improve my understanding of township education and the practice of teaching geography. As a result of these changes, the level of co-operation evident in the research needs to be assessed from the onset of the research and include all the mutations that occurred en route. I believe that when this is done, a high level of co-operation is evident.

Having raised the most significant aspects relating to reliability, attention is focused on validity.

Internal validity was established by:

- i. Expressing issues that could influence the study in its various situations;
- ii. Describing in-depth reasoning throughout the research;
- iii. Justifying assumptions; and
- iv. Using triangulation techniques (Weirsmas, 1986).

External validity is concerned with the generalization that accompanied the research. Goetz and Le Compte (in Weirsmas, 1986, p255) have identified the issue as one of needing to "demonstrate the typicality of a phenomena or the extent to which it compares and contrasts along relevant dimensions with other phenomena".

Since the research underwent several changes from its inception to its implementation⁹, I attempted to describe the chosen methodology clearly by identifying and discussing the data collection processes, as well as giving a retrospective account of how data was scrutinized and synthesized. This was necessary since external reliability depends upon the potential of subsequent research to construct original analysis strategies to ensure replacement (McKernan, 1991; McNiff, 1988). By specifying the conditions of the setting, as well as the methodology that was utilized, a base was created allowing for comparison (or lack thereof) to occur.

Validity would have been increased if multi-site studies had been undertaken. The nature and scope of a half-thesis, however, prevented this from occurring. As a result, it cannot be categorically stated that the findings of this research would be consistent across a number of studies. The research, by its very nature, has illustrated a noticeable generalization level. This is largely due to the fact that townships are similar in terms of their squalor, drabness, lack of services, high level of overcrowding, unemployment and social problems.

I am aware that absolute reliability and validity is impossible to attain in any research. Consequently, I have attempted to establish a careful balance of the variables and effects operating in the context of this research.

⁹ The research was switched from Mdantsane to Duncan Village; from a teachers' training college to a high school, and then to another. In spite of these changes, the focus remained the same: an endeavour to improve geographical understanding by undertaking fieldwork in a township setting.

5.4.4 Concluding comments

While doing the last exercise, the traffic count (which was some distance away from the school and on a busy road), I met the geography teacher who appeared to be uneasy about our doing fieldwork in the township. I attributed this to a concern for my safety¹⁰. The non-participant observer was not comfortable walking to the site of this exercise and preferred to drive to the survey point. In spite of my initial nervousness, I was not aware of any negative attitudes directed towards me or the group as we walked to the site for the survey. I felt safe in the company of these enthusiastic pupils. I felt that their positive attitude about doing fieldwork was evident for township folk to see.

5.5 SUMMARY

My belief in doing township fieldwork was based upon first-hand experience of sensing an element of empowerment amongst students who had been exposed to fieldwork over a consistent length of time.

¹⁰ Several reported incidents of death, bodily harm and intimidation of white teachers in townships on the East Reef hit the media headlines, bringing a measure of fear to casual visitors to townships. I felt the 'fear' aspect more intensely than at any time during my eight years of working in the Ciskei. This was probably due to the fact that the Duncan Village terrain was unfamiliar to me and my acquaintance with pupils was poorly developed.

The research as a whole and the implementation of the fieldwork programme in Duncan Village, in particular, did not proceed smoothly. There were several disruptions to the programme and it was terminated prematurely. Nevertheless, pupils appeared to respond positively to fieldwork skills and techniques. Their confidence was especially evident in units that required no prior knowledge and where they could work in groups.

As has been previously mentioned, the nature of the research process made the study a contrived exercise. This highlighted a number of negative issues like the need for collaborative effort, the need to empower end-users and that research should not be undertaken by an 'outsider'. In spite of the negative factors that manifested themselves during the course of the research, these should not be allowed to overwhelm the positive value of the research. The fact was that out of the shambolic educational system found in townships, the research produced positive and useable resource material.

CHAPTER 6

SUMMARY, LIMITATIONS, RECOMMENDATIONS AND CONCLUSIONS

6.1 INTRODUCTION

This research set out to use fieldwork, based in the local environment of a township, in order to teach a more relevant geography. It was hoped that through the exposure to fieldwork, users would be empowered.

Central to the research was the need to make a case for township fieldwork. This was done by: highlighting theoretical considerations that have reduced township dwellers to the status of "marginal" people; current curricula and syllabi were found to be lacking and in need of reconstruction; and a literature review revealed no research pertaining to urban fieldwork amongst the poor. As a result of these points and the fact that most South African pupils live in townships, a case was made for township fieldwork.

Having previous experience of using the fieldwork approach in a township, I felt that in spite of obvious constraints, the D.E.T. syllabi provided opportunities for doing township fieldwork with pupils. Experience revealed that students showed a sense of empowerment after doing township fieldwork over an extended time period. As a result of this experience, an investigation was made into how fieldwork could be used as a vehicle to empower users.

In this research, five main activities were undertaken, namely:

- i. The investigation of the potential of doing township fieldwork.
- ii. The development of a Resource Pack consisting of a number of field exercises for use in the school grounds and in the wider township.
- iii. The selection, justification and development of a fieldwork programme consisting of a "School Trail" and a "Township Trail". Each unit in the fieldwork programme consisted of two parts, the first contained an introductory note while the second contained field sheets that had to be completed during the field trip by pupils.
- iv. To provide backup for the inexperienced teacher a Teacher's Manual was developed but not evaluated (APPENDIX 4.2).
- v. The implementation and testing of the "School Trail".

It was envisaged that the research process would have occurred at the same venue. This, however, did not occur due to circumstances beyond my control.

Having established that there was potential for undertaking township fieldwork, an investigation was made to establish whether it was viable to implement such a programme and, if so, to account for the reason why township fieldwork had not been implemented. Evidence suggested numerous factors mitigating against the doing of township fieldwork. The research urged that alternative strategies should be implemented in the midst of a chaotic educational system.

This was suggested in an attempt to lay a foundation for a future educational system, rather than to wait for calm before initiating alternative strategies. The rationale behind this thinking was that educational initiatives take time to be implemented and that a delay in initiating would mean a deferred time period before implementation could be expected.

Another aspect stressed was the various relationships that developed during the research process. Relationships were critical since the research sought to empower users as a result of doing fieldwork. Epistemological empowerment is, however, not something one does to people but rather something that occurs as a result of exposure and interaction, the asking of questions and the solving of problems. In this way a person increases in confidence and ability and so becomes empowered. Since the purpose of the research was to improve the practice of teaching geography, an action research approach was applied. The type of action research chosen was that of emancipatory action research since it emphasized the importance of empowering the disenfranchised. The value of an action research approach is that relationships and feedback remain central throughout the research process, allowing for continual modification to take place and allowing for multiple evaluation.

It needs to be stated that fieldwork is not seen as a meta-theory. Fieldwork is simply viewed as a useful approach to teach sections of the syllabus in a creative and participatory manner. Its benefit is that it can assist in empowering users.

6.2 HIGHLIGHTING KEY POINTS

The research commenced by recognizing that geography taught in township schools was irrelevant to the needs, interests and experiences of township pupils. This was in part due to society marginalizing the disadvantaged part of itself (this phenomena is evident throughout the world). Education has maintained the status quo (Adler, 1991) rather than empowering pupils.

Fieldwork is seen to be a compensatory teaching approach (Boqwana, 1991) that can address these issues. Although fieldwork has been a part of the syllabus for a number of years, it is not undertaken in township schools.

In Chapter 2, the following emerged:

- i. A literature review showed no record of research being done in fieldwork amongst urban poor.
- ii. A framework was sought for the epistemological empowerment of the disadvantaged by giving them a voice (Prawat, 1991).
- iii. The concept of empowerment was applied to teachers and pupils. The syllabus was then analyzed to seek out opportunities to empower users.
- iv. This gave rise to a call for curriculum reconstruction.
- v. Fieldwork was seen as an approach that addressed concerns regarding relevance, involved pupils actively and was based in the local environment.

Pertinent aspects of Chapter 3 were:

- i. Emancipatory action research was chosen as the research approach as it allowed for the intervention into a classroom situation in order to understand and improve the teaching of an aspect of geography.

- ii. A number of potential field sites were identified which resulted in the development of a Resource Pack. A selection of these exercises for testing in the field required the development of a fieldwork programme and a Teachers' Manual.

Out of Chapter 4 the following issues transpired:

- i. The implementation of fieldwork into a township context was problematic, nevertheless it was a viable strategy due to requirements in the D.E.T. syllabi and because of the potential educational advantages it offered.
- ii. Two modules were developed as part of the overall fieldwork programme, the "School-" and "township trails". Each exercise in these modules was supported by an 'Introductory note' and a 'Field worksheet'.
- iii. Preliminary evaluation identified the suitability of the fieldwork programme.

Chapter 5 commenced by describing the background to the implementation and evaluation of the fieldwork programme. This was done by acknowledging that the research process was contrived. Despite the contrived nature, a number of positive aspects emerged from the research that gave the process merit.

The major emphasis of the Chapter was:

- i. The implementation; and
- ii. The evaluation of a part of the overall fieldwork programme.

Implementation occurred after pupils had been exposed to an introductory lesson where they were given background information. The "School Trail" was evaluated by means of triangulation techniques. The fieldwork programme was, however, abandoned before its completion.

6.3 LIMITATIONS OF THE STUDY

A number of limitations presented themselves during the research process. They are briefly:

- i. The change in research context from using my own students to using a group of unknown pupils, as well as switching the location from a familiar townscape to an unfamiliar one, disrupted the continuity of the research. For example, trusted relationships were replaced with new contacts. As a result, delays were caused and the emphasis of the research had to be altered. These changes also influenced the integrity of the research since the likelihood of on-going initiatives into the township using a fieldwork approach were reduced with each change in setting as the level of direct participation and ownership decreased.
- ii. The switching of the fieldwork from one high school to another was disappointing since I lost the assistance of my collaborative partner in the process. His subsequent transfer to New Brighton, Port Elizabeth in the third term accounted for the lack of direct feedback from him. The teacher at the second school did not participate in the research, excusing herself each time I visited her class. Teacher empowerment as a result did not occur.

- iii. Valuable feedback could have been generated had STD 3 students given feedback on their experience of using the fieldwork approach. This was not possible due to my dismissal from the College.
- iv. The chaotic nature of schooling in the township disrupted and delayed the research.
- v. The research highlighted much goodwill but the chaotic nature of township education prevented pupils from being able to fulfill their commitment. This resulted in the premature termination of the fieldwork programme. The termination of the research prior to its completion limited the overall insight gained.
- vi. The research would have been strengthened had fieldwork been conducted in several townships. The scope of this research, however, did not warrant this.
- vii. There is a need for black teachers to articulate their own voice which is more authentic than when this is done by 'outsiders'.

6.4 RECOMMENDATIONS

In the light of issues raised in the research a number of recommendations are made. These recommendations have been discussed according to different time frames.

6.4.1 Short-term

Recommendations that should be immediately implemented are concerned with the need to do fieldwork in the township now. This is possible in the following ways:

- i. The printing¹¹ of the Resource Pack and the Teacher's Manual together with the overall fieldwork programme and the dissemination of these resource packs to schools and teacher training colleges. The dissemination could take place via professional teacher bodies, individual schools or through Circuit Offices.
- ii. The recognition of partisan treatment of issues concerning the dominant group over the muted group. As a result of this bias, affirmative action is required to redress imbalances¹². Little can be done at a grass roots level in the short-term except to acknowledge these issues and to work for their demise.
- iii. Model C schools should be encouraged to share fieldwork resources that they have developed over the years with disadvantaged schools. This could be done through a system of "twinning schools". Such relationships would greatly assist in redressing past discrimination.

¹¹ The nature of the printed matter is unimportant. Of greater importance is getting this information to potential users, ie. geography teachers in township schools.

¹² Imbalances have occurred as a result of: unequal distribution of resources; bias in the syllabi and textbooks that are used; poorly qualified teachers are employed in disadvantaged communities; and schools in these areas are over-crowded.

- iv. Conferences and workshops should be hosted in townships. For this to occur, the community needs to co-operate to create a climate free of violence. Township residents should be informed of the benefits of hosting such meetings in their local community.
- v. All teachers, including township teachers, must be encouraged to see themselves as curriculum developers as well as researchers capable of generating valuable insight into what happens in their classrooms and to share what initiatives they have undertaken with their pupils.

6.4.2 Medium-term

- i. Curriculum developers should be challenged to reassess syllabi in the light of current changes occurring in South Africa. Pressure groups should lobby for changes, writing memorandums and making suggestions apropos new syllabi.

Geography is in need of undergoing changes so that a more relevant subject, suited to address current issues in the changing fabric of South African life, evolves.

- ii. Publishers should be pressurized to have textbooks rewritten so that greater attention is paid to the needs of muted groups and less to those pertaining to the dominant group. Publishers should also be encouraged to include a number of fieldwork units into textbooks.

- iii. Serious effort needs to be made to upgrade the training given to black teachers. Student teachers must be exposed during their training to the content of geography as well as to fieldwork so that they can apply their theoretical knowledge to the context of the local environment.

Compulsory modules dealing with townships, need to be incorporated into teaching modules. There should also be hands-on training concerning fieldwork so that a positive attitude and greater confidence can be developed amongst teachers.

Lecturers at Colleges need to be made familiar with concepts related to fieldwork, so that they can continually adapt their knowledge to the context of the local environment.

- iv. Links need to be forged between geography and biology in the interest of undertaking environmentally-based fieldwork. Collective opportunities of doing fieldwork need to be capitalized upon. The best medium for this is the respective professional subject bodies.
- v. In-service training should include training given in the field.
- vi. During pre- and in-service training of teachers, the following aspects of fieldwork need to be covered: the identification of field sites; the development of key ideas around which exercises can be built; and the compilation of pupil worksheets for use during the fieldwork sessions.

In exposing teachers to fieldwork in a hands-on context, the following three stages should be followed: teachers should first be required to do the fieldwork exercises themselves; a group of pupils with a fieldwork specialist in charge could then do the activities, with teachers being non-participant observers. At a later stage, teachers could function as group leaders to groups of pupils completing field exercises. Such a programme would ensure that teachers would have the confidence and the experience to undertake fieldwork with their own classes.

- vii. A forum needs to be created where fieldwork specialists can share their expertise with teachers from disadvantaged communities.
- viii. From this contact, opportunities should be sought to get the specialist teacher working with teachers from disadvantaged communities to develop pertinent field units for use in the township.

6.4.3 Long-term

The following aspects will need substantial determination and time before they are likely to be implemented.

- i. Syllabi need to change and this change should be reflected by more open-ended and less First World orientated examination questions. Examinations should provide opportunities for the expression of township life when answering questions.

- ii. Having mooted for the establishment of a forum of teachers from advantaged schools working with their counterparts from disadvantaged schools as a medium-term goal, there is a need for non-township pupils to be exposed to the nature of townships by doing "township trails".

6.5 AREAS FOR FUTURE INVESTIGATION

In doing this research the following areas appear to be in need of further investigation:

- i. A study of fieldwork opportunities undertaken amongst the poor worldwide needs to be undertaken. Although a literature search revealed no recorded information, I feel that fieldwork must be done in the inner city areas of the U.K. and the ghettos of the United States. It would be of great interest to compare fieldwork units developed there in comparison to what is proposed for the township.
- ii. There is a need for the development of fieldwork units applicable to pupils at a primary level.
- iii. Research is needed to investigate the potential of other forms of learner-orientated teaching approaches for the empowerment of the disadvantaged.
- iv. A study needs to be undertaken to establish what topics interest township children and teenagers the most, so that geography can be adapted to accommodate their interests.

- v. A conference of leading geographers needs to be called to seek out consensus about how geography must change to reflect changes in our society for the benefit of the majority.

6.6 CONCLUSIONS

Due to the uninspiring nature of township education, ways need to be found to build up education so that, under a new dispensation, schools will quickly be restored to their role as centres of learning. In the interim, we cannot afford to do nothing. Taking no initiative to improve education in township schools because of internal difficulties is counter-productive. Waiting for a new dispensation and for things to settle down is also not acceptable. Now is the time to implement alternative approaches, when the need is greatest. This research has shown that fieldwork is such an alternative strategy that can play a vital role in stimulating pupils and contributing to a more effective climate for learning. It has been shown that a wealth of opportunities exist on which to base fieldwork exercises as well as much goodwill. It is thus my conviction that township education has inherent opportunities and possibilities for change.

The involvement of the teacher in doing fieldwork is, however, crucial to maintain interest and continuity. This fact became evident to me while teaching at the College. Similarly, had my collaborative partner who worked on developing some of the fieldwork programme been able to implement the programme at his school, pupils would have benefited due to his interest in fieldwork. The fieldwork programme was implemented at another school as a one-off experience.

As the frequency of field-related activities decreases and as the inter-action between pupils and their teacher becomes weaker, so does the empowering potential of fieldwork decrease. In other words, the value of fieldwork is dependent upon the sustained use of this approach as well as the use of a student-centred teaching approach.

In the light of the above statements, I am aware of the limitations of this research. Having experimented with various forms of fieldwork in a township context over a two- year period and having witnessed a measure of empowerment derived by these students, I decided to develop and test a part of the overall fieldwork programme¹³ in a high school. It is hoped that from the research the Teacher's Manual and the Resource Pack will be published.

¹³ The whole programme is made up of two modules: the "School Trail" and the "Township Trail" with further exercises contained in APPENDIX I.

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PERSONAL COMMUNICATIONS

The Black Sash, East London Office
 Corplan (Planning Consultants)
 Duncan Village Residents' Association
 Gompo Township Engineer
 Principals
 Social Worker
 Minister of Religion
 Teachers

APPENDICES

APPENDIX 2.1

THE ROLE AND VALUE OF FIELDWORK

Traditionally, the role and value of doing fieldwork has been:

- i. To assist pupils to gain a deeper understanding of the subject by means of its distinctive ideas, concepts and modes of enquiry. It promotes a holistic approach to thinking and problem-solving (Selmes, 1989);
- ii. To develop social skills through inter-personal interaction;
- iii. To introduce pupils to important human-environmental issues;
- iv. To develop pupils's working skills¹⁴, values and attitudes (Proctor, 1987; Stephenson & Burbridge, 1991). The development and refinement of such skills, values and attitudes is increasingly becoming a criterion to determine the value of a particular educational method (Hurry, 1989); and
- v. To promote an approach which makes use of local field sites to demonstrate a more global context (Trudgill et al, 1990).

(After GA Sixth Form-University Working Group, 1988).

¹⁴ Skills include the following: referencing, note taking, photo analysis, listening, sketching, graphing, the use of an atlas, sketch maps, interpretation, communication, hypothesizing etc.

APPENDIX 4.1

RESOURCE PACK FIELDWORK EXERCISES

The Resource Pack contains the following fieldwork exercises for use within the school grounds and within the township itself.

Exercises within the school grounds

1. Simple mapping
2. Field sketching
3. Weather watch
4. Pollution register
5. Looking for evidence of weathering
6. The ecology of paved areas
7. Examining the soil
8. The calculation of various slopes
9. Vegetation analysis
10. Quality of the environment
11. Pedestrian and traffic movement
12. Economic study on hawking
13. How well is your school placed?
14. Exercise on population and their movements

Exercises set within the context of the township

15. Valley transect: Slope analysis
16. Valley transect: Vegetation
17. Valley transect: Soil analysis
18. Valley transect: Infiltration rates
19. Valley transect: Micro-climate
20. Field sketching
21. Stream study
22. Shopping survey
23. Daily traffic flows
24. Capturing the character of an area
25. Township transect
26. Housing study
27. Quality of the environment

PART A: FIELDWORK EXERCISES WITHIN THE SCHOOL GROUNDS

UNIT 1: SIMPLE MAPPING

Introduction: Maps help you find your way around since they show the patterns of things, i.e. how things are spread out over the land, as well as physical features. Maps are often referred to as one of the geographer's tools. Maps are an important part of fieldwork. Everything on a map is several times smaller than it is in real life for the simple reason that the map would otherwise not fit onto a given piece of paper. For example, barbie dolls and toy cars are scale models of real life objects. Similarly, maps are models of real life situations - the only difference is their size.

General aim: The aim is to draw up a map of the school and its surroundings.

Specific aim: To gain experience in drawing a map.

Skills: Map orientation and identification, the use of scales, recording and drawing.

Method:

- i. Decide on an appropriate scale i.e. let 10 paces on the ground be represented by 1cm on the map.
- ii. Pace out the length of the outer perimeter (the position of the fence around the school); use the portion adjacent to a road to start from.
- iii. Note the shape of corners and sudden changes in the fence.
- iv. Convert the paces recorded for the fence to paper by noting that 10 paces on the ground are represented by 1cm on the map.
- v. Now mark in the position of buildings. Pace out the various lengths and record these measurements.
- vi. Relate the buildings to the fence by pacing out the distance between them.
- vii. In a similar way, position other facilities within the school's grounds.

Presentation: Plot in the buildings, play areas and any adjacent roads. Be sure to give your map a title, a scale and label buildings and roads.

Follow-up: The map will be used on several occasions to identify the location of tasks to be undertaken within the school premises.

UNIT 2: FIELD SKETCHING

Introduction: A field sketch is a drawing of a landscape or a landform made in the field. By drawing a field sketch, you need to look in detail at the landscape or features before you. Field sketching is an alternative to taking photographs. Unlike photographs which show all detail, field sketches only highlight the main features. The perspectives should, however, be recognized as being the same. Field sketches must have labels to indicate key features (Figure 1).

General aim: To gain experience in drawing field sketches.

Specific aims: To have the opportunity of drawing any field sketch of the school and its surroundings.

Skills: Identification of key features, drawing, proportions and labelling.

Method: Choose a perspective within the school grounds that you want to draw. Determine the frame for your sketch, i.e. what borders do you want to make - where will your sketch end on the left and right hand side and at the top and bottom? Within your framed area draw an imaginary line that divides the picture into half vertically and another line that does the same horizontally (Figure 2). Now draw in each quarter what you see within the frame. Label key features.

Note: Your sketch should show depth and should reflect only what is seen.

Presentation: Draw a labelled field sketch.

Analysis: Is the field sketch recognizable?

Follow-up: A field sketch can be used to draw many landscapes during a field trip, i.e. coastal features, river or buildings in the city.

(After Richardson & St.John, 1989, Sauvain, 1989)

UNIT 3: WEATHER WATCH

Introduction: The section on weather and climate is often difficult to understand. Difficulties arise from: the lack of equipment; the abstract nature of many concepts/terms; and, the mathematical and scientific nature of such studies. An effective way to overcome the above problems is to do fieldwork observations of the micro-climate of the school. In this way you will become familiar with weather instruments through the observation and recording of data, and in so doing, you will be better able to understand the environment.

General aim: To discover what factors influence micro-climate.

A)
Specific aim: To test the hypothesis that the northerly aspect of a building will be warmer than the southerly one.

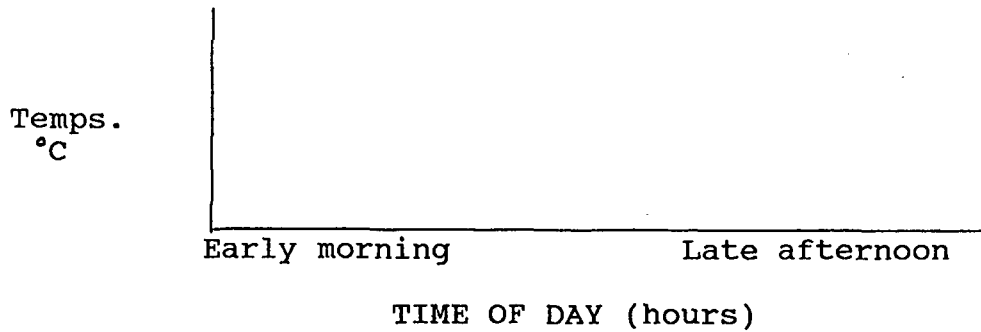
Skills: Hypothesis testing, reading instruments, recording, processing & analyzing data, drawing conclusions, drawing a graph, group work & communication skills.

Method: For the purposes of this task, the only equipment that is needed is a thermometer. Keep a record of the temperatures on the north and south sides of the school building for a whole day. The thermometer should be placed about 5m from the north side on a stool but shaded from direct sunlight. After about 5 minutes check the temperature and write it down. Do the same on the southern side. Take readings every hour from early in the morning until late afternoon.

Note the date and the general weather conditions, i.e. the cloud cover, wind speed, wet and dry bulb temperature.

Presentation: Use the provided axes to draw two line graphs to represent temperature for the north and south facing aspects.

VARIATION OF TEMPERATURES WITH ASPECT



Analysis: Is there a major difference between temperature readings from the north and south aspects? At what time of day is the difference most marked? How would other factors vary and so influence the micro-climate of the school? (Take each factor and briefly state how it would vary).

Follow-up: Devise other tests to show how other factors (not just aspect) change and so influence the micro-climate of a place.

(After Nettleship, 1987)

B)

Specific aim: To measure the approximate rate at which water is lost through evaporation from a water source.

Skills: Measuring, recording, analyzing, drawing conclusions

Method:

- i. Get yourself into a five-member group.
- ii. Each group must have a large open container that can be used as an evaporation pan. The container must not have slanting sides.
- iii. Place the container on the ground and fill it with water.
- iv. At regular intervals during the course of the day measure and record the depth of water. After taking each reading top-up the water to its original level.

- v. If the pan that was used is less than 3m in diameter the evaporation loss will be greater than from a large body of water since the sides, as they heat, will raise the water's temperature. To make an adjustment for this influence, reduce your readings by 25%.

Place Date

Time	Evaporation loss (mm)	Weather conditions	
		cloud cover	wind speed
8H00			
10H00			
12H00			
14H00			
16H00			

Presentation: Complete a matrix Table to highlight variations.

Analysis: From the Table completed above, what conclusions can you draw concerning the rate of evaporation and the time of day? What effect will the present weather have on your results?

Follow-up: Continue recordings over a longer period than a single day.

(After Lenon & Cleves, 1986)

C)

Specific aim: To determine what factors influence weather.

Skills: Measuring, recording, analyzing, drawing conclusions

Method:

- i. Stay in the same groups as for Unit 3B.
- ii. Each group should choose a number of sites within the school premises that appear to be different. The number of sites should coincide with the number of the same weather instruments available.
- iii. Read the various instruments, at the different sites, at the same time. Do these readings at regular intervals throughout the day. Keep a record of your readings.

TEMPERATURE VARIATION

Location:	A	B	C	D
1. Time				
2. Temperature (°C)				
3. Atmospheric pressure (H.Pa)				
4. Wind direction & speed (km/h)				
5. Cloud cover & type (eights)				
6. Visibility (km)				

Presentation: Complete a new matrix each time readings are taken during the day.

Analysis: The assumption on which this exercise is based is that since readings were done simultaneously, the results should be the same. Any differences that do occur are, therefore, as a result of differences in the landscape. Attempt to correlate why any of these differences occurred.

Follow-up: Extend this experiment to areas outside the school grounds: look at a valley or a shopping centre with a large paved area.
(After Lenon & Cleves, 1986)

D)

Other areas to test:

1. Find out the relationship between temperature, pressure and land-and sea-breezes.
2. Plot the dominant wind direction over a month.
3. Test whether the following are true: Low pressure is linked with rain; in summer high pressure brings bright sunny days while in winter frost and fog result; and thunderstorms are associated with cumulo-nimbus clouds.

(After Barton, 1985)

UNIT 4: POLLUTION REGISTER

Introduction: We all breathe air but the quality of the air we breathe varies greatly. Pollutants are emitted into the atmosphere through motor cars (exhaust fumes), factories, the burning of rubbish, fires, aerosols, dust etc.

General aim: The aim is to determine the direction from which most pollution at the school comes from.

Specific aim: Through the use of a simple "test", your group will be able to determine the level of pollution evident at your school and the dominant direction from which it comes.

Skills: Making of "equipment", interpreting, applying knowledge, making comparisons and attempting to give explanations.

Method: Take two pieces of graph paper and paste them onto opposite sides of a piece of cardboard so that the graph paper is rigid. Put vaseline on both pieces of graph paper. Fasten the cardboard with the graph paper onto a pole and erect the pole outside. Note the direction in which each piece of graph paper faces. After a number of hours remove the graphs and see which side has evidence of most pollution.

Do the same test with graph paper facing in different directions.

Presentation: Try and quantify these results by comparing both pieces of graph paper. Make use of the little blocks on the graph paper to do this.

Analysis: In which direction does most of the pollution come from? What activity could be responsible for this pollution? Can you identify the nature of the pollution collected? How important a role does dust play in this area? Why would this be so?

Follow-up: What can be done to reduce dust levels?

(After Law & Smith, 1990)

UNIT 5: LOOKING FOR EVIDENCE OF WEATHERING

Introduction: Weathering is the breaking up of materials due to contact with the atmosphere. There are two main types of weathering, physical and chemical. The former is caused due to stress created in rocks due to heating and cooling, wetting and drying etc. The latter occurs when minerals in rocks react to weak acids when it rains. The main factors influencing the rate of weathering are: climate, the rock material itself and local factors (like vegetation, depth of soil, speed of erosion and human activities etc.).

Since weathering takes place at very slow rates, quantitative measurements are only possible with expensive equipment. But, it is possible to make subjective assessments on weathering.

General aim: The aim is to discover whether there is evidence of weathering occurring within the school premises.

Specific aim: To examine the school buildings and rock surfaces for signs of weathering.

Skills: Observing, recording, using inventory sheet, sketching.

Method: Study Figure 3 and eliminate any reference to examples not relevant to Duncan Village's climate or physical features. In this way freeze-and-thaw and mechanical collapse can be eliminated. Pay special attention to the concepts of exfoliation, granular disintegration, oxidation and hydration.

Remember that due to the slow rate at which weathering occurs, you will have to look carefully at rocks and the brickwork and the cement of buildings. Also note the direction of dominant winds, aspect, evidence of dampness, the direction of the sea and industries, and the colour of rocks.

Presentation: Identify any evidence of weathering and attempt to sketch what you have noticed. Label your sketch.

Analysis: Refer to the Table provided: as this might provide you with key words.

Follow-up: You might like to consider what effect different pollutants will have on the weathering process.
(Law and Smith, 1990)

UNIT 6: THE ECOLOGY OF PAVED AREAS

Introduction: In the small cracks between paving stones/cement slabs one often finds organisms (both plant and animal) in spite of being continually tramped upon.

General aim: The aim of this Unit is to determine the influence of trampling on the flora and fauna within cracks and crevices.

Specific aim: To identify the characteristics of organisms occupying crevices and to determine what the impact of varying levels of traffic will have on these organisms.

Skills: Calculation, measurement, observation, analysis

Method: Choose two paved areas where there are crevices of approximately equal width. A busy paved area must be compared to a paved area that has little traffic. Consider a length of about 1m in each case. In each of the study areas:

- i. Determine, using a ruler, the length of plant cover growing in the crevices expressed as a percentage of the total length of the crevice
- ii. Count how many different kinds of plants can be recognized. How many of these plants are: a) mosses b) grasses and c) plants higher than grasses?
- iii. What is the maximum height of plants found in the crevices?
- iv. What kind of animals are present? Why are they found there? Remove plants and soil with a spade; hand sort on a piece of white paper.
- v. What activities are the animals engaged in?
- vi. How are the animals able to survive there?

CHARACTERISTICS OF TWO PAVED AREAS

	BUSY AREA	QUIET AREA
1.		
		
2.		
		
3.		
		
4.		
		
5.		
		
6.		
		

Presentation: Draw up a table to show the differences between plants and animals in the two locations.

Analysis: Does a clear pattern emerge between these two areas with differing rates of trampling?
Discuss the main findings that show that paved areas with heavy trampling differ from quiet areas.

Follow-up: Link concepts discussed here with soil infiltration rates and the factors that influence such rates.

(After Collins, 1984)

UNIT 7: EXAMINING THE SOIL

Introduction: An understanding of soil is important since soil supports life on earth. The relationship between soil, vegetation and climate is complicated. For example, the wrong use of soil or the destruction of vegetation can have disastrous results during flooding and drought conditions.

Soil starts from solid rock which is then broken down into tiny bits. To the soil is added organic matter - dead plants, roots and earthworms. Remember that water and air are found between sand particles.

A)

General aim: The aim is to determine the texture of the soil.

Specific aim: The texture of the soil will be determined by the "feel test" in the field and the "particle size analysis" back in the classroom.

Skills: Applying knowledge, comparing, sample collection, drawing of conclusions, graphing

Method: To determine soil texture using the "feel test", take a pinch of soil and rub it between your thumb and forefinger. How does it feel? Use Figure 4 to find out which applies to your soil - is it clay, sand or silt?

To test your field results take a sample of soil back to the classroom. The "particle size analysis" shows how much clay, sand and silt the soil sample contains. Put five tablespoons of dry, weighed soil into a glass jar nearly filled to the top with water. After screwing the top on tightly, shake the jar and allow the sediment to settle. After one or two days, measure the depth of each type of particle as it has settled in the jar. Then calculate the depth of each of the 3 particles and express these as a percentage of the whole jar.

Presentation: From the percentages determined from the sample in terms of clay, silt and sand content, draw a pie diagram.

Analysis: What kind of soil do you have: clay, sand, silt, clay loam, sand loam, silt loam or true loam? Why were the soil samples weighed and measured?

Follow-up: Determine how different soil types will influence infiltration.

Account for the possible reason why each soil sample was weighed prior to being placed in beakers containing water.

(After Barton, 1985; Sauvain, 1989)

B)

General aim: The aim is to indicate that plant cover and infiltration rates are related.

Specific aim: To prove that soil compaction influences plant growth and water infiltration into the soil.

Skills: Hypothesis testing, analysis, synthesis, recording

Method:

- i. Identify three sites, near/under a fence, in an open field and on a path leading to a gate.
- ii. Examine the plant community at each site and calculate the percentage plant cover per square meter per site.
- iii. Test soil compaction by measuring how far a pencil can be pushed into the ground with three light taps.

INFILTRATION VARIATION

	UNDER FENCE	OPEN FIELD	PATH TO GATE
% plant cover			
Penetration depth			

Presentation: Complete the Table to correlate percentage vegetation cover and the depth of penetration of the pencil for the three sites.

Analysis: What conclusions can you draw from this data? What will the likely effect be on each site when it rains heavily?

Follow-up: Determine the infiltration rates for the soil of the three different sites. What implication does this have for stock farming especially during times of drought and where over-stocking is a major problem?

(After Lenon & Cleves, 1986)

UNIT 8: CALCULATION OF VARIOUS SLOPES

Introduction: The slope of any site is important since it determines the ultimate end usage of the land. If slopes are steep, the slope can be used for a limited number of functions since the slope will be vulnerable to erosion. However, gentle slopes can be used by a greater variety of activities as the likelihood of erosion occurring is low.

General aim: By making use of a home-made clinometer (Figure 5), the steepness of a slope can be calculated.

Specific aim: The aim is to measure various slopes.

Method:

Proceed in the following manner:

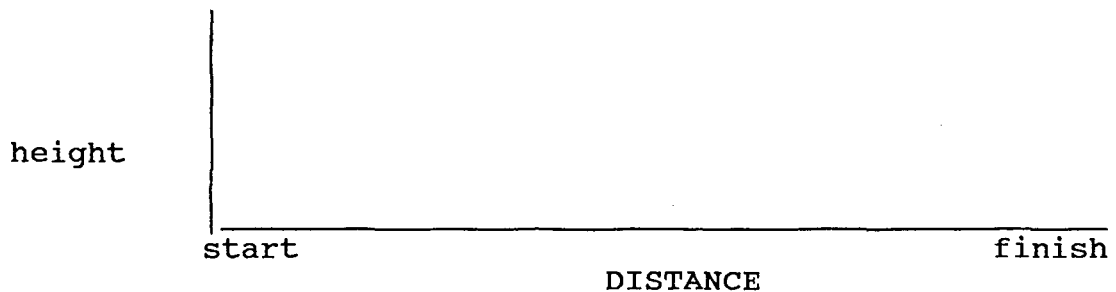
- i. Two people each hold a pole vertically with the end of the pole resting on the ground. The poles should be placed at both ends of the slope to be measured.
- ii. The clinometer is then viewed from a chosen height on one pole to the same level on the other pole and the angle of the slope is read off in degrees.
- iii. The distance between the poles is then measured. The accuracy of this method increases the shorter the distance between the poles.
- iv. Record data in the Table provided:

SLOPE MEASUREMENTS

Slope no.	Length of slope	Angle of slope
1		
2		
3		
4		
5		

Presentation: Plot the resulting measurements onto graph paper so that the slope can be constructed. It should be remembered that the length measurements are along the slope and not horizontally. Be sure to give your graph a heading and indicate the scale for your distances, i.e. 1cm is represented by 2m.

TITLE



Analysis: How prone to erosion will the slope you have just measured be when there are heavy rains? How will the vegetation influence erosion and how do different types of land use on a slope influence erosion?

Follow-up: Determine what slopes are suitable for the building of schools, shopping centres and low cost housing.

(After Lenon & Cleves, 1986)

UNIT 9: VEGETATION ANALYSIS

Introduction: Geographers are interested in vegetation since plants adapt and respond to their environment. The type and conditions of vegetation is influenced by the micro-climate, altitude, aspect, soil type and the activities of man and animals.

A)

General aim: The aim is to discover the variation of vegetation along a transect within the school grounds.

Specific aim: Draw a vegetation transect by identifying vegetation samples along a route.

Skills: Observing, recording, graph drawing, sketching

Method:

- i. Choose three routes (straight lines of approximately 30m in length) that can be used to provide insight into how vegetation changes over a distance.
- ii. Show the routes on your map of the school grounds.
- iii. Make a key: i.e. T tree; B bush/shrubs; and G grass.
- iv. From your starting point walk, note and record the vegetation that occurs every 1m along the route.
- v. See Figure 6 for an example of how a finished graph should look.

Complete the provided matrix that links vegetation to soil and to the micro-climate.

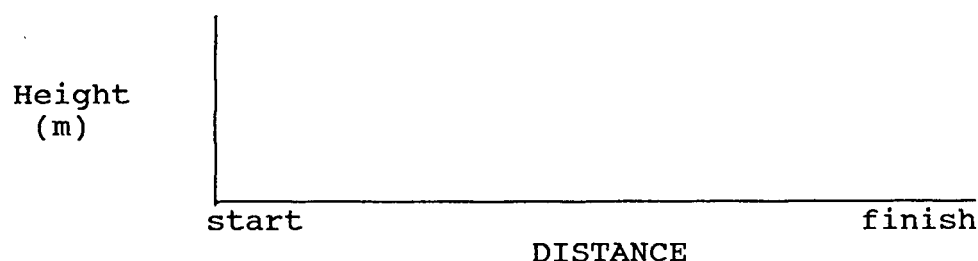
MICRO-CLIMATIC VARIATIONS

	FEATURES:	ROUTES:		
		A	B	C
1.	Highest plant (m)	.....	.....	.....
2.	Density (high/medium/low)	.....	.....	.....
3.	No. of species	.....	.....	.....
4.	Plant adaption	.....	.....	.....
5.	Soil texture	.....	.....	.....
6.	Soil moisture	.....	.....	.....

Presentation: Using the records of vegetation for each transect draw one transect that shows the greatest variation using the following guidelines:

On the axes provided indicate the vegetation identified by drawing a diagram at the respective points and indicate the relevant height for plants along the transect.

VEGETATION TRANSECT



Analysis: Comment on the distribution of vegetation along the transect drawn. Attempt to identify what factors have caused vegetation to vary.

Follow-up: By drawing a transect for the other two positions, a clearer picture will emerge as to the vegetation within the school grounds.
(After Lenon & Cleves, 1986; Nettleship, 1987)

B)

General aim: The aim is to investigate what amount of water is lost due to transpiration.

Specific aim: To determine the amount of transpiration that occurs from a leafy plant during a day.

Skills: Measurement, recording, applying knowledge

Method: Select a leafy branch and cover it with a large clear plastic bag (without holes). Tie the base of the bag to seal it. After a day return with a measuring cylinder and carefully measure the amount of water collected inside the bag.

Presentation: The total volume recorded then needs to be related to the prevailing weather conditions, especially temperature and the amount of sunlight.

Analysis: Discuss what influence the protection of leaves against the drying effect of winds has on the validity of this experiment.

Follow-up: Do the experiment for different types of vegetation where the size of leaf varies and during different weather conditions.
(After Lenon & Cleves, 1986)

UNIT 10: QUALITY OF THE ENVIRONMENT

Introduction: The character of an area can be assessed by rating the environment using a simple five point scheme. This implies the making of value judgments. The rating scheme enables results to be quantified.

General aim: The aim is to discover what the quality of the school environment is.

Specific aim: To assess the quality of the school environment and to establish what role people play in determining environmental quality.

Skills: Clarify values/responsibility, graphing, using point classification system, completing a matrix.

Method: In your groups walk around the school grounds to get a picture of the entire school area. During this time consider the various categories included in the check sheets.

After this has been done, complete the check sheets. Circle the most appropriate rating for each characteristic.

ENVIRONMENTAL QUALITY SCORE SHEET

CHARACTERISTICS	RATINGS					
	poor	1	2	3	4	5 good
Litter		1	2	3	4	5
Broken windows		1	2	3	4	5
Peeling paint		1	2	3	4	5
Broken roof/eaves		1	2	3	4	5
Paved areas		1	2	3	4	5
Pollution/smoke		1	2	3	4	5
Trees/shrubs		1	2	3	4	5
Noise		1	2	3	4	5
Overall maintenance		1	2	3	4	5
Fencing		1	2	3	4	5

Presentation: Complete the matrix and draw a graph for the ten categories with their respective scores. Use the horizontal axis for the categories and the vertical scale for the rating of quality. Label the graph.

TITLE

R A T I N G S	5										
	4										
	3										
	2										
	1										
		L I T T E R	B R O K E N P A N E S	P E E L I N G P A I N T	B R O K E N R O O F	P A V E D A R E A S	S M O K E / S M O G	T R E E S / S H R U B S	N O I S E	M A I N T E N A N C E	F E N C I N G

Analysis: Do people seem to enjoy the school environment? What are your own likes and dislikes about this area? Who is responsible for the quality of the school grounds? What can be done to improve it?

Follow-up: Make comparative studies of other school premises and try to account for any major differences.
(Nettleship, 1987)

UNIT 11: PEDESTRIAN AND TRAFFIC MOVEMENT

Introduction: Traffic is an interesting topic since it causes numerous problems: traffic jams, pollution, noise, danger, while also providing opportunities for travel.

General aim: The aim is to determine if there is conflict between pedestrians and traffic immediately outside the school gate.

Specific aim: To determine whether there is a need for scholar patrol marshals or robots immediately outside the school gate.

Skills: Raises issues of responsibility, duty, counting and recording, drawing of schematic diagrams, drawing up of tables, interpretation of results and the solving of problems.

Method: To establish if the above need exists, undertake a traffic count. Do this count before, during and after school. Each group must have two members recording pedestrians entering the school gate from both directions i.e. one on either side of the gate. Traffic should also be recorded on both sides of the gate to account for staff entering the premises by car. The last member should also be allocated to note if there are any cases where pedestrians are endangered by traffic in the proximity of the main gate and to keep a time check for recording purposes.

Draw up a schedule like the one provided and fill in the particulars. Every time a vehicle or pedestrian passes the recorder, a mark is made in the appropriate column. When the 5th vehicle or pedestrian is recorded, draw a diagonal line through the previous four lines i.e. 5 vehicles are recorded as .

Undertake the count every 15 minutes for a 5 minute period. The count should cover a total of 45 minutes immediately before school starts and 45 minutes after the last bell of the day rings. Also do a reading during the long lunch break.

SCHEDULE:	
PEDESTRIANS	VEHICLES
From EL/From Mdantsane	From EL/From Mdantsane

Be sure to differentiate the direction of movement of vehicles and pedestrians.

TRAFFIC FLOW OUTSIDE SCHOOL

	TIME	TOTAL NO. VEHICLES	TOTAL NO. PEDESTRIANS
	1. ....	.....	.....
AM	2. ....	.....	.....
	3. ....	.....	.....
	4. ....	.....	.....
BREAK	5. ....	.....	.....
	6. ....	.....	.....
	7. ....	.....	.....
PM	8. ....	.....	.....
	9. ....	.....	.....

City	Mdantsane
SCHOOL	

Presentation: Complete the provided Tables to record your results. From these results draw a diagram to identify generalized patterns for pedestrian and traffic flow before and after school

Analysis: Is there evidence of conflict between pedestrians and vehicular traffic? When is the problem most serious? What action would you regard as being most appropriate?

Follow-up: Do the survey over a longer period to verify your results. Also undertake a survey (questionnaire) of pupils, hawkers and taxi drivers to determine their feeling towards a controlled crossing. If your results point to the need of a controlled crossing point then see the Residents' Association (DVRA) and the Town Clerk or Engineer.

(After Barton, 1985)

UNIT 12: ECONOMIC STUDY ON HAWKERS

Introduction: The informal sector is increasingly accounting for a greater percentage of money generated within the country and providing more and more people with a livelihood. The success story of the Black Taxi Association is noteworthy. Since informal trading is undertaken by disadvantaged people, hawking needs to be seen as an opportunity of drawing these people into the economic life of our towns and cities.

General aim: The aim is to gain a better understanding of the informal sector.

Specific aim: Through interviewing hawkers an attempt will be made to better understand the conditions under which they work and their daily problems in staying in business.

Skills: Interviewing, recording and writing

Method: Each group must interview a hawker outside the school or nearby. Approach the seller and introduce yourself. Tell her that you are undertaking a survey of hawkers in order that you might better understand how the informal sector operates. Ask her if she minds answering a few questions and assure her of anonymity and that the information is only of academic interest.

Conduct the interview by asking the following:

1. Note the produce that she is selling
.....
2. How long have you been selling here outside the school?
.....years
3. From where do you purchase your goods?
.....

4. How far away is this place? km
5. How far away do you live from the school?
.....km
6. What form of transport do you use in making your purchases and how do you get to work each day?
.....
7. What do you do with the produce you don't sell each day?
.....
.....
8. What are the best and worst days for business?
.....
9. Why is this so?
10. What do you do when the school is on holiday?
.....
11. What is your biggest problem?
12. In ten years time what are you hoping to sell or do?
.....

Presentation: Use the responses obtained from the interview to write a profile on the person your group interviewed.

Analysis: Try and establish for what reason the school has been chosen as a site to do business from. What problems has the hawker overcome?

Follow-up: Interview other hawkers and see if there is any major differences that arise due to the products sold and the locational position.

Establish what rules exist about trading set up by the hawkers themselves to regulate their business.

UNIT 13: HOW WELL IS YOUR SCHOOL PLACED?

Introduction: The location of services like schools and jobs relative to where people live is important since it determines the distances you and other people have to travel each day. Primary schools are planned so that they serve the immediate neighbourhood and so that young children can walk to school. High schools draw pupils from a wider area while Colleges/Universities draw their students from a still wider region.

General aim: The aim is to establish how conveniently the school is located to the pupils who attend it.

Specific aim: By undertaking a survey of all members in the geography class, it will be seen how conveniently the school is located for them.

Skills: Responding to survey, analyze, synthesize, graphing, solving of a problem.

Method: All students must answer three survey questions:
i. How far do you live from school? km
ii. In what direction is your home from school?
(i.e. N, S, E, W, NE, NW, SE, SW)
iii. How long does it take you to get to school?
..... minutes

Pupils must write their responses on the chalkboard. Each group then needs to draw two diagrams as shown below - the one to represent distance together with direction and the other to indicate direction and time.

Figure 7 provides an example of such a diagram.

Collect and organize data for your class on the three questions given. Draw a diagram by plotting details on the axes provided.

Presentation: Complete the distance and time diagrams that show a number of lines radiating from the centre in accordance with the distance travelled and the time taken to reach school.

Analysis: Answer the following questions by looking at the two diagrams you have just drawn:

- i. Is the spread of pupils around the school even?
Or is there a clustering? Account for the pattern observed.
- ii. Do pupils live close to the school or not? Estimate the proportion living within easy walking distance of the school.
- iii. Are there pupils who live a long distance from school but do not spend much time travelling? How is this possible?
- iv. What is the average time taken to get to school?

Follow-up: The survey can be extended to include all pupils and staff.

(After Fien et al, 1984; Nettleship, 1987)

UNIT 14: EXERCISE ON POPULATION AND THEIR MOVEMENTS

General aim: In this exercise you are required to gather information pertaining to your own household in an effort to better understand the structure of population and the movement of people.

Specific aim: To gather information about the size, age and sex structure as well as the economic activities within the household.

Skills: Completion of matrix, collecting data, analyzing of data

Method: Each pupil is required to tabulate data concerning his/her household (people living on the same erf). No names are required hence privacy is guaranteed. Make an appropriate mark in the provided Table for each person in the household. Add to the list if necessary.

POPULATION DETAILS

PERSON	SEX		AGE				
	M	F	0-4	5-19	20-39	40-59	+65
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							
11.							

OCCUPATION

Child Scholar Student Unemployed Working Pension

1.	.....	.....	.....	.....	.....	.....	.....
2.	.....	.....	.....	.....	.....	.....	.....
3.	.....	.....	.....	.....	.....	.....	.....
4.	.....	.....	.....	.....	.....	.....	.....
5.	.....	.....	.....	.....	.....	.....	.....
6.	.....	.....	.....	.....	.....	.....	.....
7.	.....	.....	.....	.....	.....	.....	.....
8.	.....	.....	.....	.....	.....	.....	.....
9.	.....	.....	.....	.....	.....	.....	.....
10.	.....	.....	.....	.....	.....	.....	.....
11.	.....	.....	.....	.....	.....	.....	.....

EMPLOYMENT

FORMAL & INFORMAL SECTORS

No.	what kind of work?	where?	time to get to work?	cost to get to work?
—				
—				
—				
—				
—				
—				
—				
—				

CHANGES IN PAST 5 YEARS

Births (numbers)
.....
New arrivals (numbers)
 from where?

Departures (numbers)
 to where?

Deaths (numbers)
.....

Presentation: Complete the Tables above.

Analysis: Write up a profile of your household identifying the economically active (those working), the dependents (all those not working) and state the economic level of the household.

Follow-up: Combine all returns for the class and draw up a population pyramid and make comments on the employment sector? What do these figures indicate about the number of children, the size of the school-going population, the number of unemployed, the percentage employed and the elderly?

By studying the data on employment categories identified, what can be said about the state of the economy in this part of the country?

PART 2: FIELDWORK EXERCISES WITHIN THE TOWNSHIP

UNIT 15: VALLEY TRANSECT: SLOPE SURVEYING

Introduction: The slope of any site is important since it determines the ultimate end usage of the land. If slopes are steep, the slope can only be used for a limited number of uses since the slope will be vulnerable to erosion. However, gentle slopes are able to be utilized by a greater variety of possibilities as the likelihood of erosion occurring is low.

General aim: By making use of a home-made clinometer, a slope's angle can be calculated.

Specific aim: The aim is to measure various slopes.

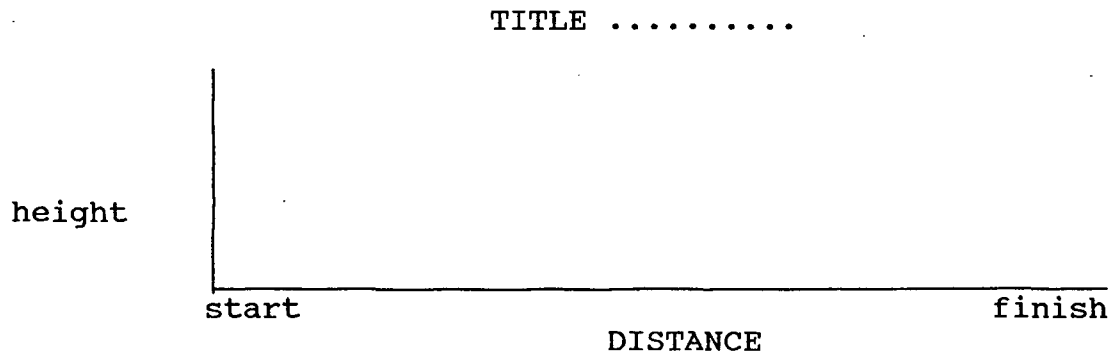
Method: Details to make a clinometer are given in Unit 8.

- i. Two people need to each hold a pole vertically with the end of each pole resting on the ground. The poles should be placed at both ends of the slope to be measured.
- ii. The clinometer is then viewed from a chosen height on one pole to the same level on the other pole and the angle of the slope is read off in degrees.
- iii. The distance between the poles is then measured. The accuracy of this method is influenced by the distance between the poles, i.e. accuracy increases the shorter the distance between the poles.
- iv. Record data in the Table provided:

Slope measurements

Slope no.	Length of slope	Angle of slope
1		
2		
3		
4		
5		

Presentation: Plot the resulting measurements onto the provided axes so that the slope can be constructed. It should be remembered that the length measurements are along the slope and not horizontally. Be sure to give your graph a heading and indicate the scale for your distances.



Analysis: How prone to erosion will the slope you have just measured be when heavy rains fall? How will the vegetation, different types of land use and slope variations influence the rate of erosion?

Follow-up: Do some research to determine what slopes are suitable for the building of schools, shopping centres and low cost housing.
(After Lenon & Cleves, 1986)

UNIT 16: VALLEY TRANSECT - VEGETATION

General aim: The aim is to discover the variation of vegetation along a transect from the bottom of the valley to the crest of the hill.

Specific aim: Draw a vegetation transect by identifying vegetation samples along a route.

Skills: Observing, recording, graph drawing, sketching

Method: Draw a transect from the base of the valley to the crest of the hill. Choose the slope you wish to draw a profile of.

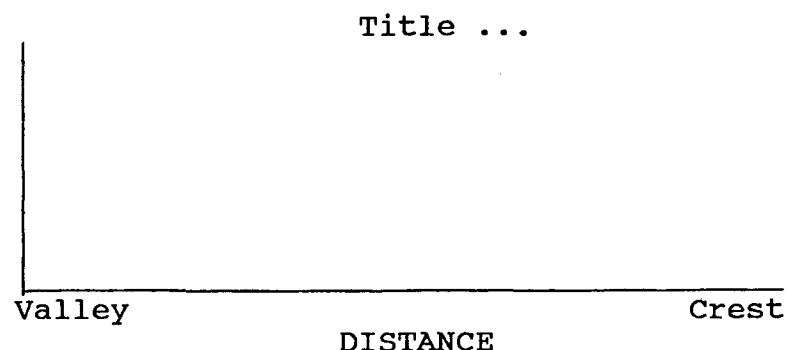
Make use of the same key used in the drawing of a vegetation transect within the school grounds, i.e. T tree; B bush/shrubs; and G grass.

Complete the provided matrix that links vegetation to soil and to the micro-climate.

VEGETATION PROFILE			
FEATURES:	ROUTES		
	A	B	C
1. Highest plant (m)			
2. Density (high/medium/dense)			
3. No. of species			
4. Plant adaptation			
5. Soil texture			
6. Soil moisture			

From your starting point walk, note and record the vegetation that occurs every 1m along the route.

Presentation: Using the records of vegetation draw the transect on the provided axes by identifying the position and the relevant heights of the vegetation.



Analysis: Comment on the distribution of vegetation along the transect drawn. Attempt to identify what factors have caused vegetation to vary.

Follow-up: Draw up a transect for the valley basins.

(After Lenon & Cleves, 1986; Nettleship, 1987)

UNIT 17: VALLEY TRANSECT - SOIL ANALYSIS

- General aim:** The aim is to determine the texture of the soil.
- Specific aim:** The texture of the soil will be determined by the "feel test" at the three positions on the valley slope.
- Skills:** Applying knowledge, comparing, sample collection, drawing of conclusions, graphing
- Method:** Determine the soil texture at the three points along the valley transect using the "feel test".
- Take a pinch of soil and rub it between your thumb and forefinger. How does it feel? Use Figure 4 to find out which applies to your soil - is it clay, sand or silt?
- Presentation:** Draw up a Table to indicate the soil texture for the three sites.
- Analysis:** What kind of soil do you have: clay, sand, silt, clay loam, sand loam, silt loam or true loam? Is there any difference in texture as one moves downslope?
- Follow-up:** Determine if there is a relationship between soil type, rate of infiltration and density of vegetation.

(After Barton, 1985)

UNIT 18: VALLEY TRANSECT - INFILTRATION RATES

General aim: The aim is to show that infiltration rates vary according to the nature of the slope.

Specific aim: To prove that steep slopes have a lower rate of infiltration than gentle slopes.

Skills: Hypothesis testing, analysis, synthesis, recording

Method:

- i. Identify three different sites, one near the crest, another halfway down the slope and the third at the bottom of the valley.
- ii. Measure the slope at the three positions using a home-made clinometer and record the angles.
- iii. Examine the plant community at each site and calculate the percentage plant cover per square meter for each site.

	AT CREST	HALFWAY UP	VALLEY
Slope			
% plant cover			

Presentation: Complete the provided Table which correlates percentage vegetation cover relative to the calculated slopes.

Analysis: What conclusions can you draw from the data? What will the likely effect be on each site when heavy rains fall?

Follow-up: Determine the infiltration rates for the soil of the three different sites. Do some 'tests' using water in tin cans with different sized holes pierced in their bottoms. Investigate the effect different types of rainfall has on infiltration.

(After Lenon & Cleves, 1986)

UNIT 19: VALLEY TRANSECT - MICRO-CLIMATE

General aim: The aim is to investigate how temperature varies across a valley.

Specific aim: To test the hypothesis that temperatures will vary across a valley cross-section in relation to the height and aspect of the land.

Method:

- i. Take temperature readings across the cross-section using one thermometer for the one slope and another for the other slope. Take measurements for a whole day.
- ii. Remember to keep the thermometer out of direct sunlight and take readings in similar open spaces.
- iii. Be sure to wait a few minutes at each survey point to make sure that the thermometer reading is accurate. Note the time when the readings were taken.
- iv. Using a topographical map of the area, draw a cross-section of the valley and mark in the locations where you read the temperatures.
- v. On your cross-section give both the vertical and horizontal scales as well as True North. Also note the weather conditions on the day of your study.

Presentation: Below the drawing of the valley cross-section, draw a line graph (vertical line) to show the temperatures you recorded at each position on the valley transect. Figure 8 provides an example of a completed valley transect describing micro-climate.

Analysis: Do the results support or reject the original hypothesis? Is there any time of day when temperature differences are more marked? What, influence, if any, is due to aspect or altitude?

Follow-up: Do the same survey in valleys with different cross-sections and aspects or for the crests of hills.

(After Barton, 1985; Nettleship, 1987)

UNIT 20: VALLEY TRANSECT - FIELD SKETCH

Introduction: Prior to doing the township trail, an opportunity was given to do a field sketch within the school grounds. You are now required to make a field sketch of the valley with the city sky-line in the background.

General aim: To gain experience in drawing field sketches.

Specific aims: To get the experience in drawing a field sketch of the valley, river, portion of the township and with the city in the background.

Skills: Identification of key features, drawing, proportions and labelling.

Method: Choose a perspective that you want to draw. Identify the frame for your sketch, i.e. what borders do you want to make? - where will your sketch end on the left and right hand side and at the top and bottom? Within your framed area draw an imaginary line that divides the picture into half vertically and another line that does the same horizontally. Now draw in each quarter what you see within the frame. Label key features.

Note: Your sketch should show depth and should reflect only what is seen.

Presentation: Draw a labelled field sketch.

Analysis: Is the field sketch recognizable?

Follow-up: The skill of drawing a field sketch can be applied to drawing many landscapes, i.e. coastal features, rivers or buildings in the city.

UNIT 21: STREAM STUDY

Introduction: A river or stream in an urban area has characteristics which allow it to be classified according to its stage of development from youthful through maturity to old age.

General aim: The aim is to show that a stream's characteristics change downstream.

Specific aim: To test the hypothesis that the channel depth/width and the speed of a stream increases downstream.

Skills: Measurement, timing a float, recording, drawing up of a Table, interpreting the landscape and the data.

A)

Method: You will need to take measurements and recordings at two places along the stream.

To test the hypothesis follow these points at both positions:

- i. Put your home-made tape with its 1m markings across the river and record its width (See Figure 9 for additional assistance).
- ii. At 1m intervals (as indicated by your tape), measure the depth of the stream with your measuring rod (Bamboo stick that is marked in 1m intervals). Record these values.
- iii. Back in the classroom/home draw a cross-section of the stream by plotting measurements of its depth and width.
- iv. Do the same for the second site.
- v. Answer the following questions by referring to your data:
 - a) How deep is the deepest part of the stream?
 - b) Where is the deepest part - near the inner or outer bank, the middle or to one side of the river?
 - c) How wide is the river?

Presentation: Draw two cross-sections for your stream and briefly answer the three questions asked above.

Analysis: By comparing your results from data recorded at the two positions along the stream, does the first hypothesis hold that the channel width and depth increases downstream?

Follow-up: Take further readings higher up and lower down than your initial readings.

(After Barton, 1985; Share-Net (undated); Skelton, 1991))

B)

Method: At each of your two recording positions do the following:

- i. Mark off a 10m distance along the bank. These positions mark the start (upstream) and the finishing point for this experiment.
- ii. Put a cork (or a light piece of wood) in the middle of the stream at the start of your 10m length. Use a stopwatch to time how long it takes for the cork to reach the finishing point.
- iii. Take about 5 readings and record the results each time. Find the average reading.
- iv. Do the same recordings at the second position.
- v. Answer the following questions:
 - a) What is the average time taken for the cork to travel the 10m distance from site A to site B?
 - b) What is the average speed of movement in m/sec using the formula:
$$\text{Average speed} = \frac{\text{time taken (min)}}{\text{distance covered}} ?$$
 - c) Does the average speed of the river increase or decrease downstream?

NAME OF STREAM/RIVER

DATE LENGTH OF SECTION 10m

TIME TRIALS		
OBSERVATIONS	SITE A (upstream)	SITE B (downstream)
1		
2		
3		
4		
5		
TOTAL	_____	_____
Average reading	_____	_____

Presentation: Present data by completing the provided table:

Analysis: Do your findings indicate that the speed of streams increase/decrease downstream? Give an explanation as to why the variations are so small between the two points.

Follow-up: Investigate sites higher and lower than your original positions to determine the validity of the hypothesis.

Study the ecology of the stream. What variety of animal organisms can you identify?

(After Barton, 1985)

UNIT 22: SHOPPING SURVEY

Introduction: Using a brief 6-question recording schedule, groups are required to collect data pertaining to shoppers' preferences. Each group is required to obtain between 25 and 30 responses. This exercise encourages students to interact with the public by informing them of the purpose of their study and showing tact in asking the various questions.

Specific aim: To investigate buying patterns of shoppers.

General aim: To establish why shoppers support particular businesses.

Skills used: Verbal communications, human interaction, tact, observation and techniques in administering a questionnaire.

Method: A shopping complex is most suited for investigation but the exercise is applicable to an isolated store.

- i. Use the provided questions so that responses might be compared to other groups' findings.
- ii. After a brief introduction in which you give your name and details concerning the research, you ask the individual if they would mind answering six brief questions concerning their shopping habits.
- iii. Ask the questions:
 - How far away do you live from this shop?
 - How many times a week do you shop here?
 - What goods do you buy here?
 - Why do you shop here?
 - Where do you do most of your shopping?
 - How would you like to see this shopping area improved?
- iv. On collecting the data, group responses by shop name, and analyze the information.

Presentation: Tabulate the findings from the survey.

Analysis: Is your group able to account for any patterns in the responses?

Follow-up: A valuable exercise would be to collate the responses from all the groups, analyze the data and give feedback to the business community.

(Raw et al, 1982)

UNIT 23: DAILY TRAFFIC FLOWS

Introduction: Duncan Village is very close to the centre of East London where work, shopping and other services are available. East London is also the end-point of numerous transportation routes for the entire Border region.

General aim: With half of East London's population living in Duncan Village, it is obvious that the transport routes between East London and Duncan Village will be well-developed.

Specific aim: To determine the actual volume of traffic between East London and Duncan Village in terms of its direction, the total number of vehicles and peak periods.

Method: Using a traffic census form (after Barton, 1985), the number of vehicles are counted according to type and direction during specified 5 minute periods.

You will need to position yourselves on a busy road in order to do the exercise. Two members from the same group are required to complete the forms for vehicles travelling out of Duncan Village towards the city, two to record vehicles entering Duncan Village from East London. The fifth person is required to be the group's official timekeeper monitoring the start/finish of the recording periods.

Recording should commence early enough to identify persons travelling to work and those returning home from work in the late afternoon. Suggested times could be: 07H00 - 07H05; 07H30 - 07H35; 08H00 - 08H05; 11H00 - 11H05; 13H00 - 13H05; 15H00 - 15H05; 16H00 - 16H05; 17H00 - 17H05; 17H30 - 17H35.

Use a new 'traffic census form' at the start of each new count.

TRAFFIC CENSUS FORM

Time of day

Position for recording

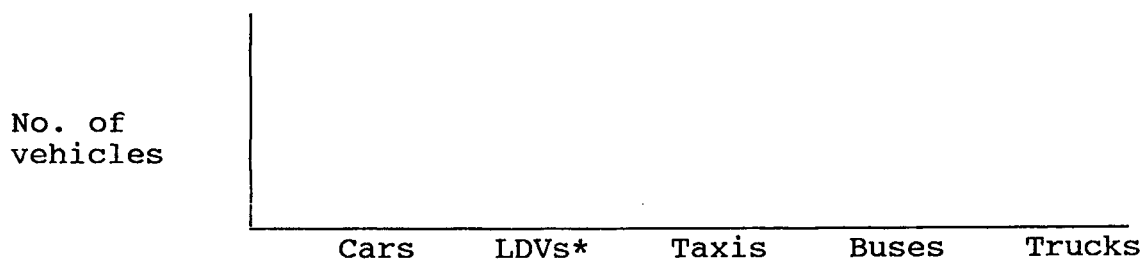
Vehicle type	To EL	From EL
Cars		
LDV's*		
Taxis		
Buses		
Trucks		

*Light delivery vans

Presentation: Each group is required to add the number of vehicles according to type. Use this data to draw a bar graph on the provided axes to indicate the total number of vehicles for the different vehicle categories.

View Figure 10 for an example of how to present data.

TYPES OF VEHICLES RECORDED



*Light delivery vans

- Analysis:** From the data collected, several questions may be answered:
- i. When are the peak periods of traffic according to your bar graph?
 - ii. Which type of vehicle is most frequently used?
 - iii. How does traffic vary in its direction of flow during the day?
 - iv. What causes these peaks?
 - v. When is the quietest period during daylight hours? Why is this so?
 - vi. Suggest what likely variations in flow might occur at night and over the weekend.
- Follow-up:**
- i. This survey could be extended to cover passenger numbers, pedestrians as well as calculating volumes over a longer time period.
Possibly the Township Engineer might have data recorded for other time periods that could be used for a comparative study.
 - ii. Another study could be undertaken to determine the origin of people disembarking from taxis.
 - iii. The level of accessibility to Duncan Village in terms of its position with regard to places of work, shopping facilities, services etc. could be determined.

(After Barton, 1985)

UNIT 24: CAPTURING THE CHARACTER OF AN AREA

- General aim:** The aim is to observe and describe a part of the township environment.
- Specific aim:** Each group is required to capture the character of a part of Duncan Village on film and then to describe what the photograph shows.
- Method:** Each group must walk the area and take two photographs that best capture the character or spirit of the township or a part thereof. Each group is then required to describe their two photographs and explain the reason for selecting them.

Presentation: The photographs will be developed and need to be accompanied by the written commentary highlighting the main features of the photographs and justifying the reasons for their selection.

Analysis: This will be included in the presentation.

Follow-up: All groups could combined their work and create a poster giving a visual representation of the character of Duncan Village.

UNIT 25: A TOWNSHIP TRANSECT

General aim: By drawing up a township transect along various routes, much information can be generated pertaining to the structure of the township.

Specific aim: The aim is to observe and record the various natural and physical features that occur along a specified route.

Method:

- i. Each group needs to draw a generalized cross-section of the urban environment.
- ii. Be sure that you are not working in the same area as another group.
- iii. Buildings along the transect are classified according to their function, i.e. dwelling, Public Open Space, business, service, other.
- iv. You need only to note land-use on one side of the street. It is suggested that the side with the greater number of functions should be used.

The work sheet performs the role of combining the various aspects of the transect to give an overall perspective.

TOWNSHIP TRANSECT

Relief description:

.....

Land use varies from.....

to

Most of the land use is

.....

Type of buildings:

.....

Cross-section
drawing:

Simplified
street plan:

Presentation: Complete the provided worksheet to illustrate
your group's township transect.

Analysis: Do any links manifest themselves as related to
slope, type of land use etc.?

Follow-up: Compare your findings to those produced by
another group.

(After Nettleship, 1987)

UNIT 26: HOUSING STUDY

- Introduction:** In this exercise you will discover through the housing sector the way in which the township has grown, and how the various social groups have been organized within it. This discussion is likely to raise "sensitive" issues like unemployment, lack of urban services, over-crowding, housing shortages, the building of shacks on open land (often in water courses), discrimination etc.
- General aim:** The aim of this Unit is to investigate how housing density varies in the township as well as discovering what changes have occurred to structures since they were first constructed.
- Specific aim:** To test what the effect of a shortage of housing has had on Duncan Village and to establish which sections are most disadvantaged due to having the highest density.
- Method:** Each group needs to work out a key that covers all housing variations in Duncan Village and then classify each dwelling unit along a selected street. Avoid duplication by working in a street not chosen by another group. Answer the following questions -
- i. Is it possible to identify home-owners by observing the condition of the house and garden? Is there any difference between rented houses and those owned by the occupier?
 - ii. Why have people decided to live in this particular area?
 - iii. What changes have occurred since the initial construction of the dwelling units? And how have homes been personalized?
 - iv. Discuss ways in which residents have utilized their homes/land to supplement their income.
- Presentation:** Colour base maps of relevant sub-sections indicating the various housing types together with a key.
- Analysis:** Each group should write a brief response to each of the four questions mentioned above.
- Follow-up:** All the streets studied can be combined. Further surveys could be undertaken to complete all areas in Duncan Village.
- (After Barton, 1985)

-----UNIT
27: THE QUALITY OF THE ENVIRONMENT

Introduction: Fieldwork provides opportunity for the expression of one's likes and dislikes about a place or landscape.

General aim: The aim is to discover what variation occurs in the quality of the Duncan Village environment.

Specific aim: To assess the quality of Duncan Village's environment and to establish whether areas differ from each other.

Method: Each group is required to assess the environmental quality of its sub-section. Following the route taken in Unit 26, note the quality of the environment by using the provided indicators and allocating appropriate point scores(1 - 5) for every fifth unit on either side of the road.

CHARACTERISTICS

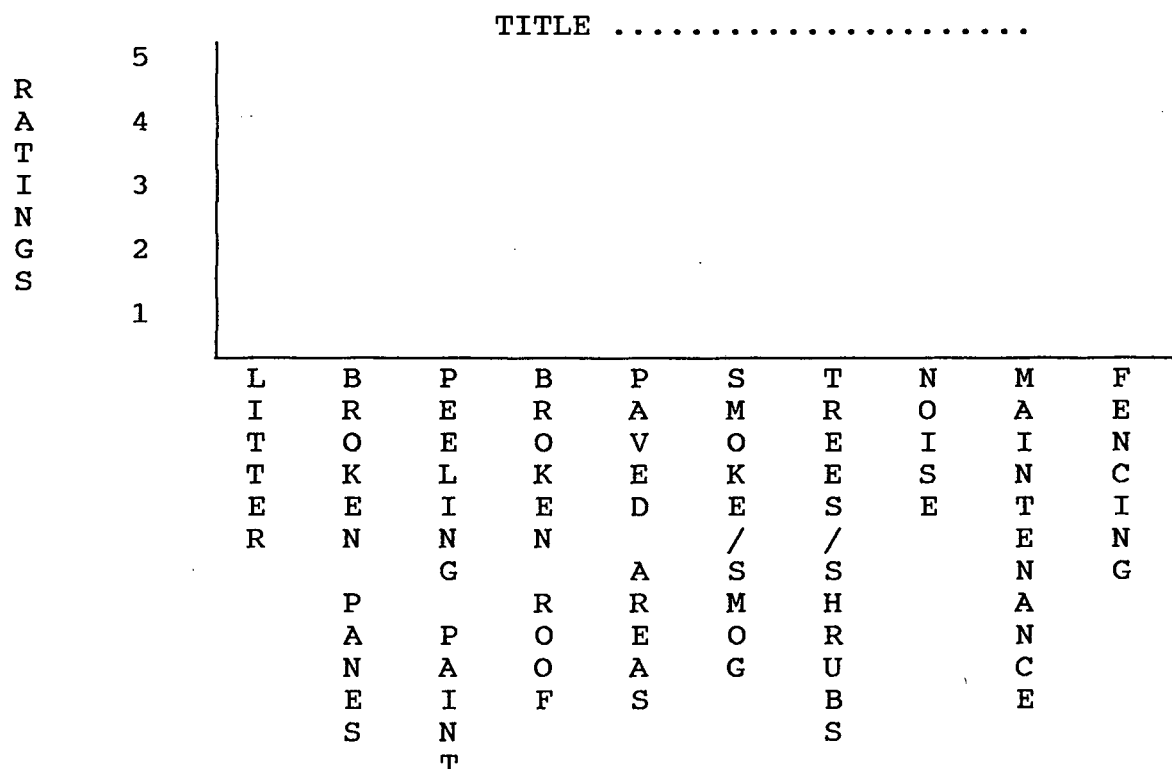
RATINGS

	poor	1	2	3	4	5	good
Litter		1	2	3	4	5	
Broken windows		1	2	3	4	5	
Peeling paint		1	2	3	4	5	
Broken roof/eaves		1	2	3	4	5	
Paved areas		1	2	3	4	5	
Pollution/smoke		1	2	3	4	5	
Trees/shrubs		1	2	3	4	5	
Noise		1	2	3	4	5	
Overall maintenance		1	2	3	4	5	
Fencing		1	2	3	4	5	

Note the materials that each building is constructed of i.e. bricks/blocks, corrugated iron, wood...

Add the total scores for each unit surveyed and give your overall index. Note the poorer the condition of the environment the closer the score is to zero; the better the environment, the closer the score is to 25.

Presentation: Using the provided axes to represent the environmental quality of the route taken by your group. Mark off every 5mm to represent 1 housing unit. Mark in the respective environmental indices you have calculated on the vertical axis.



Analysis: Do your findings indicate that there are sections that enjoy a higher level of environmental quality than others? What could be the reason for this variation?

By adding the scores of all units in your street (survey area), compare these scores with those from other groups. Note that any comparison should include the number of units.

Follow-up: Your group could investigate the reasons for the good/poor quality of the environment. Think of ways in which the "problem" could be overcome by thinking in terms of collective responsibility and involving all sectors of the community e.g. the Local Authorities.

(After Nettleship, 1987)

FIGURES:

1. Example of a field sketch
2. Frame to assist with field sketching
3. Classification of weathering
4. Table: the "feel test"
5. How to make a home-made clinometer
6. Example of a completed vegetation transect
7. Rose diagram to indicate distance travelled to school by pupils
8. Valley transect showing micro-climate variations
9. How to measure the width and depth of a stream
10. Traffic census results

Figure 1: Example of a field sketch
(Opie, 1989, p140)

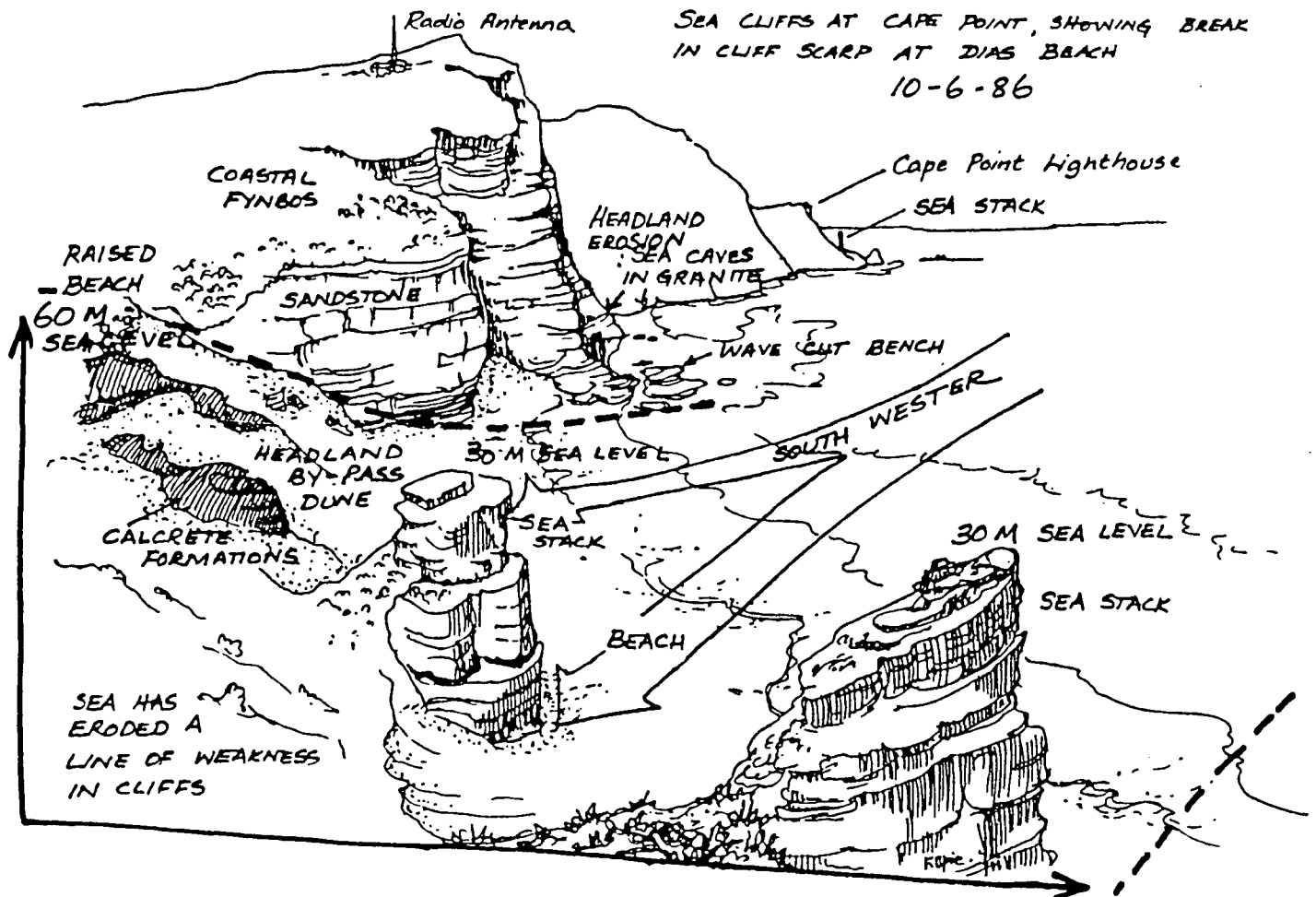


Figure 2: Frame of reference for field sketching
(Opie, 1989, p137)

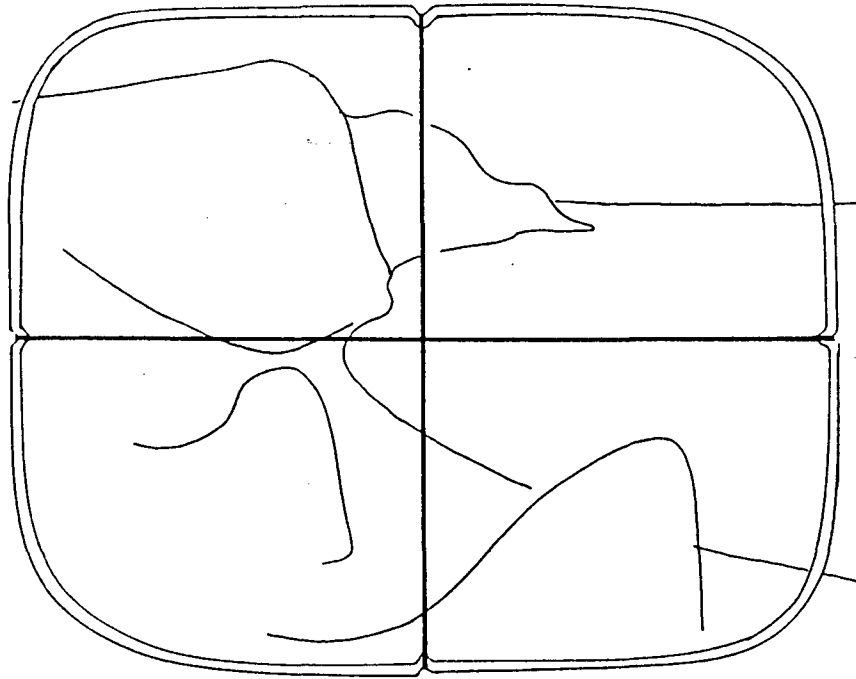


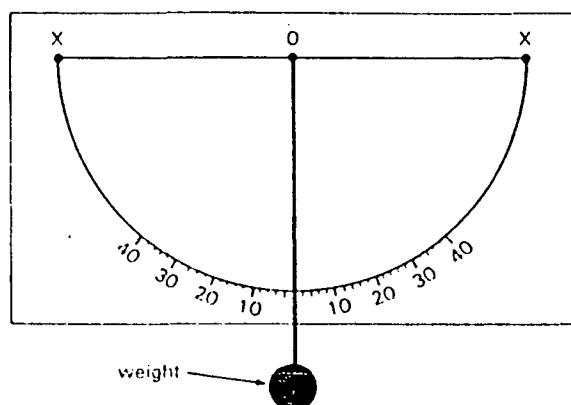
Figure 3: Classification of weathering
(Law & Smith, 1990, p147)

Group	Process	Effects of process	Examples
Physical	Exfoliation	Sheets of rock <i>peel</i> off the surface due to repeated heating and cooling (the latter perhaps by dew)	Arid areas in the tropics, e.g. around Ayers Rock, N. Territory, Australia
	Granular disintegration	Rock <i>disintegrates</i> to particles the size of individual mineral constituents due to pressures set up by different rates of expansion and contraction of minerals. (There is some doubt about the importance of this process)	Acid and semi-arid tropical area, especially of granite rocks, e.g. northern Nigeria, near Zaria
	Freeze-thaw	Rocks <i>shatter</i> as water freezes (and expands) in joints. Pressures may be very great	High latitudes or altitudes, where temperatures fluctuate about 0°C and where there is sufficient moisture, e.g. N. Scotland
	Mechanical collapse	Rocks <i>break apart</i> due to undercutting and subsequent collapse	Overhanging cliffs or river banks, e.g. chalk cliffs in S. England
	Crystal growth	Rocks <i>shatter</i> because of internal pressures	Growth of ice crystals within porous rocks, and of salt crystals in weathered rock (especially in tropical semi-arid areas)
Chemical	Hydrolysis	Layers <i>peel</i> away from spheroidally-weathered rock since some products are bulkier than the parent material. Process due to ion exchange between water and minerals	The most important chemical process, most active in humid tropical areas and on basic volcanic rocks, e.g. Grenada, W. Indies
	Oxidation/reduction	<i>Change</i> in chemical composition with the addition/removal of oxygen (often in the presence of water)	Mottled colouring in clay river banks or cliffs
	Solution	Some minerals or weathering products are <i>dissolved</i>	Caves in rock salt areas, e.g. Bavaria
	Hydration/dehydration	<i>Chemical change</i> and often <i>volume change</i> with the adding/subtraction of water	Swelling of shales e.g. Ravenscar nr. Whitby; shrinking of clays, e.g. British drought, 1976
Biotic	Carbonation	<i>Chemical change</i> of carbonates to soluble products	Karstic scenery, e.g. Eastern Transvaal
	Growth of roots	Joints in rock are <i>widened</i>	Trees growing in shallow soil
	Animal burrowing	Aeration of soil <i>aids</i> other processes New surfaces <i>exposed</i>	Prairie Dog colonies in N. America
	Enhanced solution	<i>Solution</i> aided by the presence of respired Carbon Dioxide in the soil	Areas and seasons of active plant growth
	Solution by humic acids	<i>Solution</i> by acids from decaying plants	Deep regolith beneath peat bogs, e.g. New Forest

Figure 4: Table: "Feel Test"
(Barton, 1985, p27)

INSTRUCTIONS. Take a pinch of soil and rub it between your thumb and forefinger, how does it feel? Now follow the directions below to find out which applies to your soil.		
GRITTY FEEL	You can also see small grains like sand in the soil. When dry this soil is loose and is not at all sticky when wet. Particle size:- 2.00 to 0.05mm.	SANDY SOIL
SOAPY FEEL	Some people say this soil feels smooth and silky. Particle size:- 0.05 to 0.002mm.	SILTY SOIL
STICKY FEEL	When damp this soil can be rolled into shapes and it will take good finger-prints. Particle size:- 0.002mm or less.	CLAY SOIL
A LOAM SOIL has EQUAL AMOUNTS OF SAND, SILT AND CLAY. It moulds into shapes when wet and sticks to the fingers, but, if you roll it into threads and then try and bend the threads into rings it will break and crumble. It is possible to find clay loams, sand loams and silt loams. They have a mix of all three mineral particles but one is dominant eg. clay loam (more clay than sand or silt).		

Figure 5: How to make a clinometer
(Lenon & Cleves, 1986, p22)



- 1 Trace a protractor onto a sheet of paper and mark on degrees as above.
- 2 Glue the paper to a sheet of card.
- 3 Thread some string through a hole at the point marked 'O'. Secure with a knot and fix a weight to the loose end.
- 4 Push two drawing pins through the points marked 'X' from behind. These serve as sights to help align the clinometer.

Figure 6: Vegetation transect
(Lenon & Cleves, 1986, p40-41)

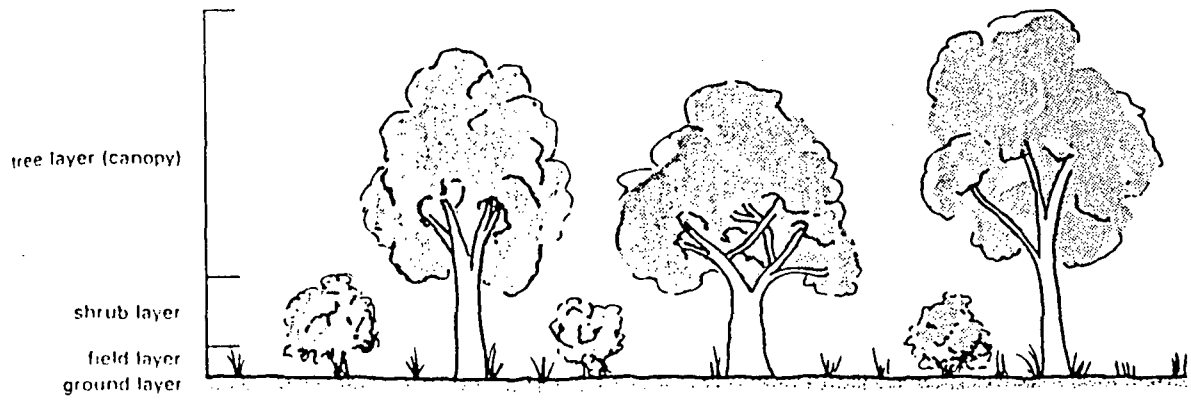


Figure 7: Distance & time rose diagram
(Nettleship, 1987, p35)

Rose diagram to show the distance
that pupils travel to school

Rose diagram to show the time
that pupils take in travelling to
school

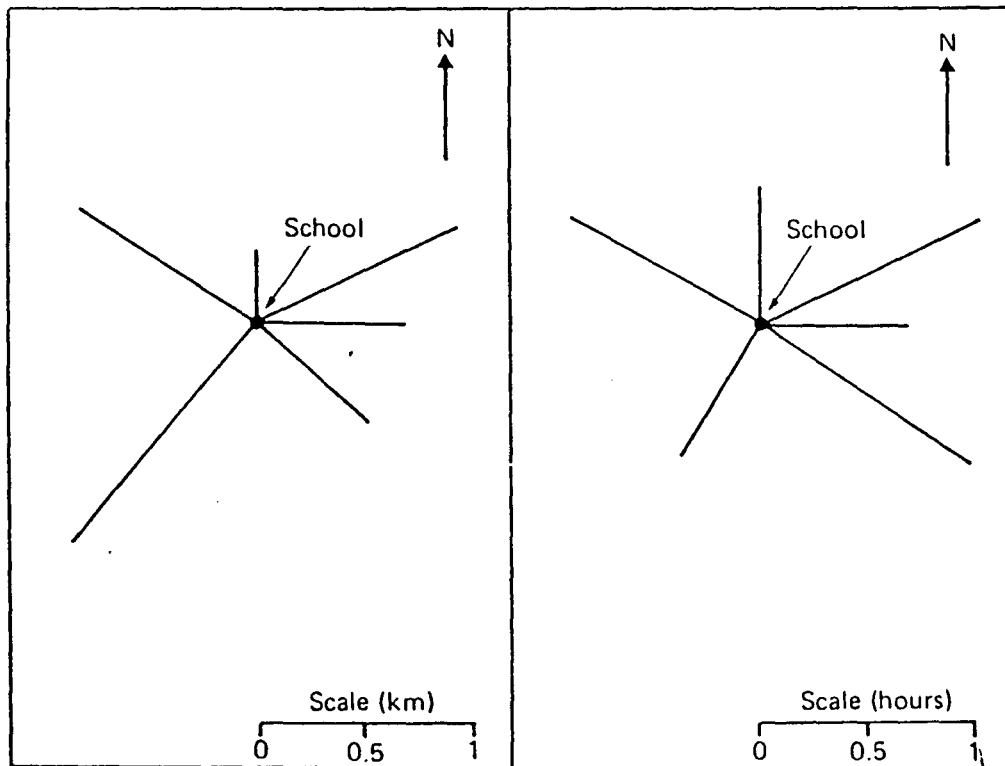


Figure 8: Valley transect: Micro-climate
(Nettleship, 1987, p47)

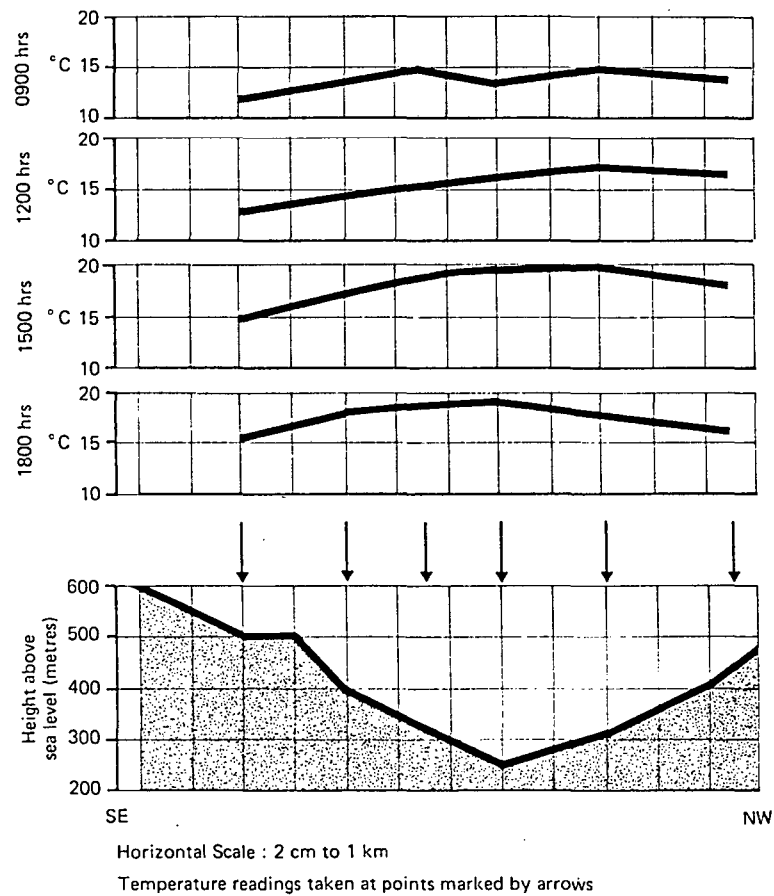


Figure 9: How to measure the width/depth of a stream
(Barton, 1985, p45)

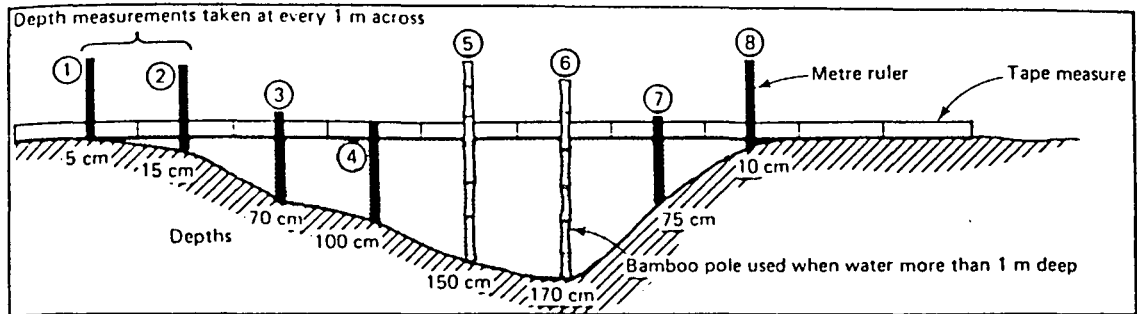
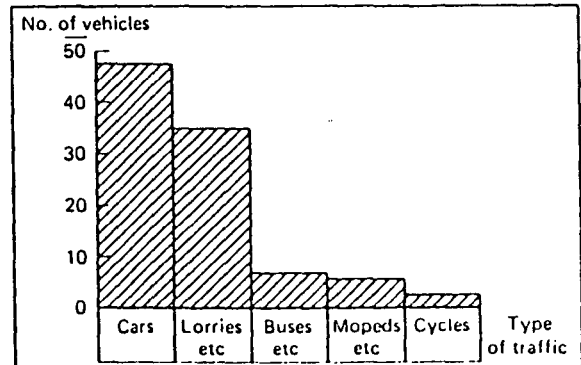


Figure 10: Traffic counts
(Barton, 1985, p18-19)



TRAFFIC COUNT TO FIND OUT				
Name: <u>T. Smith</u>		Name of road: <u>Kingsway</u>		
Time of Count:		Direction of traffic movement: <u>Towards town centre</u>		
Date of Count: <u>11th Nov.</u>		Duration of Count: <u>5 minutes</u>		
CARS	LORRIES/VANS	BUS/COACHES	MOPEDS, MOTOR BIKES	BICYCLES
JHT JHT JHT JHT JHT JHT JHT JHT JHT III	JHT JHT JHT JHT JHT JHT JHT	JHT II	JHT I	II
TOTAL = 48	TOTAL = 35	TOTAL = 7	TOTAL = 6	TOTAL = 2
GRAND TOTAL OF ALL VEHICLES = 98				

APPENDIX 4.2

TEACHER'S MANUAL

FIELDWORK IN THE TOWNSHIP

HOW TO INTRODUCE FIELDWORK CONCEPTS PRIOR TO DOING THE ACTUAL FIELDWORK

FIGURES:

1. Frame to assist with field sketching
2. Example of a field sketch
3. Table: the "feel test"
4. Table: the "particle size diagram"
5. Pie-diagram drawn from soil sample
6. How to make a home-made clinometer
7. How to use a clinometer
8. Example of a completed vegetation transect
9. Traffic census results

INTRODUCTION

The following exercises have been prepared to assist teachers by giving them the background knowledge on how to do a variety of simple field exercises. The context of application of these exercises is the township. Most, if not all of the exercises, are applicable to any township although minor adjustments might need to be made to account for specific issues.

The exercises require simple equipment for the collection and measurement of data.

The Teacher's Manual was developed to complement the pupils' fieldwork programme developed and tested in the research.

Attention needs to be brought to the numbering system used to describe the various units in the research. The following interpretation is applicable:

- A - refers to 'Introductory Notes'
- B - 'Field Sheets' and
- C - 'Teacher's Manual'

UNIT 1C: FIELD SKETCHING

Introduction: A field sketch is a drawing of a landscape or a landform made in the field. Field sketching is an alternative to, and cheaper than taking photographs or using a video camera. Unlike photographs which show all detail, field sketches highlight only the main features. Field sketches need to be labelled.

General aim: To give pupils the experience of drawing field sketches.

Specific aims: To provide pupils with an opportunity of drawing a field sketch somewhere in the school grounds.

Skills: Identification of key features in perspectives, drawing, proportions and labelling.

Method: Let pupils choose a perspective within the school grounds that they want to draw. Get them to determine the frame for their sketch, i.e. what borders do they want to make? All that the frame does is to limit the size of the sketch. In other words, it determines the left and right hand borders as well as the top and bottom of the sketch. Within their framed area pupils must draw an imaginary line that divides the picture into half vertically and another line that does the same horizontally (Figure 1). On having done this, pupils must draw in each quarter what they see within the frame. Ensure that pupils label the key features.

Note: Sketches should show depth and reflect only what is seen. While pupils are doing the sketching, walk around giving encouragement and assistance.

Presentation: Pupils must draw a labelled field sketch. Figure 2 is a good example of a field sketch.

Analysis: Are pupils' field sketches recognizable? Be sure that there are no plan views nor two-dimensional drawings.

Follow-up: There are endless opportunities for drawing field sketches, namely: to show coastal features, river profiles or buildings in the city.

UNIT 2C: EXAMINING THE SOIL

Introduction: An understanding of soil is important since soil supports all plant and animal life. The relationship between soil, vegetation and climate is complicated. For example, the over-cultivation without enrichment of the soil; overstocking the veld; or the destruction of vegetation can have disastrous results during flooding and drought conditions. Soil starts from solid rock which is then broken down into tiny bits. To the soil is added organic matter - dead plants, roots and earthworms. Remember that water and air are also found between sand particles.

General aim: The aim is to show pupils how to determine the texture of the soil.

Specific aim: Get pupils to determine the texture of the soil by using the "feel test" in the field and "particle size analysis" back in the classroom.

Skills: Pupils will have to apply their knowledge, collect soil samples, draw conclusions and graph their findings.

Method: To determine soil texture using the "feel test", get pupils to take a pinch of soil and rub it between their thumb and forefinger. They need to say how the soil feels. Figure 3 should be used to find out which characteristics apply to their soil - is it clay, sand or silt?

Make pupils take a sample of soil back to the classroom so that they can do the "particle size analysis" test. This will help identify how much clay, sand and silt their soil sample contains. Get pupils to put 5 tablespoons of dry, weighed soil into a glass jar nearly filled to the top with water. After screwing the top on tightly, the jar must be shaken; then allow the sediment to settle. After 1 or 2 days get pupils to measure the depth of each type of particle as the soil has settled in the jar. The depth of each of the 3 particles can then be calculated and expressed as a percentage of the whole jar (Figure 4).

Presentation: From the percentages of the various soil types, get pupils to draw a pie diagram (Figure 5).

Analysis: Question pupils on the kind of soil they have: Is their sample: clay, sand, silt, clay loam, sand loam, silt loam or true loam?

Follow-up: Ask pupils to explain how soil type will influence infiltration.

((After Barton, 1985; Sauvain, 1989))

UNIT 3C: SLOPE SURVEYING

Introduction: The slope of any site is important since it determines the ultimate end usage of the land. If slopes are steep, the slope can be used for a limited number of purposes since slopes are vulnerable to erosion. Gentle slopes, however, are able to be utilized for a greater variety of purposes as the likelihood of their being eroded away is low.

General aim: By making use of home-made clinometers, get pupils to calculate a slope's angle.

Specific aim: The aim is to give pupils the opportunity to measure various slopes.

Method: Details for making a clinometer are given in Figure 6.

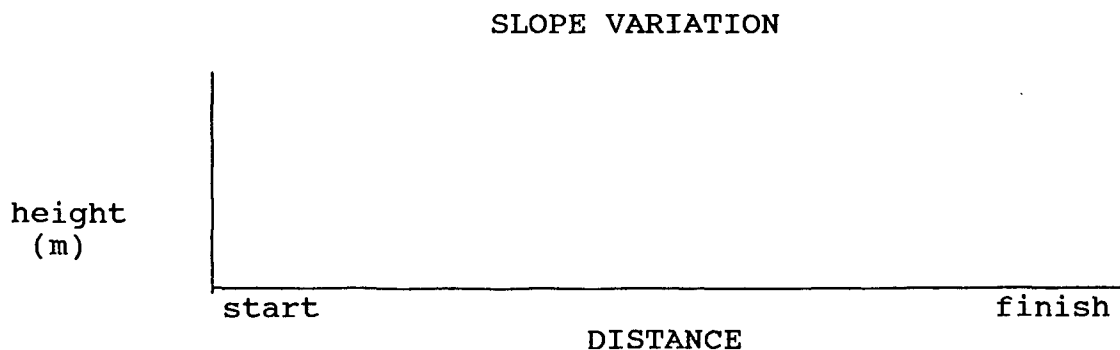
To assist pupils to measure slopes get them to proceed in the following manner (Figure 7):

- i. Two pupils each hold a pole vertically with the end of each pole resting on the ground. The poles should be placed at both ends of the slope to be measured.
 - ii. Mark a 1m height on each pole.
 - iii. The clinometer is then viewed from the 1 meter height on one pole to the same level on the second pole. The angle of the slope is read off in degrees.
 - iv. Be sure that pupils measure the distance between the poles.
- The accuracy of this method is influenced by the distance between the poles, i.e. accuracy increases the shorter the distance between the poles.

- v. Ensure that pupils make five readings and record data. Then get them to complete the provided Table and draw a graph.

SLOPE MEASUREMENTS		
Slope reading	Length of slope	Angle of slope
1		
2		
3		
4		
5		

Presentation: Ensure that pupils plot their slope data on the axes provided. Check that pupils have realized that the length measurements are along the slope and not horizontally. Ensure that pupils give their graph a heading and indicate the scale for their distances, i.e. 1cm on the map represents 2m on the ground.



Analysis: Ask pupils the following types of questions pertaining to slopes: How prone to erosion will the slope you have just measured be after heavy rains? How will the vegetation influence erosion and how do different types of land use influence erosion?

Follow-up: Enquire from pupils as to what slopes are suitable for the building of schools, shopping centres, low cost housing, playing fields, etc.

(After Lenon & Cleves, 1988)

UNIT 4C: VEGETATION ANALYSIS

Introduction: Geographers are interested in studying vegetation since plants adapt and respond to their environment. The type of vegetation and the conditions under which vegetation thrive are influenced by the micro-climate, altitude, aspect, soil type and the activities of man and animals.

General aim: The aim of this Unit is to encourage pupils to discover how vegetation varies along a transect within the school grounds.

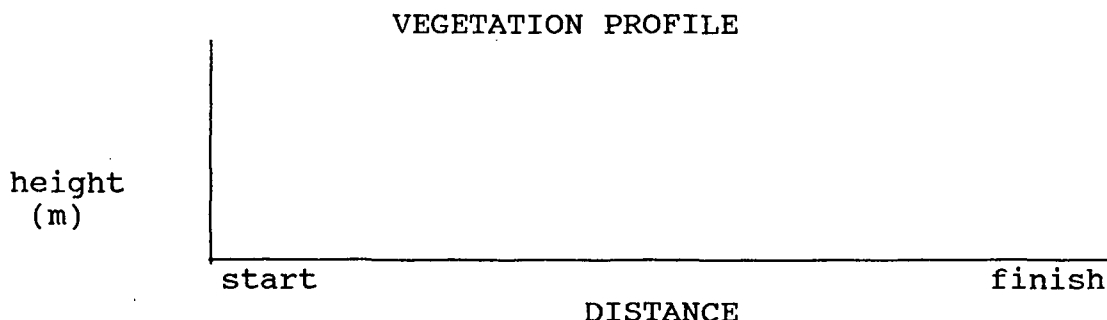
Specific aim: Get pupils to draw a vegetation transect by identifying vegetation samples along a given route.

Skills: Pupils will use the following skills: measuring, observing, recording, graph drawing, sketching.

Method: Tell pupils to choose any route (straight line of approximately 30 meters in length) that can be used as a transect to provide insight into vegetation. Get pupils to make a key of likely vegetation types: i.e. T tree; B bush/shrubs; G grass; and N/A when there is no vegetation. From their starting point, pupils should walk, note and record the vegetation that occurs every 1 meter along the route.

(For an example of recordings and what the graph looks like after completion view Figures 8 and 9).

Presentation: By using their records of vegetation for the transect, pupils should draw the vegetation profile to indicate the type and height of the recorded vegetation.



Analysis: Get pupils to comment on the distribution of vegetation along the transect drawn. They should also attempt to identify what factors have caused vegetation to vary.

Follow-up: Get pupils to draw two further transects.
(After Lenon & Cleves, 1986; Nettleship, 1987)

UNIT 5C: QUALITY OF THE ENVIRONMENT

Introduction: The character of an area can be assessed by rating the environment using a simple 5-point scheme. This implies the making of value judgments. The rating scheme enables results to be quantified and, consequently, different areas can be compared as to their respective quality.

General aim: The aim of this exercise is to get pupils to discover what the quality of the school environment is.

Specific aim: Pupils should assess the quality of the school environment by walking around the school and giving a rating score to the various categories. Pupils should also be challenged to consider what role they can play in improving the environmental quality of the school grounds.

Skills: Pupils are required to clarify their values by discussing and debating within their groups and raising issues about responsibilities. A point classification system is necessary to complete the matrix and to draw a graph.

Method: Encourage pupils to walk around the school grounds to get a "feel" of the school environment. During this time pupils should consider the various categories included in the check sheet. They should give a point rating to the various categories, by circling the appropriate value that corresponds to the quality of the environment.

ENVIRONMENTAL RATINGS

	poor	1	2	3	4	5	good
Litter		1	2	3	4	5	
Broken windows		1	2	3	4	5	
Peeling paint		1	2	3	4	5	
Broken roof/eaves		1	2	3	4	5	
Paved areas		1	2	3	4	5	
Pollution/smoke		1	2	3	4	5	
Trees/shrubs		1	2	3	4	5	
Noise		1	2	3	4	5	
Overall maintenance		1	2	3	4	5	
Fencing		1	2	3	4	5	

Presentation: The provided matrix needs to be completed and a bar graph drawn for the ten categories and their respective scores. The horizontal axis should be used for the categories and the vertical scale for the rating of quality. Ensure that pupils label their graph.

R
A
T
I
N
G
S

5
4
3
2
1

QUALITY OF THE SCHOOL ENVIRONMENT

L I T T E R	B R O K E N	P E E L I N G	B R O K E N	P A V E D	S M O K E / S M O G	T R E E S / S H R U B S	N O I S E	M A I N T E N A N C E	F E N C I N G
	P A N E S	P A I N T	R O O F	R E A S					

Analysis:

Ask pupils the following questions concerning the quality of the environment:

- Do people seem to enjoy the school environment?
- What are your own likes and dislikes about this area?
- Who is responsible for the quality of the school grounds?
- What can be done to improve it?

Follow-up:

Pupils can make a comparative study of other school premises and attempt to account for any major differences.

UNIT 6C: TRAFFIC MOVEMENT

Introduction: Traffic is an interesting topic since it causes numerous problems: traffic jams, pollution, noise, danger, as well as providing opportunities for travel. The topic is raised at a Std 7 level and is expanded upon in Std 9 and especially the Std 10 syllabus.

For many schools traffic is likely to be a problem if they are located next to a busy road. A school's location has both benefits and inconveniences.

On the one hand pupils benefit from the proximity to transport routes but are affected by the likely dangers from many fast-moving vehicles and the noise they produce. This study looks at some of these issues in an attempt to provide possible solutions.

General aim: The aim is to encourage pupils to study traffic movements immediately outside the school gate to determine if scholars are at risk from vehicular traffic.

Specific aim: Pupils will need to determine whether there is a need for scholar patrol marshals or robots immediately outside the school gate.

Skills: This study raises issues of responsibility, duty, counting and recording, drawing up of tables, interpretation of tables and the solving of a problem or potential problem.

Method: To establish if there is a need for scholar patrol marshals outside the school, organize each group to do a traffic count before, during and after school. Two members of the group will need to record pedestrian movement i.e. one on either side of the gate. Have another two members to count the number of vehicles passing the school, one for each direction.

Provide pupils with a schedule like the one provided below on which they can fill the relevant data. Every time a vehicle or pedestrian passes the recorder, the pupil must make a mark (vertical line |) in the appropriate column. When the fifth vehicle or pedestrian is recorded, a diagonal line is drawn through the previous four lines i.e. 5 vehicles are recorded as ||||.

The fifth member must be the group's timekeeper. He needs to ensure that pupils undertake a count every 15 minutes for a 5 minute period. The count should cover a total of 45 minutes for the day (immediately before school starts, during long break and 45 minutes after the last bell of the day rings).

PEDESTRIAN/VEHICLE SCORE SCHEDULE

Name

Time

Date

Name of road

Direction of traffic movement

Length of count

SCHEDULE:	
PEDESTRIANS	VEHICLES

Check that pupils have indicated the direction of movement of vehicles/pedestrians on their schedules.

SCHEDULE OF TRAFFIC

	Time	Total no. vehicles	Total no. pedestrians
	1. ....	.....	.....
AM	2. ....	.....	.....
	3. ....	.....	.....
	4. ....	.....	.....
BREAK	5. ....	.....	.....
	6. ....	.....	.....
	7. ....	.....	.....
PM	8. ....	.....	.....
	9. ....	.....	.....

Presentation: Pupils will need to draw up a table to record the totals for their group's results. Get them to fill the data on the Tables provided.

Analysis: Ask pupils the following questions: Is there evidence of conflict between pedestrians and vehicular traffic? When is the problem most serious? What action would you regard as being most appropriate?

What do you conclude about your school's position?

Follow-up: A similar survey can be done outside the gates of other schools, pre-primary, primary and secondary. Encourage pupils to undertake a survey (questionnaire) of pupils, hawkers and taxi drivers in proximity to their school to determine these people's feelings towards a possible controlled crossing. If pupils' findings point to the need for a controlled crossing, then encourage a class delegation to make a formal presentation of their findings to the local Residents' Association and the Town Clerk/Town Engineer.

(After Barton, 1985)

UNIT 7C: VALLEY TRANSECT - FIELD SKETCHING

Introduction: This exercise uses the same foundation laid in Unit 2. All that has changed is the context of being in the township rather than being within the school grounds. This makes the view more complex since the environment has great variety and contrasts. The principles applied earlier are, however, still applicable.

General aim: To give pupils the opportunity of drawing another field sketch.

Specific aims: To provide pupils with an opportunity of drawing a field sketch of the valley, river, portion of the township and with the city in the background.

Skills: Identification of key features, drawing, proportions and labelling.

Method: Let pupils choose a perspective that they want to draw. Remind them to determine a frame for their sketch, i.e. what borders do they want to make? Get them to draw an imaginary line within their framed area that divides the picture into half vertically and another line that does the same horizontally. They need to draw in each quarter what they see within the frame. Ensure that pupils label key features on their sketches.

Note: Ensure the pupils' sketches show depth and reflect only what is visible from that vantage point.

Presentation: The completed and labelled field sketch.

Analysis: Are their field sketches recognizable? Be sure that they are not two-dimensional drawings.

Follow-up: A field sketch can be used to draw many landscapes during a field trip, i.e. coastal features, river or buildings in the city. With more practice field sketches will improve in quality.

UNIT 8C: VALLEY TRANSECT - SLOPE SURVEYING

Introduction: As was mentioned in Unit 3C, the slope of any site is important since it determines the ultimate end usage of the land. Steep slope can only be used for a limited number of activities since steep slopes are vulnerable to erosion. Gentle slopes are, however, able to be utilized by a greater variety of activities since erosion likelihood is low.

General aim: By making use of a home-made clinometer, the steepness of a slope can be calculated.

Specific aim: The aim is to measure various slopes.

Method: For details concerning the making of a clinometer, consult Figure 6.

This exercise works best if pupils are organized into groups.

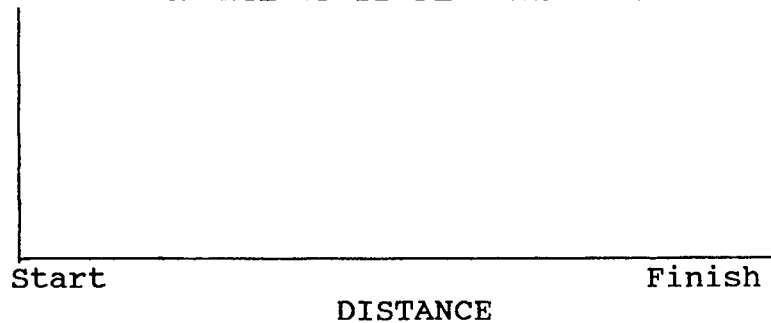
- i. Two members of the group must hold a pole vertically with the end of each pole resting on the ground. The poles should be placed at the ends of the slope to be measured. Make sure that groups use a distance of between 2 - 5m.
- ii. Make a 1m mark on both poles.
- iii. The clinometer is then viewed from the 1m height on one pole to the same height on the second pole. The angle of the slope is read off in degrees.
- iv. Groups need to measure the distance between the poles. The accuracy of this method is influenced by the distance between the poles, i.e. the shorter this is, the more accurate the reading.
- v. Ensure that groups take five readings and record these. Thereafter, groups need to complete the provided Table and draw a graph of their findings.

SLOPE MEASUREMENTS

Slope reading	Length of slope	Angle of slope
1		
2		
3		
4		
5		

Presentation: Groups need to plot their results on to the provided axes. Remind pupils that the length measurements are along the slope and not horizontally. Be sure that pupils give their graph a heading and indicate the scale for their distances.

CHANGE OF SLOPE OVER TRANSECT



Analysis: Ask pupils the following questions:

- i. How prone to erosion will the slope you have just measured be after heavy rains?
- ii. How will the vegetation, different types of land use, rainfall types and slope variations influence the rate of erosion?

Follow-up: Do some research to determine what slopes are suitable for the building of schools, shopping centres and low cost housing.

(After Lenon & Cleves, 1986)

UNIT 9C: VALLEY TRANSECT - SOIL ANALYSIS

Introduction: The Unit utilizes concepts previously developed during the "school trail". You may need to review Unit 3C to remind yourself of key concepts.

General aim: The aim is to determine the texture of the soil.

Specific aim: The texture of the soil will be determined by the "feel test" at three positions on the valley transect.

Skills: Applying knowledge, collecting samples, comparing, drawing of conclusions, graphing

Method: Get pupils to determine the soil texture using the "feel test" at the three points along the valley transect. Get them to take a pinch of soil between their thumb and forefinger and rub it. How does it feel? Check the criteria in Unit 3C for classification details. Pupils need to determine whether their soil sample is clay, sand or silt?

SOIL TYPE

Soil sample	Soil texture (texture)	Distance from start of transect
A		m
B		m
C		m

Presentation: Pupils must complete the provided Table to indicate the soil texture for the three sites.

Analysis: Groups need to determine whether they have: clay, sand, silt, clay loam, sand loam, silt loam or true loam? Ask them if they notice any difference in texture of the soil as they moved down slope?

Follow-up: Ask pupils to determine whether there is any relationship between soil type, rate of infiltration and density of vegetation.
(After Barton, 1985)

UNIT 10C: VALLEY TRANSECT - VEGETATION ANALYSIS

Introduction: For background data consult Unit 4C.

General aim: The aim is for pupils to discover the variation of vegetation along a transect from the bottom of the valley to the crest of the hill.

Specific aim: Pupils need to draw a vegetation transect to reflect vegetation along a route.

Skills: Observing, recording, graph drawing, sketching

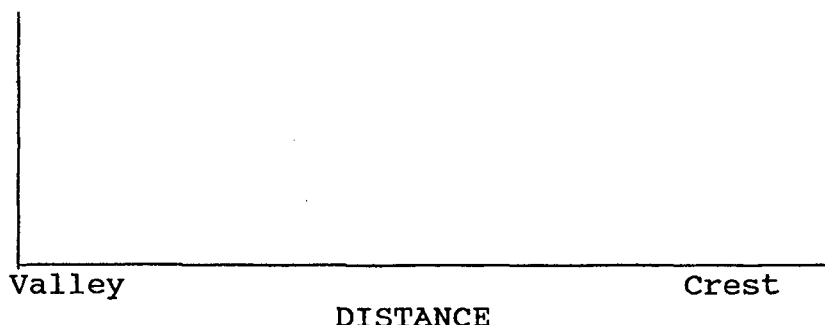
Method: Each group is required to draw a transect from the river to the crest of the hill. Groups may choose any slope for their profile. Encourage them to use the same key as was used in the exercise completed within the school grounds, i.e. T tree; B bush/shrubs; and G grass. From their starting point they need to record the vegetation that occurs every 1m along the route. Encourage groups to compare their results with other groups. Each group needs to complete the provided Table and the graph as part of the exercise.

	FEATURES:	ROUTES:		
		A	B	C
1.	Highest plant (m)	....	....	....
2.	Density (high/medium/low)	....	....	....
3.	No. of species	....	....	....
4.	Plant adaptation	....	....	....
5.	Soil texture	....	....	....
6.	Soil moisture	....	....	....

On the graph indicate the vegetation identified by drawing a diagram at the respective points and indicate the relevant height.

- Presentation:**
- i. From their records of vegetation, pupils must draw a graph of the transect.
 - ii. Each group needs to complete the provided matrix which links vegetation to soil and to the micro-climate.

VEGETATION VARIATION ALONG THE PROFILE



Analysis: Ask groups to comment on the distribution of vegetation along the transect drawn. Ask them to identify what factors have caused vegetation to vary.

.....

.....

.....

Follow-up: Do a similar study elsewhere in Duncan Village.

(After Lenon & Cleves, 1986; Nettleship, 1987)

UNIT 11C: VALLEY TRANSECT - INFILTRATION RATES

Introduction: This Unit explores aspects of the concept of infiltration rates by discussing the relationship between soil, slope and vegetation. The amount of rainfall as well as the type of rainfall influence infiltration rates as does the land use of an area.

General aim: The aim is for pupils to discover the relationship between infiltration rates and the slope of an area.

Specific aim: For pupils to prove that steep slopes have a lower rate of infiltration than level slopes.

Skills: Hypothesis testing, analysis, synthesis, recording

Method:

- i. Pupils should identify three different sites, one near the crest, another halfway down the slope and the third at the bottom of the valley.
- ii. Groups need to measure the slopes using a clinometer at the three positions, and record the angles of slopes.
- iii. Pupils need to examine the plant community at each site and calculate the percentage plant cover per square meter per site.

RELATIONSHIP BETWEEN VEGETATION COVER AND SLOPE			
	AT CREST	HALFWAY UP	VALLEY
Slope			
% plant cover			

Presentation: Pupils must complete the Table which correlates percentage vegetation cover relative to the angle of the slope.

Analysis: Ask pupils the following questions:

- i. What conclusions can you draw from this data?
- ii. What will the likely effect be on each site when heavy rains are experienced?

Follow-up: Encourage pupils to discover what relationship there is between types of rainfall and rates of infiltration.

(After Lenon & Cleves, 1986)

UNIT 12C: DAILY TRAFFIC FLOWS

Introduction: Duncan Village is very close to the centre of East London where work, shopping and other services are available. East London is also the end-point of numerous transportation routes for the entire Border region.

General aim: With half of East London's population living in Duncan Village, it is obvious that the transport routes between East London and Duncan Village will be well-developed.

Specific aim: To determine what the actual volume of traffic is between East London and Duncan Village in terms of its direction, the number of vehicles and its peak periods.

Method: Using a traffic census form get pupils in their groups to count the number of vehicles by type and their direction of movement during specified 5 minute periods.

Two members from each group need to complete the forms for vehicles travelling out of Duncan Village towards the city, two to record vehicles entering Duncan Village from East London's direction and one member is to be the group's official timekeeper monitoring the start/finish of the recording periods.

Recording should commence early enough to identify persons travelling to work but also late enough for those returning home in the evening. Suggested recording times could be: 07H00 - 07H05; 07H30 - 07H35; 08H00 - 08H05; 11H00 - 11H05; 13H00 - 13H05; 15H00 - 15H05; 16H00 - 16H05; 17H00 - 17H05; 17H30 - 17H35.

TRAFFIC SCHEDULE:

VEHICLES

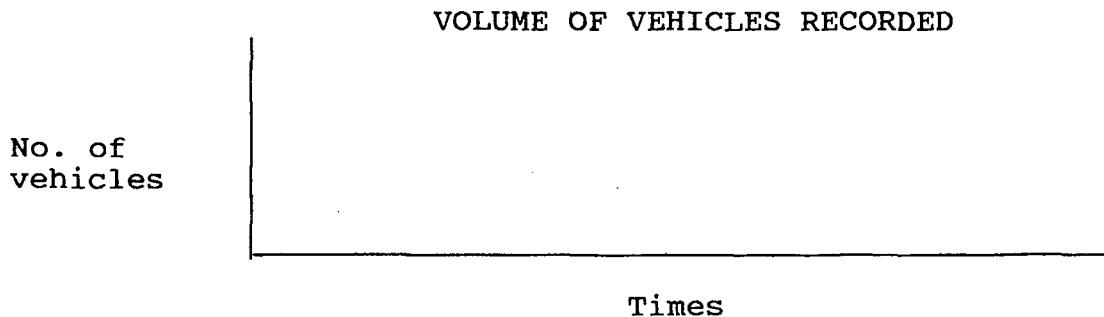
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Be sure to differentiate the direction of movement of vehicles and pedestrians.

TRAFFIC FLOW IN THE COURSE OF THE DAY

TIME	TOTAL NO. VEHICLES
07H00 - 07H05	
07H30 - 07H35	
08H00 - 08H05	
11H00 - 11H05	
13H00 - 13H05	
15H00 - 15H05	
16H00 - 16H05	
17H00 - 17H05	
17H30 - 17H35	

Presentation: Each group is required to add the number of vehicles according to type to get a cumulative total and then to draw a bar graph to show these totals. Place the various times on the horizontal axis and the volume indicated on the vertical axis.



Each group is also required to tabulate the total number of vehicles (in both directions) for the various allocated time periods. From this table a bar graph can be drawn.

Analysis: From the data collected, several questions may be answered:

- i. When are the peak periods of traffic?
- ii. How does traffic vary in its direction of flow during the day?
- iii. What causes these peaks?
- iv. When is the quietest period during daylight hours? Why is this so?
- v. Suggest what likely variations in flow might occur at night and over the weekend.

Follow-up: This survey could be extended to cover passengers and pedestrians and by determining volumes over a longer time period. The Township Engineer could be approached for data recorded for other time periods that could be used for a comparative study.

Another study could be undertaken to determine the origin of people disembarking from taxis.

A study could be made of the level of accessibility for Duncan Village residents in terms of the township's position with regards to places of work, shopping facilities, services etc.

UNIT 13C: CAPTURING THE CHARACTER OF AN AREA

General aim: The aim is to observe and describe any part of the township that pupils feel captures the character of Duncan Village or a part of the township.

Specific aim: Each group is required to capture the character of Duncan Village on film.

Method: Groups should walk through the area before taking two photographs that best capture the character or spirit of Duncan Village. Groups then need to describe their two photographs and explain the reason for their selection.

Presentation: Each group should make a poster on which it pastes their two photographs accompanied by the written text highlighting the main features of the photographs and qualifying the reasons for their selection.

Analysis: The written commentary describing and justifying the photographs forms the analysis.

Follow-up: A large poster combining the efforts of the different groups' could then be made to give a visual representation of the character of Duncan Village.

UNIT 14C: THE QUALITY OF THE ENVIRONMENT

Introduction: Fieldwork provides an opportunity for the expression of one's likes and dislikes about a place. This expression can be communicated in poetry or in a field sketch. Another way is to make use of a rating scheme which uses a point system of scores to rate likes/dislikes. In this way it is possible to compare subjective views.

General aim: The aim is to discover the quality of the Duncan Village environment.

Specific aim: To determine the overall quality of Duncan Village's environment and to establish whether areas differ greatly from each other in quality.

Method: Groups should conduct this survey by assessing the environment's quality as they walk down a chosen route in the neighbourhood. Groups should do this by using the provided indicators and allocating appropriate points (1 - 5).

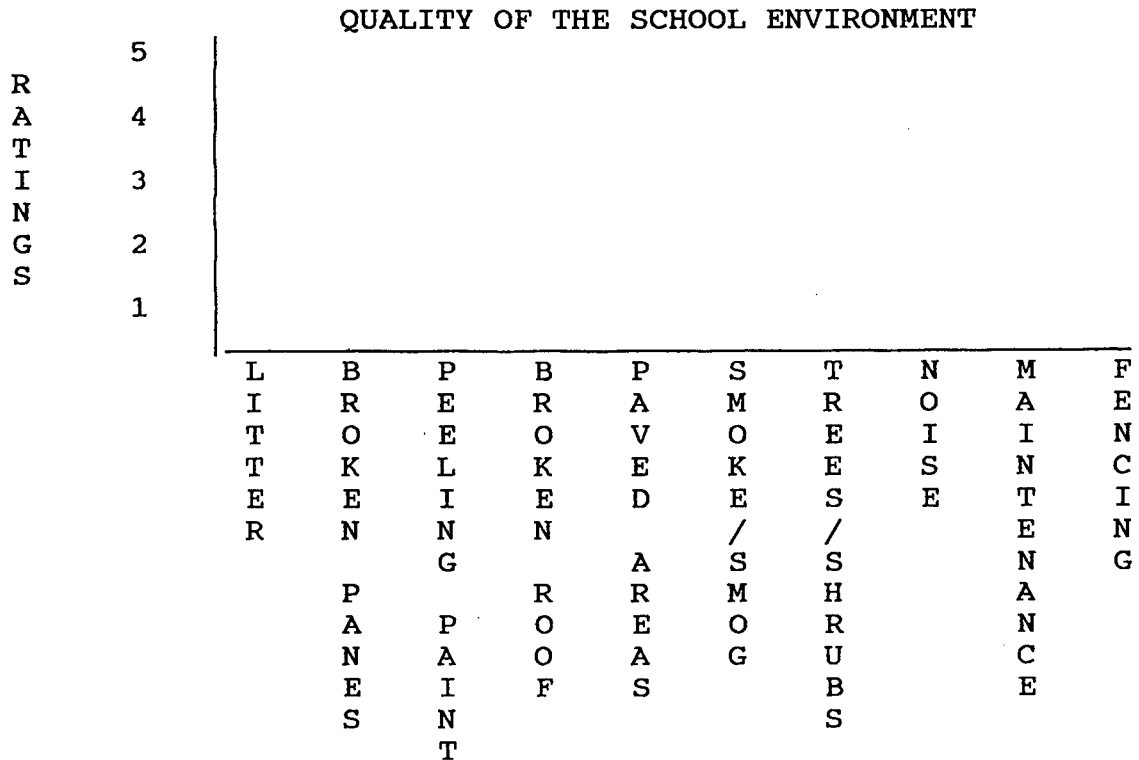
ENVIRONMENTAL QUALITY INDICATORS

INDICATORS		SEVERE	MARKED	SOME	LITTLE	NONE
		1	2	3	4	5
a)	Peeling paint	1	2	3	4	5
b)	Broken and cracked windows	1	2	3	4	5
c)	Rubbish in garden	1	2	3	4	5
d)	Overcrowding	1	2	3	4	5
e)	Use of iron sheets, wood or plastic	1	2	3	4	5

Draw pupils' attention to the nature of the materials that each building is constructed of i.e. bricks/blocks, corrugated iron, wood...

By adding the total scores for each unit surveyed pupils will have determined an overall index for their area. Note the poorer the condition of the environment the closer the score is to zero; the better the environment, the closer the score is to 25.

Presentation: Using the axes provided to represent the route taken, mark off every 5mm to represent 1 house unit. Ensure pupils mark in the respective environmental index they have calculated on the vertical axis for each dwelling.



Analysis: By comparing ratings from other groups, pupils must determine whether their findings indicate that there are sections of Duncan Village that enjoy a higher level of environmental quality than others. If this is so, give pupils the opportunity to provide a possible explanation.

Ask pupils to consider whether there is anything that residents could do to improve the quality of their environment?

Follow-up: Groups could investigate the reasons for the poor quality of the environment. Encourage them to think of ways in which the "problem" could be overcome through collective responsibility and involving all sectors of the community.

(After Nettleship, 1987)

FIGURES FOR THE TEACHER'S MANUAL

Figure

1	Frame of reference for field sketching
2	Example of a field sketch
3	Table: "Feel Test"
4.	Table: "Particle size"
5	Pie-diagram of soil sample
6.	How to make a clinometer
7.	How to use a clinometer
8.	Vegetation transect
7	Traffic counts

Figure 1: Frame of reference for field sketching
(Opie, 1989, p137)

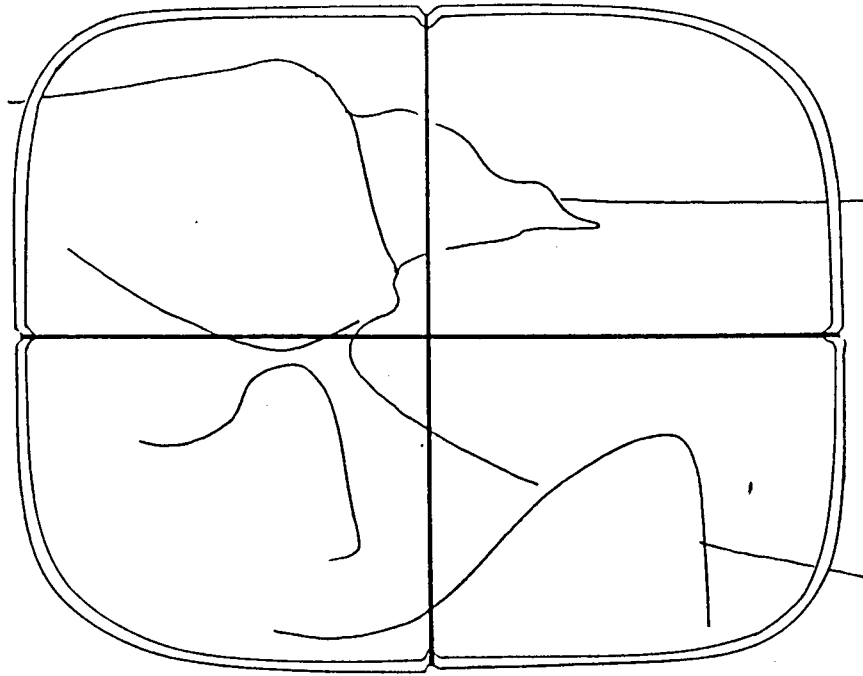


Figure 2: Example of a field sketch
(Opie, 1989, p140)

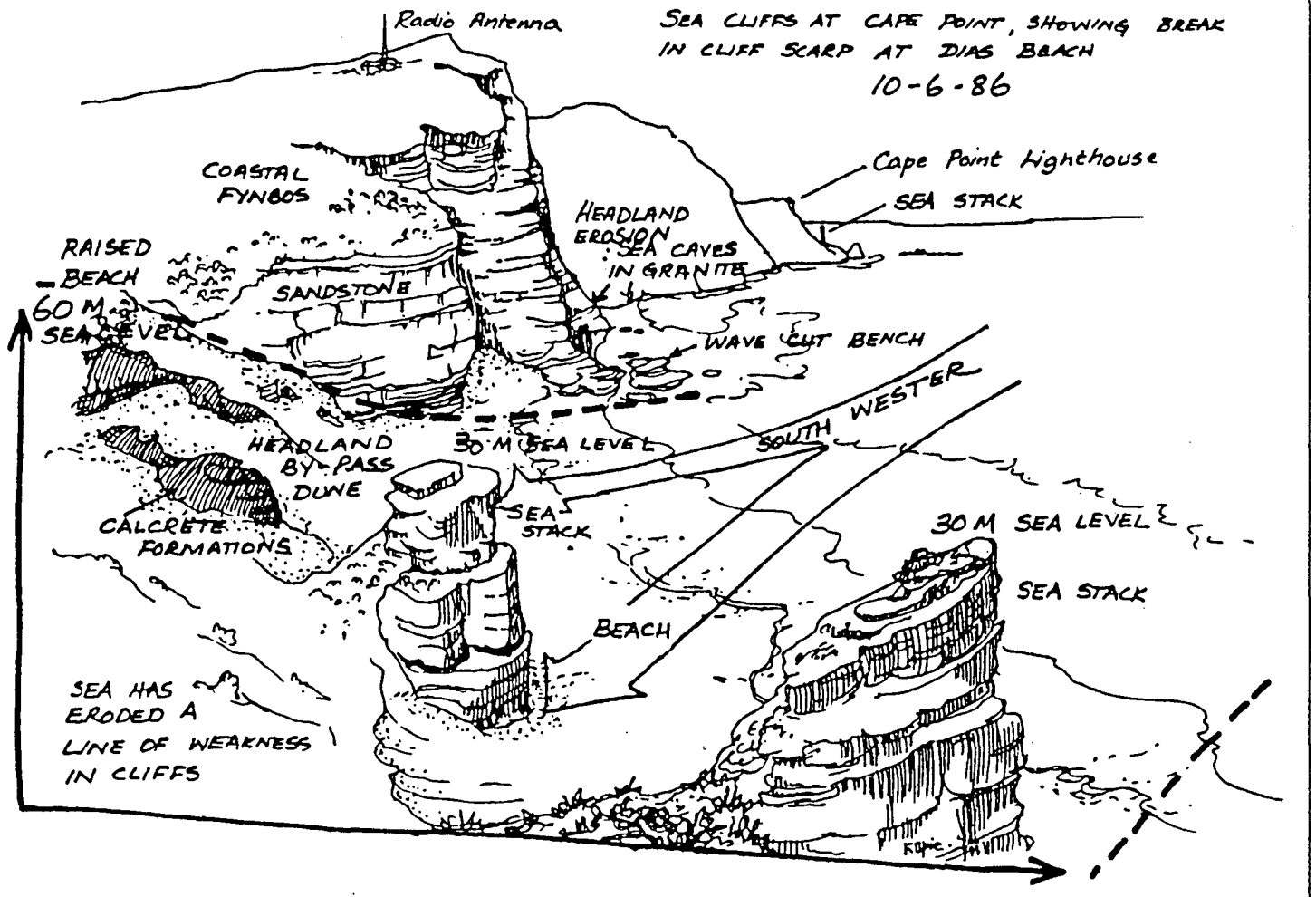


Figure 3: Table: "Feel Test"
(Barton, 1985, p27)

INSTRUCTIONS. Take a pinch of soil and rub it between your thumb and forefinger, how does it feel? Now follow the directions below to find out which applies to your soil.		
GRITTY FEEL	You can also see small grains like sand in the soil. When dry this soil is loose and is not at all sticky when wet. Particle size:- 2.00 to 0.05mm.	SANDY SOIL
SOAPY FEEL	Some people say this soil feels smooth and silky. Particle size:- 0.05 to 0.002mm.	SILTY SOIL
STICKY FEEL	When damp this soil can be rolled into shapes and it will take good finger-prints. Particle size:- 0.002mm or less.	CLAY SOIL
A LOAM SOIL has EQUAL AMOUNTS OF SAND, SILT AND CLAY. It moulds into shapes when wet and sticks to the fingers, but, if you roll it into threads and then try and bend the threads into rings it will break and crumble. It is possible to find clay loams, sand loams and silt loams. They have a mix of all three mineral particles but one is dominant eg. clay loam (more clay than sand or silt).		

Figure 4: Table: "Particle Size"
(Barton, 1985, p27)

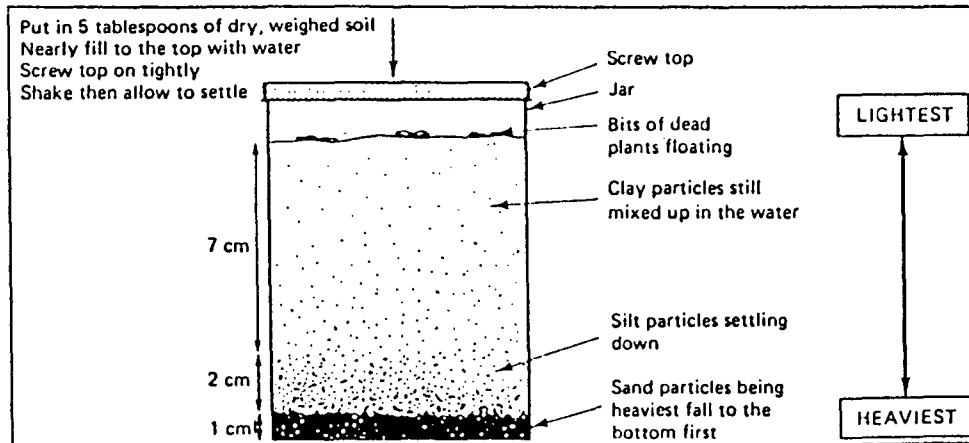


Figure 5: Pie-diagram of soil sample
(Barton, 1985, p27)

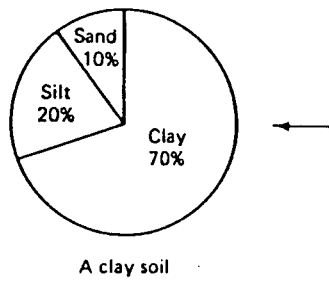
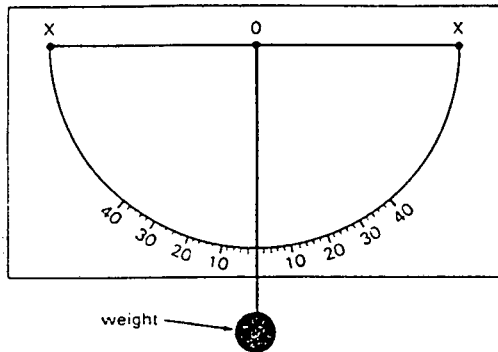
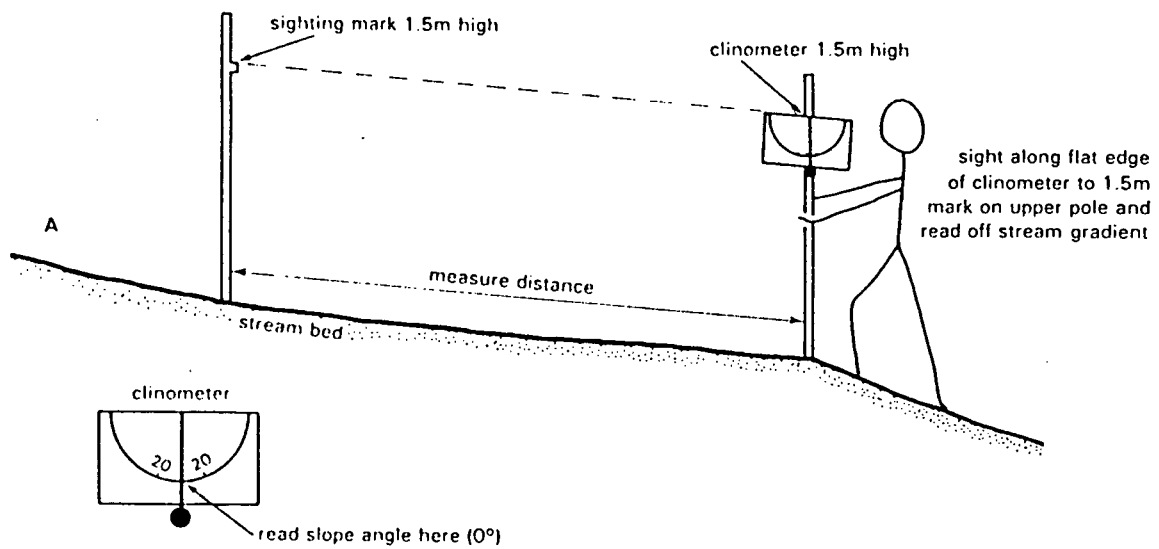


Figure 6: How to make a clinometer
(Lenon & Cleves, 1986, p22)

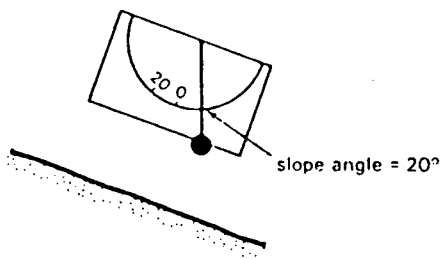


- 1 Trace a protractor onto a sheet of paper and mark on degrees as above.
- 2 Glue the paper to a sheet of card.
- 3 Thread some string through a hole at the point marked 'O'. Secure with a knot and fix a weight to the loose end.
- 4 Push two drawing pins through the points marked 'X' from behind. These serve as sights to help align the clinometer.

Figure 7: How to use a clinometer
(Lenon & Cleves, 1986, p23)



B



C

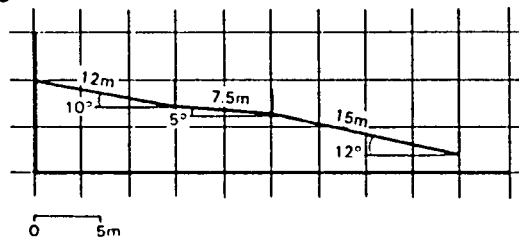


Figure 8: Vegetation transect
(Lenon & Cleves, 1986, p40-41)

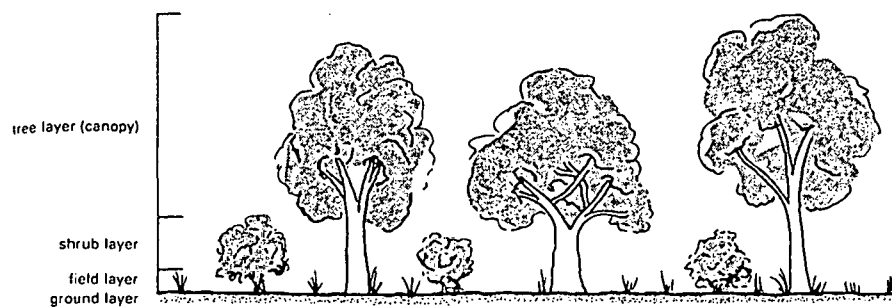
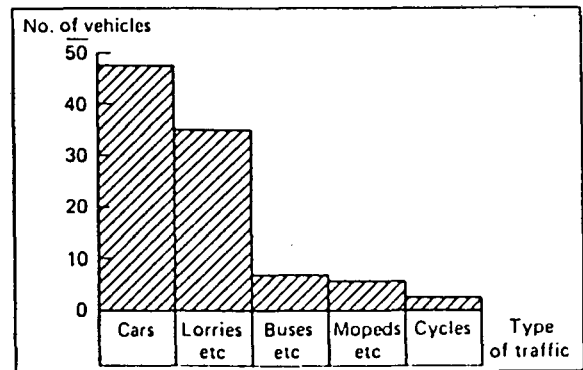


Figure 9: Traffic counts
(Barton, 1985, p18-19)



TRAFFIC COUNT TO FIND OUT ?				
Name: <u>T. Smith</u>		Name of road: <u>Kingsway</u>		
Time of Count:		Direction of traffic movement: <u>Towards town centre</u>		
Date of Count: <u>11th Nov.</u>		Duration of Count: <u>5 minutes</u>		
CARS	LORRIES/VANS	BUS/COACHES	MOPEDS, MOTOR BIKES	BICYCLES
IHT IHT IHT IHT IHT IHT IHT IHT IHT III	IHT IHT IHT IHT IHT IHT IHT	IHT II	IHT I	II
TOTAL = 48	TOTAL = 35	TOTAL = 7	TOTAL = 6	TOTAL = 2
GRAND TOTAL OF ALL VEHICLES = 98				

APPENDIX 4.3

FIELDWORK OPPORTUNITIES IN THE D.E.T. SENIOR SECONDARY GEOGRAPHY SYLLABUS

Std. level	TOPIC	FIELDWORK OPPORTUNITY
	<u>General geographical techniques</u>	
Std.8	Topographical maps (1:50000 & their interpretation) & photographic interpretation.	Making use of local maps & aerial photos
Std.9	Similar to Std.8	Making use of local maps & aerial photos
Std 10	Techniques of collecting & processing data Fieldwork in urban areas	Useful in collecting & presenting fieldwork data Land-use classification; interpretation & analysis of land-use patterns; local traffic counts
	<u>Climatology:</u>	
Std.8	Elements of weather/climate	Measurement of temperatures (How it varies); evaporation rates; wind speed & direction; & the classification of clouds
Std.9	Nil	Nil
Std. 10	Local climates	What causes local variations in weather?

Std.8	<u>Demography:</u> Numerous indirect opportunities	Suited for questionnaire exercises
Std.8	<u>Oceanography:</u> Nil	Nil
Std.8	<u>Geomorphology:</u> Weathering Landform identification	Identification of the different forms Noting of landforms in the local area
Std.9	Fluvial processes	The river system
Std.10	The drainage of an area Structural landscapes Slope types	Discuss run-off & drainage in townships Identification of different rock types Basic slope types
Std.8	<u>Human geography:</u> Nil	Nil
Std.9	Energy resources Primary, secondary & tertiary activities	Survey on the use of various fuel types, especially in the informal sector Identification of the various economic activities found including informal ones
Std.10	Nil	Nil

	<u>Regional geography:</u>	
Std.8	Nil	Nil
Std.9	Nil	Nil
Std.10	South Africa & Ciskei	Context within which fieldwork occurs
Std.10	<u>Settlements:</u> Concept of rural-urban fringe Urban: Growth & distribution The internal structure of cities	The township: rural; urban; or prei-urban? Delimitation of the urban sphere of influence; factors influencing site & situation Land-use zones; cities: their problems; & planning for a better future
Std.9	<u>Economic geography:</u> Primary, secondary & tertiary activites Maize & cattle farming; subsistence agriculture; mixed farming Economic conditions in the peripheral areas	Definition of terms & adding of informal sector mentioning its value Visiting a rural village rather than an isolated farmstead Survey of what opportunities exist for people to improve their standard of living
Std.10	Migrant labour	Nature of working conditions & discussion of the changes that are currently occurring

Std.10	<u>Ecological geography:</u> Soil profile The ecosystem & ecological processes Influences of man on the ecosystem	Degree of compaction Looking at the urban ecology of a township Problem-solving exercises

APPENDIX 5.1

OBSERVATION SCHEDULE: SCHOOL TRAIL

1. Please indicate your observations concerning each of the items listed below by circling the appropriate rating in the column next to each item. Please complete the entire schedule.
2. The following ratings have been used:
 - 1 - very weak
 - 2 - weak
 - 3 - satisfactory
 - 4 - good
 - 5 - excellent
3. Please be frank and as specific as possible since every piece of information will help to illumine this research project.

A GENERAL ASPECTS

1.	Clarity in introducing concept of fieldwork	1	2	3	4	5
2.	Emphasizing the relevance of fieldwork	1	2	3	4	5
3.	References made to real world situations	1	2	3	4	5
4.	Commencing from pupils' experiences	1	2	3	4	5
5.	Suitability of language	1	2	3	4	5
6.	Free of culture clashes	1	2	3	4	5
7.	Keeping to the topic	1	2	3	4	5

B FIELDWORK UNITS: Explanation and exercise completion

1.	Field sketching					
	Raising of key principles: Imaginary frame, main features, 3-dimensional, labels	1	2	3	4	5
	Clarity of explanation	1	2	3	4	5
	Appropriateness* of proposed material	1	2	3	4	5
	Use of suitable material	1	2	3	4	5
	Response of pupils to knowledge	1	2	3	4	5
	Skill development: Ability to know how to draw a field sketch	1	2	3	4	5
2.	Examining the soil					
	Raising of key principles: The "feel test", follow instructions in Table 1, classify the soil	1	2	3	4	5
	Clarity of explanation	1	2	3	4	5
	Appropriateness* of proposed material	1	2	3	4	5
	Use of suitable methods of interpretation	1	2	3	4	5
	Responses of pupils to knowledge	1	2	3	4	5
	Skill development: Ability to know how to test for a soil type	1	2	3	4	5

*Appropriateness i.t.o. the syllabus, culture, level of development

3. Slope surveying

Raising of key principles: characteristics of different slopes, making and using a clinometer, measuring slopes, recording results, drawing a graph	1	2	3	4	5
Clarity of explanation	1	2	3	4	5
Appropriateness of proposed material	1	2	3	4	5
Use of suitable techniques	1	2	3	4	5
Responses of pupils to new technique	1	2	3	4	5
Skill development: Ability to know how to measure a slope, record and graph results	1	2	3	4	5

4. Vegetation analysis

Raising of key principles: Choosing a transect, measuring distances, recording vegetation and drawing a pictograph	1	2	3	4	5
Clarity of explanation	1	2	3	4	5
Appropriateness* of proposed material	1	2	3	4	5
Use of suitable explanations	1	2	3	4	5
Responses of pupils to method	1	2	3	4	5
Skill development: Ability to know how to do a vegetation survey and to graph results	1	2	3	4	5

5. Quality of the environment

Raising of key principles: Observing environment, clarifying values, completing a matrix and drawing a bar graph of ratings	1	2	3	4	5
Clarity of explanation	1	2	3	4	5
Appropriateness* of proposed material	1	2	3	4	5
Use of suitable explanation notes	1	2	3	4	5
Responses of pupils to principles	1	2	3	4	5
Skill development: Ability to assess the quality of the environment and draw a bar graph of results	1	2	3	4	5

6. Pedestrian and traffic movement

Raising of key principles: Using a traffic recording sheet, totalling scores and drawing up of tables	1	2	3	4	5
Clarity of explanation	1	2	3	4	5
Appropriateness* of proposed material	1	2	3	4	5
Use of suitable recording tools	1	2	3	4	5
Response of pupils to recording tool	1	2	3	4	5
Skill development: Ability to record traffic, total scores and draw up various tables	1	2	3	4	5

HOW FIELD UNITS WERE USED

Stimulation of pupil enquiry/interest	1	2	3	4	5
Integration of units into township context	1	2	3	4	5
Pupils' use of the material	1	2	3	4	5
Simplicity and clarity of material	1	2	3	4	5

D TEACHER-PUPIL INTERACTION

Evidence of group discussion /interaction	1	2	3	4	5
Pupils' enthusiasm/interest	1	2	3	4	5
Level of spontaneity	1	2	3	4	5
Pupil participation in the lesson	1	2	3	4	5
Teacher's pitching of lesson at group's level	1	2	3	4	5
Ability to work informally with a teacher	1	2	3	4	5

General comments:

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