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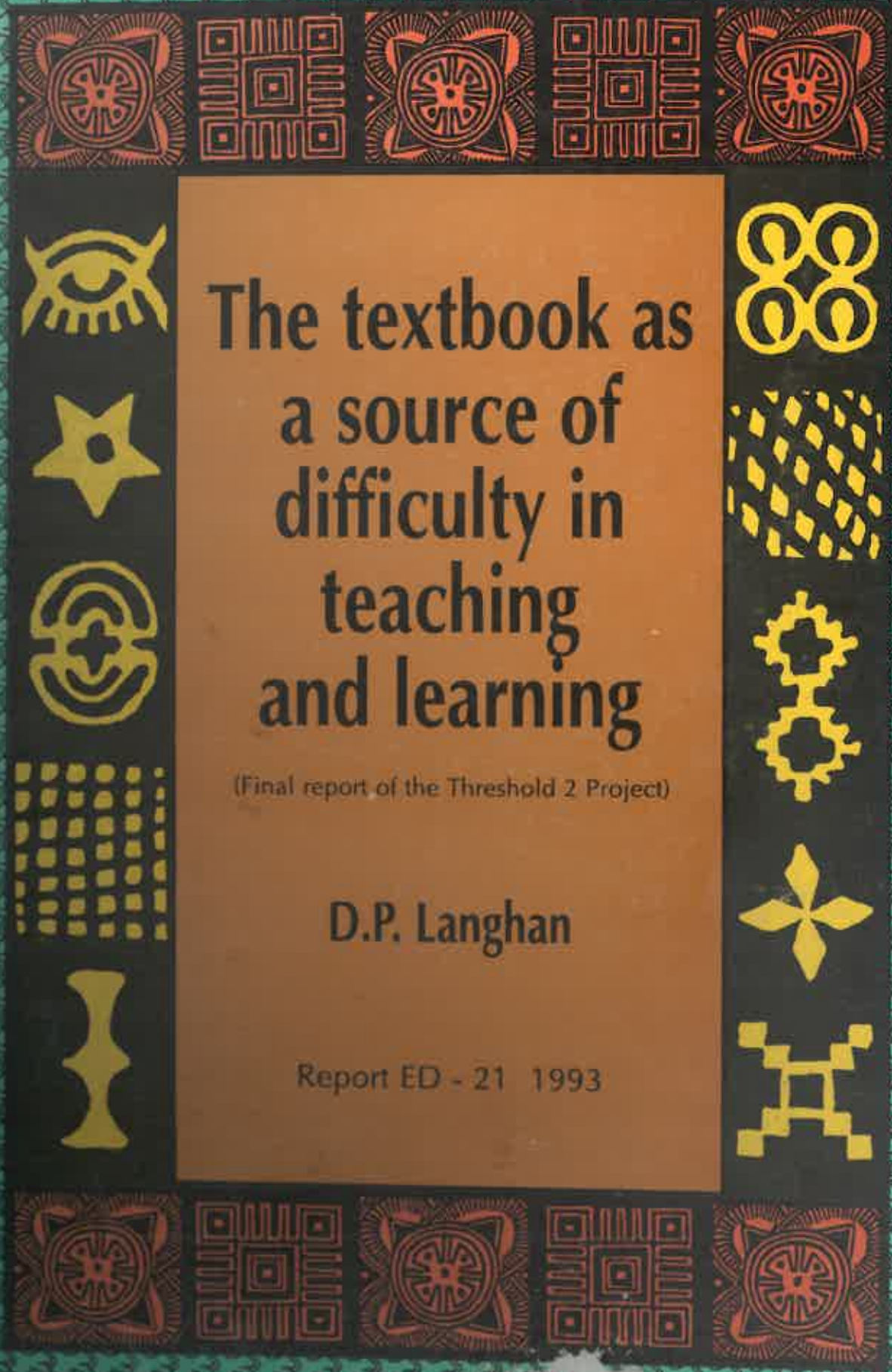
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The textbook as a source of difficulty in teaching and learning

(Final report of the Threshold 2 Project)

D.P. Langan

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**THE TEXTBOOK AS A
SOURCE OF DIFFICULTY IN
TEACHING AND LEARNING**

A final report of the Threshold Project

D. P. LANGHAN

MOLTENO PROJECT

**APPLIED RESEARCH AND
DEVELOPMENT UNIT**

D.P. Langhan

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FOREWORD

The Threshold Project has been concerned with establishing the nature and extent of the educational difficulties encountered when African children make the sudden transition to English as the medium of instruction in their fifth year of schooling (Std 3). The main research was conducted in the Institute for Research into Language and the Arts at the Human Sciences Research Council between 1985-1989. The research, sponsored by the Anglo-American Chairman's Educational Trust Fund, was commissioned by the Institute for the Study of English in Africa at Rhodes University, Grahamstown.

One of the projects of the ISEA at that time, the Molteno Project, had a research officer conducting research for his MA at the same time. His research was completed slightly later than the Threshold 1 Project research, but was in the same paradigm, and addressed many of the issues central to the Threshold enterprise. This was the work of David Langhan, and as project leader, I have asked the Project committee if an edited version of his research might be published along with the Threshold 2 Main Report. Thus it is with great pride that I commend this excellent piece of research to you.

Geography, as a subject, makes rather special demands on young learners. The topic types are almost completely new to pupils; they deal with concepts which are complex and abstract, although they may appear simple and concrete on the surface. The phenomena described in texts are not only outside the pupil's immediate experience, but they are also difficult to exemplify in the classroom. Geographical description is a very important source of information; and the descriptions are substantially supported by non-verbal graphics, photographs, maps, diagrams and tables. Hence geography text would constitute very difficult expository, or informational text.

Not only pupils, but also teachers have trouble understanding geography text. To the pupils, the current texts are totally incomprehensible, and to the teachers, they are partly incomprehensible. However, the teachers use these texts as a guide to a conceptual understanding of the content of geography lessons, therefore, if they are not able to understand the text adequately, it follows that this will directly affect the quality of their instruction. This state of affairs may go some way towards explaining why children have great difficulty with geography in Std 3. However, the most telling implication is that authors are writing textbooks, publishers are publishing them, and, where possible, schools are using them – and the whole cycle of production is an exercise in futility. The situation should not be allowed to continue. What this study illustrates is that we now have sufficient information to ensure that adequate texts can and must be constructed in the future. I say 'texts' advisedly, since it may be that formal textbooks, encompassing every 'fact' in the syllabus may well not be what is required for children to learn effectively when we are able to design and implement a new curriculum. However, even short pieces of text would need to conform to what we understand by good practice in text construction.

Carol Macdonald
Threshold Project Leader
August 1992

ABSTRACT

This investigation provides evidence to suggest that teaching and learning difficulties with geography in Std 3, experienced by teachers and learners whose first language is not English, are largely attributable to inappropriate prescribed textbooks that are difficult to read and comprehend.

The investigation outlines the properties of expository texts necessary to facilitate reading and comprehension for the target readers. It describes the negative impact of existing prescribed textbooks on current teaching and learning practices and identifies, in precise terms, the extent to which such texts are incomprehensible because of their failure as well-constructed expository discourse. The study provides strong evidence to show that such textbooks are wholly inappropriate for pupils by demonstrating teachers' difficulties in reading and comprehending them. Finally, it demonstrates how the same texts, rewritten to incorporate the necessary properties of well-constructed expository discourse, significantly improved teachers' reading and comprehension and, therefore, have the potential to reduce teaching and learning difficulties currently associated with inappropriate textbooks.

In conclusion, recommendations for the design and development of more appropriate textbooks are provided for education authorities, curriculum designers, syllabus writers, textbook publishers and authors, as well as teacher training colleges.

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GLOSSARY

EFL/FL	English foreign language
EMI	English medium of instruction
ESL	English second language
HPS	Higher primary school
JPS	Junior primary school
L1	First language
L2	Second language
MT	Mother-tongue
G1 and 2	Interviewees teaching in Grahamstown schools
PE1 and 2	Interviewees teaching in Port Elizabeth schools
C1 and 2	Interviewees teaching in Ciskei schools
T1 and 2	Interviewees teaching in Transkei schools

1 THE CONTEXT

1.1 INTRODUCTION

Black primary school children in South Africa have, for decades, begun their education through the medium of their mother-tongue and changed to learning through the medium of either English or Afrikaans at some point during the primary school phase. The most appropriate point at which to introduce the new medium has been a controversial issue and has shifted between the second, fourth and sixth year of school several times since 1935 (Hartshorne, 1992:186-217). Since 1982, mother-tongue medium of instruction for the first four years of schooling (to the end of Std 2) has been standard practice (NEPI, 1992:6). However, in the second year of school, before learning skills have properly been established in the mother-tongue, English is introduced as a curricular subject.

After only three years of exposure to English as a subject, little more than 365 hours of what is often less than adequate formal English instruction (Van Rooyen, 1990:1), it was assumed that pupils had reached a state of readiness to enable them to cope with English-medium instruction in Std 3. That is, it was assumed that pupils were able to learn content subjects (mathematics, general science, history, geography and health education), through the medium of English, with no preparation other than the formal English instruction received during the previous three years.

This assumption has been seriously challenged by recent research. Lanham, for instance, argues that the level of English of pupils in their first year of English-medium instruction is inadequate in that it:

...is a product not of natural assimilation, but of being taught it in the previous three years of schooling. For the great majority of (black) primary school children, English learnt in the classroom lacks any sustaining environment outside the school; English is, in other words, a foreign language (Lanham, 1986:1).

Such challenges point to the need for further research in the field of primary school English-medium content subject instruction. This need is highlighted by three important facts. The first, is that in the last 20 years, education departments and private-sector employers have tended to focus attention and resources at the secondary school level. This, in an extended, but largely unsuccessful attempt to reduce black matriculation failure rates and to improve school leavers' qualifications. However, consistently high failure rates suggest that attempts to improve English and English-medium instruction at this level are largely remedial and of limited value.

The second arises out of the findings of recent South African research which reveal that English-medium teaching and learning in black primary schools is as seriously in need of attention as it is in secondary schools (Burroughs, 1987; Grossman, 1986; Kroes, 1987; Lanham, 1986, 1987 b and c; Macdonald, 1986, 1987b, 1990; Meyer, 1989, and Van Rooyen, 1990). It is significant that this research reflects a great deal of consensus about the fact that if linguistic and cognitive foundations are not adequately laid and properly developed in the primary school, there will be a mismatch between pupils' competence and the demands of English-medium secondary schooling (see Weimann, 1986 and Pillay, 1989).

The third, which is likely to create a new set of problems in primary education with serious implications for secondary education, arises out of the

1991 amendment to the Education and Training Act of 1979 (*Government Gazette*, 1991), which allows for the transfer to English-medium instruction before Std 3 from 1993. Given the existing educational context in South Africa, and the disappointing results of similar policies implemented in 17 other English-speaking African countries, it is likely that attempts to introduce English-medium instruction before Std 3 will compound the problems outlined in this investigation and further disadvantage young black learners (Langhan, 1991:47).

It is important to note, however, that the focus of this investigation is on the current situation in which the transfer to English-medium instruction still takes place in Std 3. In this regard, it is significant to note that recent South African research identifies existing prescribed content subject textbooks as important contributors to the difficulties faced by Std 3 pupils. Lanham (1986), Burroughs (1987) and Meyer (1989) have examined selected Std 3 textbooks from various perspectives and conclude that such textbooks are likely to create serious reading and comprehension difficulties for young second language readers. Such texts are, therefore, hardly likely to facilitate learning through the medium of English.

1.2 PRIMARY SCHOOL TEXTBOOKS AND READERS

Over the last 20 years, a number of American and European studies have drawn attention to mismatches between primary school content subject textbooks and the linguistic and cognitive competencies of the English first and second language children for whom they are intended. (See Durojaiye, 1974; Rosen, 1979; Meyer, Brand and Bluth, 1980; Taylor, 1980, 1982, 1983; McGee, 1982; Kinney, 1985; Elliot *et al*, 1986; Perera, 1986.) In South Africa, however, very little formal research had been conducted on this problem until fairly recently.

1.3 REVIEW OF RECENT SOUTH AFRICAN RESEARCH

Macdonald (1986) was among the first South African researchers to draw attention to what have subsequently been recognized as serious problems in black higher primary education. Among these are: 'the standard of English that Std 3 children can control is poor, and that they are far less capable of handling content subjects such as geography, general science and mathematics through English, than through their mother-tongue' (1986:2). Her research indicates that the performance of Std 3 pupils in content subjects is inhibited, at least in part, by an inability to deal with English texts, and instruction through the medium of English. Moreover, she reports, there is a complex relationship between language medium and the pupils' conceptual understanding of the content of various subjects. This further compounds their linguistic problems.

1.3.1 First year of EMI

In the fifth year of school, when English becomes the official medium of instruction, pupils are assumed to have reached a level of competence that will enable them to cope with reading and instruction in the new medium in all content subjects. Evidence from Macdonald and Van Rooyen's (1985-1990) Transvaal and Bophuthatswana research suggests that this is, in fact, not the case. Macdonald (1986 and 1990) and Rodseth (1978), suggest that young black pupils moving from the vernacular to English-medium instruction may well not be functionally literate in their mother-tongue and that they will also not have achieved sufficient English competence to be able to cope with English-medium instruction. Macdonald (1987b:3) points out that children may have learnt to read English with some success by this

1.3.2 Textbooks in first year of EMI

stage, but even if they are competent at the level of the Std 2 English syllabus, this is inadequate preparation for the shock of the transition in Std 3. Van Rooyen (1990:3) confirms these views and adds that given the present resources and other constraints within the education system, the gap between the English subject competence ideally held by children at the end of Std 2, and the competence required for meaningful use of texts in Std 3, appears to be too great for any black child to bridge.

Macdonald, in her study of general science textbooks (1986:5), reports that in addition to pupils' poorly developed language competence, the quality of the content subject textbooks they are required to use is equally likely to be a cause of learning difficulty. Also, in Std 3 children are exposed to expository texts for the first time in their school experience: they receive up to five textbooks, each as many as 100 pages long. Apart from the unfamiliar textual conventions in such texts, the children face at least three other obstacles: 1) difficult grammatical constructions; 2) a 'veritable mountain of vocabulary'; and 3) textbooks that are generally badly constructed (see also Lanham 1986 and Meyer 1989). According to Macdonald (1986:4): 'The child's task appears formidable, if not impossible'.

1.3.3 Teaching and learning practice

Burroughs (1986:2) and Macdonald (1987b:3) report that in higher primary classes, it is not uncommon to observe that teaching practices emphasize the accurate recall of memorized information. In such classrooms, teachers typically 'provide' information which pupils memorize and reproduce without necessarily comprehending the subject matter. Macdonald suggests that there seem to be two likely explanations for this approach to teaching. The first is that the practice has deep cultural roots, and the second is that textbooks that are above the competence levels of the users 'impose' the rote-learning style.

ROTE-LEARNING AS A CULTURAL STYLE

In cultures with an oral tradition, such as the African culture, knowledge is transmitted from 'above', with little questioning from 'below' (Ellis, 1987:85-89). It follows then, that teachers' assumptions about communication provide a framework in which we can understand how beliefs about knowledge relate to the roles assigned to teachers and pupils in teaching and learning (see Barnes and Shemilt, 1974:224; and Macdonald, 1987b:1). In other words, the teacher's view of knowledge and learning determines what happens in the classroom, and what becomes available to be learnt. In a British survey of 125 teachers, Barnes and Shemilt (1974:223) found that most teachers fell into two main categories, namely, transmission and interpretation teachers.

Barnes and Shemilt propose that two sets of opposing beliefs about what constitutes teaching and learning underlie these views of classroom communication. Based on their hypothetical reconstruction of these beliefs, they conclude that interpretation teachers will tend to allow their pupils to have some part in determining what counts as knowledge in their lessons and emphasize understanding and meaningful learning. On the other hand, they suggest that transmission teachers tend to exclude pupils from the process of formulating knowledge, preferring to 'transmit' knowledge to their pupils. This approach results in active teachers with passive pupils whose primary function is to memorize and reproduce transmitted information, often at the expense of understanding.

Macdonald and Ellis suggest that the oral cultural tradition of the African teacher, together with its implicit views of knowledge, tends very strongly towards Barnes and Shemilt's transmission view of teaching and learning.

ROTE-LEARNING AS A RESPONSE TO POOR TEXTS

While it appears likely that there is some kind of affinity between the culture of the 'transmission' classroom and the traditional views of knowledge, learning and authority still operative in African culture, there is evidence that suggests that prescribed textbooks may be an equally important factor in determining the teacher's preferred style. Lanham (1986:9), for example, suggests that poor texts may be contributors to black children's present tendencies to write in terms of disjointed, propositionally jumbled sentences, and also to rely upon rote learning. He argues that 'learning by rote may be the only way the child has of remembering the content' of poorly constructed texts. This view is confirmed by Young and Nuttall (1989:224):

The less well written the text, the greater will be the tendency to reproduce unselectively and uncritically, large sections of that text which appear to be helpful in answering the questions set, regardless of whether the text has been effectively understood or not.

1.3.4 Impact of early EMI

Van Rooyen (1990:1-3) reports that it is not uncommon in Std 3 classes to find that little more than half of the syllabus is covered in a year. This creates a cumulative backlog the children may carry with them each year until Std 10. This 'backlog' effect may provide part of the explanation for the high drop-out and failure rates in black higher primary and secondary schools (See Carstens and Du Plessis, 1987:19 and Du Plessis, Du Pisani, Plekker 1988:17; 1989:14).

Pillay (1989:1), for example, points out that as black pupils progress to secondary school, they simultaneously face two problems:

- a) more advanced conceptual difficulties in geography, science, mathematics, etc... and b) studying those subjects through the medium of English. Throughout secondary school the problem becomes more serious and by the time they reach university the surviving students are still struggling with what seems to be largely meaningless English prose in their texts. See also Weimann (1986).

1.4 AIMS OF THE STUDY

Since recent research hypothesizes that existing textbooks are likely to contribute to the learning difficulties in the first year of English-medium instruction, this investigation aims to:

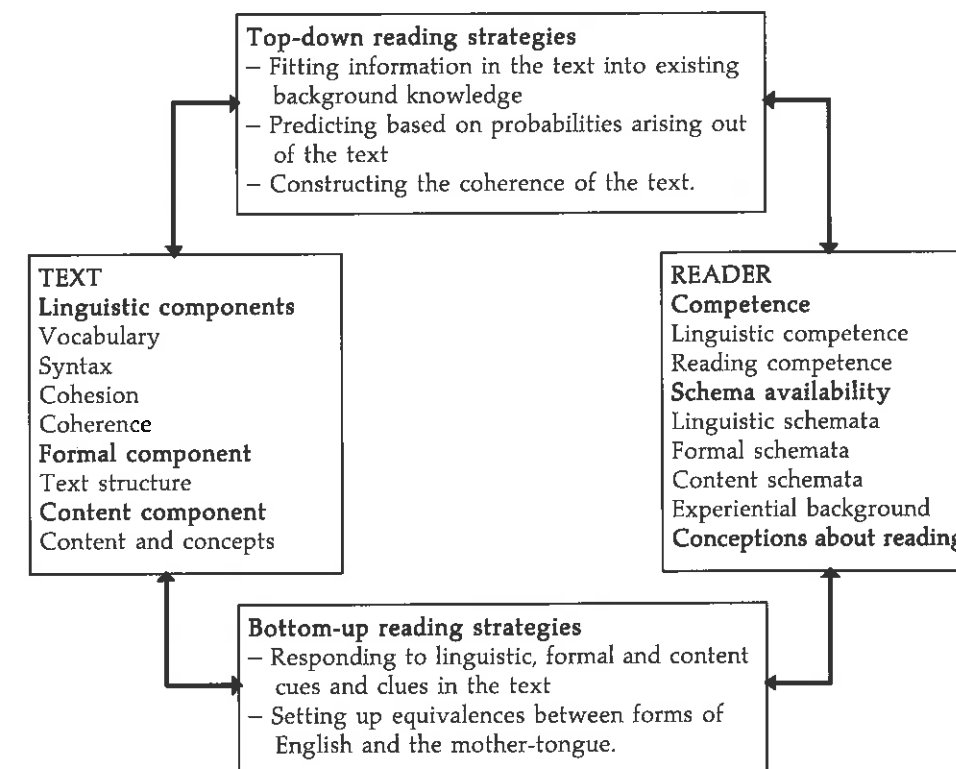
- Determine the extent of Std 3 geography pupils' and teachers' difficulties in using selected geography textbooks.
- Identify actual causes of difficulty for Std 3 geography textbook users. (The reader, the text and the reader-text interaction are addressed.)
- Show that rewritten texts that take users' identified difficulties into account, facilitate reading and comprehension and are, therefore, likely to improve the quality of teaching and learning through the medium of English.

2 LITERATURE SURVEY: READING AND ANALYZING TEXT

2.1 MAIN COMPONENTS OF THE INTERACTIVE READING PROCESS

In this chapter, it will be shown that reading is an interactive process involving the reader and the text (by implication, the writer). On the one hand, the text, based on the writer's assumptions about readers' ability to process and infer meaning, provides readers with clues that should facilitate the reconstruction of the intended meaning of the text. These 'clues' are discussed under the headings of 'vocabulary', 'syntax', 'cohesion', 'coherence' and 'text structure'. On the other hand, readers are thought to use mental or cognitive strategies in a cyclical process of constructing their own meaning by sampling a text. Depending on readers' linguistic competence, visual literacy and background knowledge, they are thought to respond to clues and cues in a text by activating the appropriate background knowledge. In this way, meaning is 'reconstructed' in a complex interaction between writer, reader and text.

Figure 2.1
The main components of the interactive reading process



This process may be illustrated by the flow diagram in Figure 2.1 above. This diagram attempts to show both the interaction between reader and text, and the cyclical nature of the reading process, both of which are explained in detail in this chapter.

Following the flow diagram, it is clear that a focus on text factors alone does not go very far in determining the 'compatibility' of reader and text. On the contrary, in the case of young ESL readers, the starting point for the writing process is the level of the readers in terms of competence, schema availability and conceptions about reading. These reader-factors (together with syllabus

requirements) should determine the linguistic, formal and content components of texts intended for them.

For the purpose of this study, the following criteria will be used to determine whether a geography textbook intended for black Std 3 pupils can be considered readable and comprehensible:

- If the average pupil is able to recognize the constructs and components (or textual properties) in the text, and
- if the readers' background knowledge and cognitive reading strategies are taken into account and facilitated, so that
- they are able to interact with the text so as to be able to construct, for themselves, the intended meaning of any part of that text.

2.2 READING IN A SECOND LANGUAGE

2.2.1 AUDIOLINGUAL ERA, 1942-1962

During the 40s, 50s and early 60s reading (in a first language) was viewed as secondary to, and dependant on, development of oral language skills (Fries, 1945, 1962). The strong influence of the audiolingual method at the time, resulted in the view that reading and writing could only be taught, and therefore learned, after aural-oral skills had been mastered. Teachers trained in the audiolingual method were taught that 'language was speech', and that 'reading was simply speech written down' (Silberstein, 1987:28). Consequently, the teaching of reading skills was not emphasized and many audiolingual programmes ignored the teaching of reading altogether in favour of dialogues and pattern-practice drills thought to produce effective speakers (Silberstein, 1987:28)

A DECADE OF QUESTIONING, 1962-1973

According to Silberstein (1987:29), a major transformation in the conceptual model of (first language) reading was begun in 1962 as a result of a great deal of debate on reading instruction, the usefulness of audiolinguilism, and the reassessment of the linguistic and psychological theories upon which the audiolingual method was based. Researchers like Rivers (1964,1968), Plaister (1968), Eskey (1970,1971) and Yorio (1971) moved towards a slightly less mechanical view of reading. They regarded reading primarily as a decoding process of reconstructing meaning by recognizing and decoding letters and words and then phrases, clauses and intersentential linkages. Although this view was more concerned with deriving meaning from texts than previous views, it did not provide either an effective method for the teaching of reading, nor a model that explained the reading process satisfactorily. The focus was still on the text as the 'container' or 'carrier' of meaning.

It was during this time of changing attitudes towards reading, however, that the importance of the reader's background knowledge, in particular the role of socio-cultural knowledge in second language reading, began to be recognized. According to Fries (1963), a failure to relate the linguistic meaning of a reading passage to cultural factors would result in something less than total comprehension. However, despite Fries' early insight into the importance of the role of culture-specific knowledge, the concept was not taken up in early theories of second language reading, and the methodological and instructional focus remained on decoding (Carrell, Devine and Eskey, 1988:2).

INFLUENCE OF PSYCHOLINGUISTICS, 1967-1979

The really significant work during this period came about as a result of the influence of psycholinguistic research. Goodman's 1967 model of reading as a 'psycholinguistic guessing game' marked the introduction of a completely new approach to reading. This strategy continues to inform most current thinking about reading.

Goodman (1967:371) rejected previous text-based, decoding views of reading and proposed, instead that:

Reading is a psycholinguistic guessing game. It involves interaction between thought and language. Efficient reading does not result from precise perception and identification of all elements, but from skill in selecting the fewest, most productive cues necessary to produce guesses which are right the first time (1976:372).

Smith (1973) draws attention to two important contributions from psycholinguistic research which support the argument that the efficient reader does not proceed in a rigid word-by-word manner. The first is that there is a severe limit to the amount of information that readers are able to receive, process and remember. The reader, therefore, does not use all the information on the page, but selects only the most productive cues. The second is that reading is only incidentally visual, and that more information is contributed by the reader than by the text on the page. Readers, therefore, understand what they read 'because they are able to take the stimulus beyond its graphic representation and assign its membership in an appropriate group of concepts already stored in their memories'.

Although Goodman's model exerted a strong influence on views of first language reading at the time, it was only by the early 70s that its significance for second language reading was realized. Its major impact was that it introduced the notion of the reader as an active participant in the reading process. Since then, readers have been seen to be involved in making and confirming predictions based primarily on their linguistic background knowledge. However, it is at this very point that the major limitation of his model becomes evident.

While readers are seen to be active participants in the reading process, their primary contribution to the reading of a text is limited to *linguistic* knowledge. Although, as a result of this model, second language reading came to be seen not only as a vehicle for language instruction, but also as a unique information-processing skill, the focus was still on processing information in the text.

SCHEMA-THEORETIC OR INTERACTIVE APPROACH, 1979-1988

Since 1979, Goodman's basic psycholinguistic model, as applied to second language reading, has been extended to incorporate new psycholinguistic insights about a reader's background knowledge. This knowledge interacts with conceptual abilities and process strategies to produce comprehension (Adams and Collins, 1979; Steffenson, Joag-dev and Anderson, 1979; Carrell, 1981; Johnson, 1981, 1982; Hudson, 1982; Carrell and Eisterhold, 1983). In this view, not only is the reader's prior linguistic knowledge and level of proficiency in the second language important; but also prior background knowledge of the content area of the text as well as its rhetorical structure (Carrell, 1983, 1984a, 1985).

Unlike previous approaches to reading, a fundamental assumption of interactive approaches is that meaning is not fully present in a text, waiting to be decoded. Rather, meaning is created through the interaction of reader and text (Adams and Collins, 1979). According to Adams and Collins, a text only provides directions for readers as to how they should retrieve or construct intended meaning from their own, previously acquired knowledge. The background knowledge that facilitates text comprehension has been studied under the name of schema theory. This theory emphasizes the role of pre-existing knowledge in providing the reader with information that is implicit in a text (Rumelhart, 1977, 1980, 1981; Carrell and Eisterhold, 1988).

According to schema theories, all pre-existing knowledge is packed into units or knowledge structures called schemata. These knowledge structures or schemata, are 'stored hierarchically in the brain, the more general subsuming the more specific' (Rumelhart, 1981:4,5). A reader's hierarchy of schemata organizes his knowledge of language and the world. So, while reading, on the basis of input from the text, the reader forms expectations based on prior knowledge both of texts (formal schemata) and of the world (content schemata). He seeks to confirm his expectations by matching information in the text with information stored in the relevant schemata. Following this approach, efficient comprehension requires the ability to relate textual material to one's own knowledge.

The process of interpretation is guided by the principle that every input is mapped against some existing schema, and that all aspects of that schema must be compatible with the input information. This principle results in two basic modes of information processing, called bottom-up and top-down processing. Bottom-up processing occurs when information from the text (linguistic input, for example, phonemes, graphemes and words) is mapped against the reader's schemata, which are modified on the basis of information encountered in the text. Top-down information processing occurs when readers use prior knowledge to make predictions about the data they will find in a text, based on prior experience or background knowledge, and then checking the text for confirmation or refutation of those predictions.

The crucial feature of an interactive reading model is that bottom-up and top-down processing are thought to occur simultaneously, and to interact with each other. (See the flow diagram in section 2.1.) Thus, according to schema theory, readers activate an appropriate schema against which they try to give a text a consistent interpretation. 'To the extent that they are successful, we may say that they have comprehended the text' (Carrell, 1984b:1,2).

It is significant for this investigation, particularly for the discussions of readability and text analysis in sections 2.4 and 2.5 of this chapter, that the interactive model suggests that no text can be considered 'generically difficult or easy simply on the basis of linguistic features such as syntactic complexity or word frequencies' (Silberstein, 1987:31). Texts become easier to comprehend if they correspond to readers' prior knowledge of language, rhetorical conventions and the world (Hudson, 1982; Steffenson, 1979, 1984, 1988b; Carrell, 1981, 1983, 1984b, 1985, 1987; Johnson, 1981, 1982).

2.2.2 Interactive approach to comprehension difficulties

According to the interactive model of reading, failures in reading comprehension can occur due to a breakdown in the simultaneous bottom-up, top-down (bidirectional) processing, and the over reliance on either bottom-up or top-down (unidirectional) processing (Silberstein, 1987; Carrell, 1988a). Carrell (1988a:101) points out that less skilled readers tend to rely too heavily on processes in one direction, producing 'deleterious

effects on comprehension'. She goes on to identify four main causes (103-110) of such breakdowns in the interactive process discussed below.

SCHEMA AVAILABILITY

The most obvious cause of over reliance on the text in comprehension is the absence of relevant knowledge structures (schemata) to utilize top-down processing. If the schemata do not exist for the reader, they cannot be used (Bobrow and Norman, 1975; Rumelhart, 1981; Carrell, 1984b).

Carrell (1988a:104) draws an important distinction between *formal schemata* (background knowledge of the formal, rhetorical, organizational structure of the text; see also Meyer, 1975, 1977, 1981), and *content schemata* (background knowledge of the content area of the text). She shows that the absence of either or both of the schemata, as appropriate to a particular text, can result in processing difficulties. Readers may then either:

- rely too heavily on text-based processes, or;
- substitute the closest schema they possess, and try to relate incoming textual information to that schema, resulting in schema interference. In either case, comprehension and recall suffer.

SCHEMA ACTIVATION

It is also possible that readers may possess appropriate schemata which are not activated during reading. This results in comprehension difficulties. This is likely to be as a result of what Carrell (1988a) calls 'opaque' texts, that do not contain sufficient textual cues to signal the schemata to be activated. (See also Johnson, 1981; Rumelhart, 1981; Bransford, Stein and Shelton, 1984.)

SKILL DEFICIENCIES

There are two skill deficiencies that are likely to cause the failure of bottom-up processing in reading, namely, linguistic and reading-skill deficiencies.

- Linguistic deficiencies – the linguistically deficient reader, who is unable to decode syntactic structures or recognize content vocabulary, will be unable to use text-based, bottom-up processing. (See also Clarke, 1979; 1980:206.)
- Reading-skill deficiencies – readers may also have reading-skill deficiencies, and, for example, be inefficient bottom-up processors, decoding language only with great effort. This deficiency, according to Carrell (1988a), may lead either to over reliance on decoding or its avoidance.

CONCEPTIONS ABOUT READING

The reader's conceptions about reading may also interfere with interactive processing. Some students simply do not know that they are allowed or expected to use information not stated in the text in order to interpret it, believing that 'all the meaning is in the text'. (See also Lanham 1990: 179.)

2.2.3 Contemporary issues in ESL reading

'HOLDING IN THE BOTTOM'

Probably the single most significant issue in contemporary reading theory, as it informs classroom practice, is the concern for a properly balanced or symmetric approach to interactive reading (see Grabe, 1986; Silberstein, 1987; Carrell, 1988b; Eskey and Grabe, 1988). This concern stems from the fact that there has been a tendency to view the introduction of 'a strong

top-down processing perspective as a substitute for the bottom-up, decoding view of reading, rather than its complement' (Carrell, Devine and Eskey, 1988:4). Eskey and Grabe (1988:93) have pointed out that, in practice, bottom-up processing has been de-emphasized. They hold that for the less proficient, developing reader (like most second-language readers), the strong top-down perspective does not provide a true picture of the problems such readers must surmount. They argue that for a proper interpretation of texts, top-down skills are crucial; but lower-level skills such as the rapid and accurate identification of lexical and grammatical forms are 'not merely obstacles to be cleared on the way to higher-level "guessing-game" strategies, but skills to be mastered as a necessary means of taking much of the guesswork out of reading' (98).

ROLE OF THE TEACHER

In contrast to audiolingual teachers who, when they taught reading, used a great deal of mindless drilling; Grabe (1986) and Silberstein (1987) write that there is a great deal of consensus that the role of the teacher is to 'facilitate reading, raise consciousness, build confidence, ensure continuity and systematicity, show involvement, and demand performance'. The implication is that teachers should understand that reading is crucial for learning; that learning is dependant on the ability to read; and that reading is certainly not to be regarded simply as an extension of aural-oral language learning.

2.2.4 Conclusion

A necessary implication of the interactive approach to reading is that 'reading undeniably and incontrovertibly involves two necessary elements: a reader and a text' (Alderson and Urquhart, 1984:xvi). Ideally, these two elements should be 'compatible' in the sense that a meaningful interaction is possible between them. The extent to which the interactive process described in this chapter is successful, depends on a number of reader and text-related factors. These factors, although part of a simultaneously interactive process, will be analyzed separately in the following sections of this chapter, in order to gain a deeper understanding of potential causes of difficulty for young second-language readers.

2.3 COGNITIVE READING STRATEGIES

2.3.1 From product to process

Traditionally, reading researchers focusing on what the reader does while reading, have attempted to analyze the reading skill into a series of subskills (Alderson and Urquhart, 1984:xvi). Most early research attempted to discover if reading is composed of different subskills that relate to one another within a hierarchy of skills. Since 1944, many attempts have been made to classify reading skills, and the literature reflects a great deal of controversy over at least two issues. The first, concerns the number of reading skills (see Barret, 1968; Davis, 1944, 1972; Luzner and Gardner, 1979; Munby, 1978; Spearritt, 1972; Thorndike, 1973) and the second, whether the skills-approach is appropriate for a description of the reading process.

While the question of 'how many skills' does not appear to have been settled, recent research has been more concerned about whether the reading process is best described as a unitary ability or in terms of multiple skills that can be identified and measured. In reviewing the literature in this field, there appears to be increasing support for the view of reading as a unitary, cyclical process in which mental processes or strategies interact simultaneously (Goodman, 1970; Guthrie, 1973; McNeil, 1974; Stennet, Smythe and Hardy, 1975;

Samuels, 1976; Kintsch and Van Dyk, 1978; Artley, 1980; Downing and Leong, 1982; Alderson and Urquhart, 1984; Tonjes, 1986; Lanham, 1986).

2.3.2 Reading as a process

Alderson and Urquhart (1984:xix) argue that the focus of early research on the product rather than the process of reading is 'inadequate because of the unpredictable and normal variation in product, and because knowing the product does not tell us what actually happens when a reader interacts with a text'. The process, they argue, underlies the product. The value of concentrating on process in research and teaching is that if processes can be characterized then they may contain elements that are general across different texts. Learners can then assimilate them in order to improve their reading. A description of the process should lead to the possibility of distinguishing the processing of successful and unsuccessful readers. This in turn should lead to the possibility of teaching the strategies or process components of successful readers to unsuccessful ones, or at least of making them aware of other strategies.

According to Alderson and Urquhart the problem with research into process is that 'the process of reading is elusive' (1984:xx). The following discussion attempts to illustrate how a satisfactory description of the cognitive process of reading continues to elude researchers.

One of the older, yet most useful techniques of investigating the process of reading is Goodman's miscue analysis (1974, 1976). The basic reading strategies that miscue analysis appears to reveal are:

- Prediction – what the next piece of language will be
- Sampling – selecting the minimum information from text a consistent with the prediction
- Confirming – testing the prediction against the sample
- Correction – if the prediction is not confirmed, another prediction is generated.

Naturally, these strategies closely reflect Goodman's model of reading discussed in section 2.2 of this chapter. It is to be expected then that strategies derived from his early model will not reflect the entire reading process as it is described by more recent interactive models. There are at least three important weaknesses in using Goodman's miscue analysis approach for deriving cognitive reading strategies:

- These strategies are inferred by researchers, rather than displayed by readers.
- The connection between reading aloud, which is necessary for the miscue analysis, and silent reading is difficult to prove. It is therefore difficult to generalize about cognitive strategies.
- Goodman's psycholinguistic model of reading does not take into account the role of the reader's content and formal background knowledge, and their activation as a strategy, nor does it account for cultural factors.

Even if miscue analysis was applied in the context of an interactive model of reading, only the last of the three weaknesses discussed above could be accounted for. Researchers would still have to infer readers' cognitive strategies and assume that these were the same for reading aloud and silent reading. (See Olson and Mack's 1984 'Thinking-Out-Loud' method). Nevertheless, current reading research seems to point conclusively to the

2.3.3 Cognitive reading strategies

appropriateness of a process approach for the explanation and description of cognitive strategies.

It has been explained that the focus of reading research has shifted from the classification and description of reading skills, to an interest in the cognitive strategies that are part of the process of reading. Lanham's 1986 and 1990 work is particularly significant in the South African context. By drawing on schema theory, cognitive strategy research and his own extensive empirical research into the reading problems of young black readers, Lanham (1986:10-11) suggests that there are three main cognitive strategies in competent reading. In a 1990 paper (a,1) he proposes a fourth. Particularly significant for this study, is the fact that he shows how these strategies relate to young ESL readers' competence in Std 3, and identifies reading difficulties they may be expected to encounter as a result. Lanham's four main cognitive strategies are:

FITTING TEXTUAL INFORMATION INTO A BACKGROUND OF PREVIOUS EXPERIENCE

Lanham (1986:5) points out that there are at least two important issues for reading in a second language:

- The second-language reader will interpret what he reads in a text in terms of its relevance to, and closeness of 'fit' with the components of his background schema. Because of different cultural and life experiences, this may not, in fact, be the intended message of the text. (See also Johnson, 1981, 1982; Murray, 1985; Tonjes, 1986.)
- Even more important is whether or not the second-language reader makes any attempt to construct or activate a background schema at all. Lanham (6) points out that there is evidence to suggest that even if this strategy is practiced in the mother-tongue, it does not transfer effectively to learning to read in a second language.

EQUIVALENCES BETWEEN ENGLISH AND MOTHER TONGUE

Lanham (1990a:175) explains that in processing texts, young second-language readers are inevitably involved in an encounter with unknown and unfamiliar components and properties of texts. They tend to be blocked at points where meaning is not readily inferred and they are delayed in the process of calculating meaning.

The effective processing of an extended text requires a certain momentum to be maintained, failing which a grasp of the coherence of a text is lost. In this context, Lanham proposes that an important strategy adopted by young bilinguals is the setting-up of equivalences between forms in English and the mother-tongue on the basis of known meanings. He points out that such meanings may be syntactic, lexical, cohesion devices, etc. Clarke's (1979,1980) findings that linguistic competence may influence the transfer of L1 skills to the L2 is particularly significant.

ANTICIPATING WHAT IS TO COME

An important aspect of the interactive process between reader and text involves predicting what is to come. The competent reader creates such expectations not only from a schema constructed from previous experience, but from cues coming from words, structures and meanings which themselves predict the words, structures and meanings that lie ahead (Lanham 1986:9). Lanham points out (7) that these expectations are a product of extensive

exposure to reading texts in a language, or living in a culture; they are not the products of rules. The young ESL readers' disadvantage is obvious. It cannot be assumed that they have had this exposure.

In addition, prediction implies the presence of a running hypothesis in the mind of a competent reader of what lies ahead. S/he needs only a sampling of a text to confirm the hypothesis. The antithesis to this competent-reading strategy is that of progressing from left to right, processing each and every word, working out meaning in retrospect and adding it to the meaning of a previous sentence (7). This way of reading precludes constructive interaction with the information in a text.

CONSTRUCTING THE COHERENCE OF THE TEXT

In terms of the schema-theory approach to reading, this strategy allows for the proper storage of the content of a text; an ability to recall much of the information created in a text; and an ability to interrelate different parts of a text between which there is no obvious overlap of ideas (7). This also includes the extraction of the theme that unites an entire text. This takes the form of a 'progressively advancing synthesis' which amounts to 'what the text is about'. This is done by seeking the 'central idea' sentence or sentences that all other sentences support and of which other sentences are obvious entailments.

Lanham points out that in descriptive or expository text that Std 3 pupils are expected to read, the structure is more complex than in narrative texts. In expository text, 'what the text is about' has 'conceptual form but not necessarily syntactic expression' (8). This means that constructing the coherence of such texts is a particularly demanding strategy and a young ESL reader whose only exposure has been to narrative text, is unlikely to have had any practice using it.

Finally, Carrell (1988b:248), in her discussion of reading strategies, suggests one that does not appear to be accounted for by Lanham. This may, in fact, make up a fifth strategy, namely, *text mapping*, or using knowledge about the rhetorical organization of a text to guide and organize the interaction with the text.

2.3.4 Special cognitive demands of geography

In addition to the cognitive strategies the reader is thought to apply during the reading process, the study of geography makes special cognitive demands on its learners. Davies and Green (1984) provide a useful overview of the four major cognitive demands geography makes on its learners.

A fundamental requirement of geography is that pupils develop and learn to use appropriate mental frameworks, or schemata that enable them to make sense of the information in the text by fitting what is *new*, into an already established, or *old* framework (Davies and Green, 1984:2). Davies and Green argue that geography, perhaps uniquely, makes very considerable intellectual demands on pupils. The topic-types of geography are not only relatively new to pupils, but they deal with concepts that reflect the phenomena and methods of both history and science. These ideas are neither simple nor concrete as they may appear on the surface, but are complex and abstract.

CONCEPTS OUTSIDE IMMEDIATE EXPERIENCE

By definition, the phenomena that are described in geography texts are not only outside pupils' immediate experience, they are also difficult to exemplify in a classroom. This means that a geographical *description* is a fundamental

source of information for pupils. The description, therefore, frequently has to substitute for, rather than support practical investigation. This is one reason why verbal descriptions in geography texts are so substantially supported by non-verbal graphics, photographs, maps, diagrams and tables. Thus, a very real demand on pupils using geography texts, is that they engage meaningfully with both verbal and graphic descriptions.

DYNAMIC AND UNPREDICTABLE PHENOMENA

Pupils learning geography are required to embrace notions of dynamic change and alternative (and often competing) explanations from descriptions which may be at variance with current facts and perspectives.

ELUSIVE DEFINITIONS

Geography requires that pupils radically revise and modify the 'space and time schemata' that serve them quite adequately when studying scientific phenomena or reading English stories. In geography, pupils are in effect invited to move from their own personal environment out into the world, and in so doing, to suspend or relinquish the 'egocentric and ethnocentric' views of the world that are an important part of their identity.

SPECIALIZED VOCABULARY

It is not only the concepts of geography that impose demands on the cognitive and linguistic capacities of pupils. So too do apparently simple descriptions of human activities that incorporate vocabulary used in new and specialized ways, the meanings of which will not necessarily be immediately evident. Pupils are critically dependent upon a real comprehension of the meaning of new and specialized vocabulary.

2.3.5 Conclusion

From this discussion it would seem clear that cognitive strategy research complements schema-theory research. The reader, using cognitive strategies (consciously or unconsciously), is seen to be actively engaged in constructing meaning by interacting with a text that makes cognitive demands of its own. The cognitively prepared, active reader is therefore as important for the reading process as is the text.

The reading process, the reader, and his cognitive strategies, have been discussed in the previous two sections of this chapter. In order to complete the discussion of the components of the interactive reading process, the text and its features will be discussed in the remaining sections of this chapter.

2.4 READABILITY

2.4.1 Traditional assessment

Readability has been variously defined as:

- Ease of understanding or comprehension due to style of writing (Klare, 1963)
- The proportionality between processing effort and obtainable knowledge during the activity of reading (De Beaugrande, 1980:283) when:
 - a text's meaning can be quickly and easily understood by the reader for whom it is intended;
 - the target reader is successful in completing the task embodied in a text;
 - if necessary, the reader can quickly and easily recall the essentials of a text some time after reading it (Williams, 1985).

2.4.2 Traditional readability formulae criticized

In spite of the fact that most *definitions* of readability account for some kind of interaction between reader and text, traditional *methods of assessing* the readability of texts have focused primarily on the text in isolation. Consequently, most readability formulae are 'essentially mechanistic' (Young and Nuttall, 1989:229), focusing on the text as product or structure, and placing reliance on 'superficial standards of length and complexity of words or sentences' (De Beaugrande, 1980:283).

Among the better known of these readability tests are the Flesch Reading Ease Formula (1948), the Gunning Readability Test (1952), the Fry Readability Graph (1968), the Fog Index and the Cloze Procedure (Rye, 1982). According to Pillay (1989:52) the typical procedure followed in the application of such formulae to test readability is as follows:

It is usual to sample at least three 100-word passages selected at random. A count is made of some easily identifiable characteristics, such as the average number of words per sentence or the number of polysyllabic words in the sample, and then a calculation is performed to produce a score. This score indicates the difficulty of the sample of text. It is then assumed that this score reflects the difficulty of the whole text.

For the purposes of this report, it is important to note that traditional readability formulae are considered to be inappropriate for assessing the readability of texts intended for young ESL readers, primarily because they do not account for many of the most significant factors affecting the reading process. The following list points to examples of the kinds of factors such formulae exclude from consideration.

- Syntax and complexity of sentences, unusual positioning of sentence components and number of dependant clauses.
- Word frequency, inference, appropriate use of discourse markers, cohesion devices, coherence and logical presentation of ideas, rhetorical organization, author's style, concept density, level of abstraction, inherent difficulty of subject matter.
- Complex socio-psychological factors such as reading purpose and background knowledge, and cognitive processing at work when students read texts.

Also, because readability formulae depend on correlational data, they fail to enlighten us as to what makes a text difficult to understand. Particularly significant, in the light of the schema-theoretic view of reading, is Kintsch and Van Dyk's observation (1978:372) that readability cannot be considered a property of texts alone, but one of text-reader interaction.

Furthermore, there are several problems associated with the use of readability formulae such as:

- Readability formulae do not have the precision of scientific formulae, and different formulae produce different results on the same text.
- The formulae do not account for passages of variable complexity within a single text.
- A good readability score, according to the formulae, does not guarantee comprehension because the simplification of a text in terms of sentence length and syllable counts may increase the difficulty of the reading task by rendering explicit relationships obscure (Davies, 1984:196).

- It is significant to note that readability formulae were developed for assessing L1 texts, and are not in fact designed to be used on L2 texts.
- The fact that researchers like Davies (1984:196) have warned that readability formulae 'are not intended as guides to simplification procedures, and do not work as such'; and that even developers of such formulae have warned of the limitations of their own formulae (see Fry, 1979:41; Chall, 1979:40).

The current significance of the criticisms levelled at readability formulae is that they inform authors, publishers and education departments that to use such formulae to guide the selection and or production of texts for a particular readership, is to lose sight of a number of crucial readability factors.

The recent evidence of a serious mismatch between young ESL readers and their content subject textbooks discussed in Chapter 1 suggests, however, that authors and publishers continue to use, or are influenced by readability formulae in the selection and production of 'appropriate' texts. Evidence of this is provided by Young and Nuttall (1989:229) who report that South African publishers, '...if they use readability formulae, ...tend to use the Fry readability graph', in their grading of texts. A recent informal interview with members of the editorial staff of two of South Africa's main textbook producers revealed that they do not, in fact, use 'such sophisticated techniques'. Instead they rely heavily on an 'intuitive sense' of readability levels.

2.4.3 Two other approaches to assessment

LINGUISTIC THEORIES OF DISCOURSE

For the past 40 years, many researchers have been trying to understand and explain the fundamental properties of texts in terms of linguistic theories of discourse. Carrell (1982:479-482) is careful to point out, however, that there are at least two points to be aware of in discussing this research:

- Most of the different models deal with selected properties of text (for example, Halliday and Hasan (1976) deal only with cohesion), and are therefore not 'models' for the comprehensive analysis of any text.
- Most text analysis approaches treat text as though it occurs in a vacuum. She goes on to argue (487) that we must supplant or at least supplement textual analysis theories with broader, more powerful theories that take the reader into account, and which look at reading as an interactive process that includes the writer, the reader and the text.

TEXT ANALYSIS MODELS

More recently, partly as a reaction to the inadequacy of readability formulae, educationists and publishers have attempted to develop models for textual analysis. These models are generally intended to be used as easy guides for the selection of appropriate textbooks by non-experts such as content subjects teachers (Van Rooyen, 1990:9). Two common weaknesses in most of these models are that:

- they do not fully account for all known readability factors, and;
- they do not account for the role of the reader.

For example, out of six models analyzed, four focused exclusively on text-based factors (Conn, 1988; Durojaiye, 1974; Giordano, 1987; Van Rooyen, 1990) and only two incorporated reader and text factors (Williams, 1985; Young and Nuttall, 1989). Only Young and Nuttall's model (in progress)

emphasizes the complex nature of the interaction between writer and reader through the text.

Since neither educationists nor researchers have been able to develop a truly comprehensive model for textual analysis, and since it seems unlikely that it is possible for any single model to account for all possible factors in the complex interaction between writer, reader and text; no attempt will be made to develop such a model in this study. However, in order to judge the readability of a text, it is necessary to have some kind of measure. For this purpose, the views of Kintsh and Van Dyk (1978) and Lanham's (1986-1990) application of these views in the South African context are considered the most appropriate. These are discussed in section 2.5, and applied in Chapter 3. Not only are their views based on the interactive approach to reading, but they also account for cognitive reading strategies and textual properties which may cause the young ESL reader to stumble.

2.4.4 Conclusion

In keeping with current interactive views of reading, recent research has moved away from traditional measures of readability. Alternative approaches to the analysis of text call for an assessment of readability in terms of both reader and text. This means, for example, that it is essential for potential authors to have a good idea of what their intended readers are likely to be able to 'bring' to the reading of a text in terms of linguistic, content and formal schemata. They should also have an understanding of what, for the ESL reader, is likely to be 'readable writing'.

2.5 DISCOURSE ANALYSIS – ASSESSMENT OF THE READABILITY OF EXPOSITORY TEXTS

This section provides a discussion of the text-based factors affecting readability and a summary of those factors considered *most likely* to affect the reading process and, therefore, the readability and comprehensibility of ESL texts. These factors are discussed under the headings of *vocabulary, syntax, cohesion, coherence* and *text structure*.

2.5.1 Vocabulary

According to Campbell (1987:123), vocabulary is the aspect of reading most often identified by readers as difficult. A wide background knowledge of the topic in the text can make reading less traumatic for pupils. However, if pupils are confronted with a new topic, couched in a language they have not yet acquired adequately, vocabulary can be a profound obstacle to comprehension (Saville-Troike, 1984; Williams and Dallas, 1984; Williams, 1985). It is therefore important for an author to know what reading vocabulary a reader brings to a text (Van Rooyen, 1990:61).

On the question of establishing the reading vocabulary of the Std 3 ESL reader, Lanham (1990 informal notes) points out that word-frequency lists, in the tradition of Thorndike and Lorge in the 1940s (quoted in Bransford, 1979), are of no use in the South African context as pupils' exposure to English by this stage, is often so poor that their vocabulary does not relate to such frequency lists at all. Williams and Dallas (1984:208) also point to a number of problems associated with the selection of appropriate vocabulary for the content area textbooks as follows:

- Vocabulary lists in an English syllabus that are taught in English lessons may well be (and frequently are) markedly different from the actual command of vocabulary that pupils possess.
- The L2 English syllabus is usually general in nature, i.e., it gives scant regard to the purpose for which English is taught. Consequently,

vocabulary lists in the English syllabus contain few words that are included in the language of content area subjects.

- Authors of content area textbooks are unwilling to accept the strictures of a vocabulary list.

Lanham suggests that the only real way to assess young black ESL readers' probable vocabulary is to examine the English stories and books that they have been exposed to in their previous school experience. In one such study, Macdonald (1987:4) estimates that there is a disparity of approximately 4 500 lexemes (or core/root words) between the English vocabulary learnt up to the end of Std 2, and the vocabulary required to cope with content subject textbooks written in English for Std 3.

The distinction between terminology and non-technical terms in content subject textbooks is an important one (Jeffs, 1980; Davies and Green, 1984). The study of geography demands the use of subject-specific terminology (register terms) which Evans (nd:585) defines as 'a word or phrase which, when used in the context of a particular academic discipline, carries a single specific meaning'. The use of such terminology may create comprehension problems for young ESL readers who do not know the subject-specific meanings of the words, or the meanings of other familiar words used in new specialized ways.

The comprehension of non-technical vocabulary may also create reading comprehension difficulties, because readers have to know the meaning of most of the words used in a text to make sense of the text as a whole. Jeffs (1980) suggests that while teachers are often extremely diligent in their efforts to explain obviously difficult words, they are likely to take for granted pupils' recognition of more common words. Consequently, it may be that a child is able to grasp a one-to-one connection between a newly explained term and the object or idea that it denotes, but still find that this and related terms are logjammed in his mind by his inability to use the 'thinking words' himself.

The schema-theoretic view of reading has also shed new light on views of vocabulary development and word recognition crucial to successful bottom-up decoding skills (Carrell, 1988b:242). Unlike traditional views of vocabulary, current thinking converges on the notion that a given word does not have a fixed meaning, but rather it has a variety of meanings around a 'prototypical' core, and that these meanings interact with contextual and background knowledge. Thus, Carrell says, 'knowledge of individual word meaning is strongly associated with conceptual knowledge – that is, learning vocabulary is also learning the conceptual knowledge associated with the word'. On the one hand, an important part of teaching background knowledge is teaching the vocabulary related to it, and, conversely, teaching vocabulary may mean teaching new concepts and new knowledge.

The above overview of recent literature on vocabulary in content area textbooks raises the following ten significant points about vocabulary and how it is likely to affect the readability of textbooks prescribed for young ESL pupils:

- Words of high frequency or familiarity to the reader will contribute to more readable writing. For example: *give* instead of *assign*
wind instead of *breeze*
mealie instead of *maize*
seed instead of *grain*

2.5.1.1 Vocabulary and readability

Conversely, Lanham (1990a:176) believes that unknown words, unsupported by context, is a major cause of reading difficulty. In particular, ESL readers can be expected to have difficulty with text where there are many unknown words. These difficulties are compounded when a text does not provide semantic reinforcement in the form of known vocabulary.

- Concrete words are more readable than abstract words. One abstract word by itself, although less readable, is not likely to pose a major problem for the ESL reader. But in association with other contributions to impaired readability like long sentences, complex syntax and paragraph structure, one abstract word might be the decisive factor for impaired comprehension. 'Abstract words are a particular problem for the L2 reader when presented in quick succession' (Williams, 1985:12).
- Use specialist terminology only when necessary. Williams (1985:17) writes that specialist terminology makes for economic writing with precise meaning, but that writers should be sensitive to terms that may not be familiar to a reader, and assist a reader to their meaning in cases of doubt.
- Active verbs are more readable than passive verbs. An active verb is shorter, more familiar, and thus promotes a stronger mental image, for example, the active verb in 'The miners *are digging* for gold' is more readable than the passive verb in 'The gold *is being dug* for by the miners'. Also, the active verb marks the subject-verb-object (SVO) relationship more clearly than the passive verb.

In her study of the differences between narrative and expository texts, Perera (1986:58) found that three-quarters of the verbs in narrative passages were active and dynamic. On the other hand, in expository texts, only half of the verbs were active. She argues that 'the heavy use of passive verbs... contributes to the lack of momentum evident in so much expository text'.

- Writers need to be careful that when intensifiers are used they are necessary and appropriate in meaning. This will ensure that a young reader's perception of degrees of intensity is consistently and correctly reinforced. Examples of the three main categories of intensifiers are:

Emphasizers – *definitely*

Amplifiers – *completely*

Downtoners – *partly*

- Where possible avoid homonyms (words which have the same sound and/or spelling but have different meanings). The following examples illustrate the potential for confusion:

Same spelling, different sound:

lead(v) – to go before, show the way, etc.

(n) – heavy (soft, blue-grey) metal

Same sound different spelling:

bare (adj) – without clothes (naked person)

– without leaves (a tree)

– empty (a cupboard)

bear(n) – a large, hairy animal

(v) – to carry a heavy load

Since weaker ESL readers often read on a word-by-word basis, and often lack the ability to draw on contextual clues, they are likely to use the primary meaning of the homonym and/or on the meaning within their contemporary experience. This may or may not be the meaning intended by the author.

- For word-by-word readers, an idiom (a phrase which means something different from the meanings of the separate words), can cause immense difficulty (Williams, 1985 and Lanham, 1990a). In this category Lanham (1990a:178) includes figures of speech, fixed expressions, metaphor and phrasal verbs as serious problem areas for young ESL reader. For example:

To be *hard up* (to be without money – not: not soft, not down)

He *slipped up badly* (made a serious mistake – not: fell)

This will *fit the bill* (it will do the job, etc. – not: fit onto or into...)

- Take advantage of a reader's familiarity with collocations. Words collocate when they accompany each other in a way that sounds natural. For example, for the average Western adult, *strong* collocates with *coffee*, but *powerful* does not. Lanham (1986:6) points out that:

The words in our vocabulary are extensively linked with others in concurrence probabilities arising from formulaic expressions, collocations, idioms and factual knowledge of the world, in fact, all favoured ways of saying things... It should be noted that having these co-occurrence expectancies is a product of extensive exposure to reading texts in the language or living in the culture; they are not the products of rules.

- Obscure reference words are confusing. Lanham (1990a:178) refers to a reader's difficulty in finding a referent in the real world, when a reference is not obvious for various reasons. For example:

... *his four-footed friend*: 'You can have the puppy if you look after it,' said mother. And *it* became his.

- Obscure substitute terms used as a cohesion device are confusing. Lanham (1990a:178) refers to the use of substitute words whose relationship with the words they are substituting is not clear to the ESL reader. For example:

The *mother* and child walked up the hill towards the store carrying *two brown carrier bags*. 'It is hot today', said the *lady* as she put down her heavy parcels.

2.5.2 Syntax

In section 2.2 of this chapter it was explained that several studies have shown the important role played by linguistic competence, in this case grammatical knowledge, in native and non-native reading. The current emphasis in ESL reading research on 'holding in the bottom' of the interactive reading process, emphasizes among others, the importance of syntax in the reading process.

Although syntactic decoding is not isolated from semantic factors in reading, Berman (1984:139) claims that efficient ESL readers must rely – in part, though not exclusively – on syntactic devices to uncover meaning in text. Cooper (1984:133) shows that 'unpracticed' readers display weaknesses in understanding syntactic features that clearly affect comprehension. Berman proposes, therefore, that in order to uncover the basic propositional content

of a sentence, readers must be able to manipulate the following interrelated components of sentence structure:

- Constituent structure – what the parts of a sentence are, and how they interrelate hierarchically.
- Structural items (or markers of constituent structure) – function words and affixes that link constituents or serve as markers of grammatical relations and of constituent structure. For example, the plural *s* marker, and the adjectival *al*.
- Dependencies – relations expressed between discontinuous elements by structural items, such as *so* and *that* in the sentence: *So* widespread had the habit of reading the Bible in English become *that* official steps were taken to combat it.

CONSTITUENT STRUCTURE

Berman (1984:141) points to the research of Wood (1974) and Clark and Clark (1977), which shows that separating sentences into their 'natural surface structure constituents clearly facilitates the speed at which sentences can be processed' regardless of the grade, level or skill of the reader. This research seems to confirm Berman's claim that a reader 'must first and foremost recognize the basic parts of a sentence: what constitutes its main and subordinate clauses, what their predicate and arguments are in propositional terms, the subject-verb-object (SVO) of surface syntax, and the noun-verb-noun (NVN), actor-action-patient semantic relations'. She argues that where the typical expectations of readers are violated by shifts in the expected ordering, their fluency may be disrupted and hence comprehension hindered.

STRUCTURAL ITEMS (MARKERS OF CONSTITUENT STRUCTURE) AND DEPENDENCIES

Berman (1984:143) explains that in English, a single structural item may perform various functions. Thus, its occurrence is no guarantee of a given type of constituent to follow. She shows, for example, that this is true of *one* as a pronominal substitute and as a quantifier. Her research suggests that ESL readers, as a strategy, tend to select one function for any given structural item. When it marks some other function in the text, expectancies are not met and comprehension is impeded.

Berman (140) goes on to point out that handling the three components (constituent structure, structural items and dependencies) during the reading process may be complicated by 'perceptual factors such as heaviness and opacity' discussed below.

- Heaviness as a potential source of difficulty

By heaviness, Berman (142) refers to constructions that extend the basic NV(N) structure so that one or more of the sentence constituents is 'heavy; containing many sub-parts of embedding or modification'. She emphasizes that heaviness is not a straightforward function of linear length. Rather, the problem 'seems to concern the amount and depth of information which the reader must store in memory in moving from one constituent to the next, and how hard the transition becomes as a result' (142).

Perera (1986:58; see also Quirk *et al*, 1972:934), in her research on sentence-level differences between fiction (narrative) and non-fiction (expository), found the following major differences that support the findings of Berman and Lanham discussed above:

- There are more than twice as many 'interrupting constructions' in expository texts than in narrative texts.
- In narrative texts children are exposed to subordinate clauses used frequently in speech. In expository texts, however, they meet 'a considerable density of clause types that are fairly unfamiliar'.

Perera claims that this difference between narrative and expository texts goes some of the way towards explaining why children who can read stories cannot always understand the complex relationships expressed in their textbooks.

- Opacity versus transparency

Berman (142) suggests that the ESL reader needs maximal transparency in marking the relations between one part of a text and another, specifically if these devices do not operate in the mother-tongue. That is, certain cohesive devices (see section 2.5.3 below for further discussion of cohesion) may render a text 'opaque' to the ESL reader. These may take the form of *deletion*, for example, lack of relative pronouns in relative clauses; or of *substitution*, for example, nominal *one* as grammatical substitute for repeated lexical material, as well as lexical substitution.

She goes on to point out that styles approved in English rhetorical tradition may run counter to the requirements of maximal transparency from the ESL reader's point of view. The point to note is that the use of mother-tongue equivalences of English syntactic structures should facilitate the ESL reading process, while non-equivalent syntactic structures are likely to cause reading problems.

2.5.2.1 Syntax and readability

Following Berman's approach, Lanham's (1990a:175-181) discussion of aspects of syntax that are likely to cause reading problems is particularly appropriate. He cites the following four examples of structures taken from Std 3 texts to illustrate the difficulties they present to the young ESL reader:

- Ellipsis is a syntactically controlled deletion as a cohesion device which is common in English, but has little or no African language equivalence. For example:

*Mary did want to go home but not now.
John promised his friend that he would.*

- Non-equivalent syntactic structures:

- Substitution and alternation should be avoided as there are no mother-tongue equivalents.
- The noun, (noun modifier and noun head) in English that are translated by genitive and relative clause structures in southern African languages. For example:

Perfect participles in adjectival function: *the opened letter; the cane-covered hills.*

Noun modifier and noun head: *paper hat, clock face.*

The point about this structure being that meaning is derived pragmatically: the more context dependant the meaning becomes, the less accessible it is to the ESL reader.

Gerunds: *Mary's mother doesn't like her playing with me.*
Noun and infinitive: *in days to come, an offer to help.*

- Convolved syntax making agents (actors), instruments, patients (objects), etc., obscure. In particular, transformations that transpose constituents such as inversions and passives with deleted agents. For example:

To grow, plants need water. Running to meet her were Nomsa and her friend.

Non-logical subjects and objects, as in the following example, are extreme cases:

Peter is sure to help his friend. (The writer is sure – not Peter.)

- Sentence structure overload – extended constituent structures usually make a sentence too long, for example, multiple relative clause embedding:

This is the cat that chased the rat... Jack built.

2.5.2.2 Cumulative effect of syntax

Young and Nuttall (1989:255) point out that the reading of school texts is seldom a case of reading isolated or individual sentences and that any individual syntactically complex sentence does not, in itself, create a readability problem. They agree with Williams (39) that 'the really important thing in any discussion of syntactic structure is that its impact on readability is cumulative'.

The cumulative impact of the two factors discussed so far (vocabulary and syntax) on the readability of texts intended for young ESL readers seems clear. However, though significant, this impact must be seen to be only part of a number of other interrelated, text-based factors that interact with a number of reader-factors to determine the readability of a text. The next two sections introduce another set of text-based readability factors, namely, cohesion and coherence.

2.5.3 Cohesion

In the previous section on syntax, the focus was on intra-sentential factors affecting readability. Following Widdowson (1978: Chapter 2) and Halliday and Hasan (1976:2), however, it is important to note that:

Normal linguistic behaviour, does not consist in the production of separate sentences, but in the use of sentences for the creation of discourse.

In this section, therefore, the focus extends beyond the sentence as a unit of language to relationships between and across sentences – otherwise known as inter-sentential relationships within discourse.

2.5.3.1 Halliday and Hasan's cohesion theory

According to Halliday and Hasan (1976:4) who have led cohesion research:

Cohesion occurs where the INTERPRETATION of some element in the discourse is dependant on that of another. The one PRESUPPOSES the other, in the sense that it cannot be effectively decoded except by recourse to it. When this happens, a relation of cohesion is set up, and the two elements, the presupposing and the presupposed, are thereby at least potentially integrated into a text.

Following the schema-theoretic view of the reading process, the presupposed antecedent of a referential item may be present either in a text or in the real world. In either case, a reader must be able to follow a reference in a text to its antecedent and make the necessary links.

Halliday and Hasan (1976:8) make it clear that 'cohesive relations have in principle, nothing to do with sentence boundaries'. If both a referential item and an antecedent occur in the same sentence, they regard the occurrence as a

function of syntax and not cohesion. They argue that cohesion is displayed in the ties that exist between a presupposed item and a presupposing item (which may or may not be structurally related), and that text derives coherence from these cohesive ties. The concept of ties, they claim, makes it possible to analyze a text in terms of its cohesive properties and give a systematic account of its patterns of coherence (4). Cohesion, therefore, refers to the linguistic means whereby a text is enabled to function as a single meaningful unit (30).

Halliday and Hasan (1976:6) divide the cohesive devices in texts into two broad categories, namely, *grammatical* and *lexical* cohesive devices. *Grammatical devices* include reference, substitution, ellipsis and conjunctions; while *lexical devices* include the use of reiteration (including synonyms and hypernyms), and collocations.

GRAMMATICAL COHESIVE DEVICES

Reference

Reference refers simply to one item in the text referring to another, either in the text or outside it. Halliday and Hasan divide all reference devices into two main categories, namely, exophoric and endophoric reference (31). Exophoric reference signals that reference must be made to the context of situation outside a text. In the case of expository text, reference is made to the 'real world', for example, a range of mountains. Endophoric reference is reference within a text under two general headings:

- Cataphoric reference refers forward in the text to succeeding elements, or to following text, to which the reference is in no way structurally related.
- Anaphoric reference refers backwards in the text to preceding elements.

Both exophoric and endophoric reference, therefore, embody an instruction to retrieve, from elsewhere, the information necessary for interpreting the passage in question. What is, however, essential in every instance of reference, 'is that there is a presupposition that must be satisfied. The thing referred to has to be identifiable somehow' (Halliday and Hasan 1976:33).

Under their general heading of reference, Halliday and Hasan propose the following subcategories. They are all either exophoric or endophoric references and can function as either cataphoric or anaphoric references.

- Personal reference – reference to people and things by specifying their function in the discourse.
- Demonstrative reference – essentially a form of 'verbal pointing'. The writer locates the referent by situating it on a scale of proximity.
- Comparative reference
 - General comparison in terms of likeness and dissimilarity – two items may be the *same*, *similar* or *different* without respect to any particular property.
 - Particular comparison – comparison that is in respect of quantity and quality.

Substitution

Substitution refers to a process within the text where one item is replaced by another. It is a 'purely textual relation, with no other function than that of cohering one piece of text to another' (226). The substitute signal in effect

'supplies the appropriate word or words already available in the text; it is a grammatical relation, one which holds between the words and structures themselves rather than relating them through their meanings'. Substitution can involve nominal, verbal or clausal items within the text.

Ellipsis

Essentially, ellipsis and substitution are the same process. However, ellipsis can be interpreted as that form of substitution in which an item is replaced by nothing (88), otherwise referred to as 'substitution by zero' (Halliday and Hasan, 1976:142 and Williams, 1985). It is important to note, however, that ellipsis does not refer to any and every instance where there is information that a reader has to supply him/herself. It refers specifically to syntactically controlled omissions.

Conjunctions

Conjunctions are different in nature from the other cohesive relations. They are not simply anaphoric relations. They are a semantic expression of a link in the discourse. They are therefore not 'search instructions' as are other cohesive devices, but 'specifications' of the way in which what is to follow is systematically connected to what has gone before. Halliday and Hasan distinguish between four types of conjunctions: additive, adversative, causal, and temporal conjunctions.

LEXICAL COHESION DEVICES

Reiteration

Reiteration is a form of lexical cohesion that involves the repetition of a lexical item. At one end of the scale it refers to the use of a general word to refer to a lexical item. At the other, it refers to the repetition of a lexical item, and a number of things in between such as synonym, near-synonym, a superordinate term or a general word (Halliday and Hasan, 1976:278). All these have in common the fact that one lexical item refers to another, to which it is related by having a common referent. The second and subsequent occurrences of a word in a text may therefore be: identical, inclusive, exclusive, or unrelated.

Collocation

According to Halliday and Hasan (1976:284), collocation is the 'most problematic part of lexical cohesion'. It is achieved through an association of lexical items that regularly co-occur. The cohesive effect, they argue, depends 'not so much on any systematic semantic relationship as on their tendency to share the same lexical environment, to occur in collocation with one another' (1976:286).

In general, any two lexical items or groups of lexical items that tend to appear in similar contexts, will generate a cohesive force if they occur in adjacent sentences. Such patterns occur both within the same sentence and across sentence boundaries, and are largely independent of the grammatical structure. This includes not only synonyms, near-synonyms and superordinates, but also pairs of opposites of various kinds – complementaries (*boy ... girl*), antonyms (*like ... hate*), and converses (*order ... obey*).

2.5.3.2 Cohesion and readability

Lanham (1990:178) has found cohesion devices to rank particularly highly as a source of difficulty for young ESL readers. He identifies two aspects of cohesion as most problematic, namely, obscure lexical substitution (as a

cohesion device), and ellipsis. Perera (1986:56) and Williams (1985:50) identify conjunctions as another major source of difficulty.

Obscure substitute terms

Young and Nuttall (1989:256) point out that there is a danger that the ESL reader will not make the connection between an original word and a substitute used later in a passage. They go on to warn that by far the largest readability problem, in terms of substitution, is caused when a general noun is used to replace a phrase or clause.

Ellipsis

Lanham (1990a:181) proposes that elliptical 'gaps in the information' cause problems for young ESL readers for two reasons. The first, is that as a common cohesion device in English, it has 'little or no equivalence' in African languages, and is 'foreign to the child'. The second, following from the first, is that the young African reader expects the text to 'tell him everything' (179).

Conjunctions

Perera points to evidence that shows that even students aged 15 and over find conjunctions (*similarly, therefore, nevertheless, etc*) as sentence connectors, particularly difficult. She points out that, on the whole, expository text is more dependant than narrative on conjunctions or 'discourse markers' as they are otherwise known. Williams (50) points out that the function of a conjunction is to indicate to the readers the general relationship between what they have just read, and what they are about to read. Hence, if a conjunction or discourse marker present in the text is not understood, comprehension will be affected.

Another difficulty is that certain words can function as conjunctions in one context, but not in another. For example, consider the function of the word *yet* in these sentences:

- As discourse marker/conjunction:
He was very weak because he had not eaten any food for two days. *Yet* he still managed to win the race.
- As adverb:
He has not *yet* done his homework.

2.5.4 Coherence

In this section it will be shown that while Van Dyk (1977a), Widdowson (1978) and Carrell (1982) recognize the value of Halliday and Hasan's cohesion theory as it applies to cohesive factors, they dispute the claim that it is the *cause* of coherence for two main reasons. The first is that overt links are not necessarily present in coherent text. The second is that a reader's background knowledge is not accounted for.

2.5.4.1 Coherence and overt links

Van Dyk (1977a:92) explains that coherence is not well-defined. He argues that propositions (information or ideas) in a discourse may form a coherent discourse, even if they are not all overtly connected to every other sentence or proposition. This view is supported by Widdowson (1978:29), who illustrates that it is not difficult to provide the following interchange with a plausible interpretation, in spite of the complete absence of cohesion:

A: *That 's the telephone.* (Request)

B: *I'm in the bath.* (Excuse)

A: OK (Accept)

Once one establishes a relationship between the three utterances as illocutionary acts and thereby sees them as constituting a coherent discourse, one can then supply the missing propositional links and produce a version which is cohesive:

A: *That's the telephone. (Can you answer it, please?)*

B: *(No, I can't answer it because) I'm in the bath.*

A: OK (*I'll answer it.*)

Coherence then, according to Widdowson, is measured by the extent to which a particular instance of language use corresponds to a shared knowledge of conventions as to how illocutionary acts are related to from larger units of discourse (45). If we are not familiar with the conventions, then the language is incoherent to a degree corresponding with our unfamiliarity. It is therefore possible that a writer 'can arrive at a number of cohesive versions of a text, but the most acceptable unit of discourse will depend on which is the most coherent' (52).

2.5.4.2 Coherence and background knowledge

The second cause for disputing the cohesion theory's claims about coherence stems from research that has emerged in the light of the schema-theoretic view of text processing. Carrell (1982:484) cites the research of Feathers, (1981); Bobrow and Norman, (1975); Morgan and Sellner, (1980); Freebody and Anderson, (1981) and Steffensen, (1981), in support of her argument that in their discussion of coherence, Halliday and Hasan do not account for the significance of a reader's role, and that textual cohesion represents a potential that can be fully realized only when a reader appropriately identifies the schema underlying a text. In other words, accessing the appropriate background schema makes possible the complete processing of the cohesive elements in a text. If a reader does not have, or fails to access, the appropriate schema underlying the text, 'all the cohesive ties in the world won't help that text cohere for that reader' (Carrell, 1982:485).

An important point raised by Widdowson (1978:53) and Lanham (1986:7) in connection with the conventions of coherence, is that a knowledge of these conventions derives from a learner's experience of language use. It follows then, that the young ESL reader, who is only familiar with the conventions of narrative texts, cannot be assumed to be able to recognize and use the conventions of expository text without some explicit prior guidance.

In conclusion, while the main strength of cohesion theory is its power to assess the 'technical' cohesiveness of discourse, it is also necessary, when analyzing discourse in terms of its readability and comprehensibility, to account for the readers' ability to access the appropriate background schema underlying a text. Drawing on these two approaches, it is possible to analyze discourse in terms of the interactive view of reading. Halliday and Hasan's cohesion theory represents the bottom-up process where the reader reacts to clues in the text; while Carrell's background knowledge represents top-down processing, with the reader bringing information to a text.

2.5.4.3 Coherence and readability

INACCESSIBLE BACKGROUND KNOWLEDGE

Lanham (1990a:181) points out that Johnson (1981) found that inaccessible background knowledge is the single most significant factor in reading comprehension. Because of different cultural experiences, readers' interpreta-

tions of a text in terms of their own background of experiences, may not, in fact, be the intended message of a text.

MISSING PROPOSITIONS OR INFORMATION GAPS

Every text contains missing propositions – assumptions about shared knowledge of the world of the topic being read about, that are unexpressed by a writer and subconsciously supplied by a reader. A complete grasp of the 'world' of the topic or story can supply the missing information. However, this may be inaccessible to the young ESL reader who, 'expects the text to tell him everything' (Lanham, 1990a:179). Writers should therefore be aware of the fact that:

What to the writer appears as a logical consequence, and obvious implication or next step in a sequence of actions or events, may not be so for the ESL reader with a different world view or life experience (Lanham 1986:6).

He goes on to recommend that, in texts for second language consumption, 'it is better, therefore, to err in the direction of statements of the obvious' (6).

ILLOCUTIONARY FORCE – WRITER'S INTENT OR ATTITUDE

According to Titone (1985:68) and Adegbija (1987) there is a complex set of locutionary act and illocutionary force combinations in English that need to be acquired. That these possible combinations are acquired by the ESL reader is important if a reader needs to comprehend any utterance in a specific language and culture. For instance, the illocutionary force of a proposition or sequence of propositions, reveals a writer's attitude or intent. It is assumed by a writer that a reader is able to make the necessary inferences that supply the full meaning of a discourse. In the content subject textbook, the ESL reader's task of inferring illocutionary force is made especially difficult when writers use indirect speech acts or propositions. That is, when a writer intends to communicate more than s/he actually says. The following example illustrates this point:

If you turn to page 10, you will find...

While this utterance appears to be a *conditional statement*, the illocutionary force in a textbook is that of an *instruction*. If it is misunderstood, the reader/listener will miss the point and lose important information.

DIGRESSIONS FROM THE TOPIC LINE

Referring to the logical progression of ideas as crucial in the propositional development of a text written for young ESL readers, Lanham (1990a:179), identifies digressions from the topic line or the logical progression of ideas, as likely stumbling blocks. He explains that non-sequiturs, or digressions, disrupt a child's grasp of an evolving topic or theme.

It follows then, that if a young unskilled reader is to be encouraged to construct the coherence of a text, and extract the theme that unites the whole text, then sentences that follow each other in descriptions, etc. should express logical next steps. A reader should not have to distinguish between digressions and the logical next steps and then have to reorder them to get the logical sequence. In short, the ideal text for young ESL readers should be written so that ideas are logically stated and related, and are mutually supporting.

IMPLICIT LOGICAL CONNECTION

Implicit logical connection refers to instances in discourse when conjunctions (logical connectors) are not actually present in a text and have to be inferred by a reader. The following example illustrates the kinds of comprehension problems that are likely to result when textbook writers assume that ESL readers can make the 'hidden connections'.

() *Driving along in the car, Peter heard all the news.*

The 'absence' of the temporal conjunctive *while* is likely to result in the sentence being processed as two separate, incomplete sentences; and/or the reader being unaware of the passing of time implied; and/or the reader being unaware of the implied presence of one or more persons telling Peter the news.

2.5.5 Text structure

Text structure, the formal or rhetorical organization of text, may be defined as the specific organization or pattern used in written discourse that allows for differentiation between text types such as narrative and expository. It also allows finer distinctions to be made between types of expository text such as descriptive, comparative/contrasting, or sequential pattern (Kintsch and Yarbrough, 1982; Armbruster, Anderson and Ostertag, 1987; Armbruster and Anderson, 1988).

An important aspect of reading comprehension as viewed by schema theory, involves the process of choosing and verifying formal (rhetorical) schemata in order to account for the text that is to be understood (Rumelhart, 1977, in Carrell, 1984a:446). According to Meyer's text structure approach (1984a:120), a skilled reader possesses a finite number of formal schemata related to text organization, and approaches text comprehension with the knowledge of how certain texts are conventionally organized. For a particular text, a reader selects that formal schema in his/her repertoire that best accounts for that text. The schema employed to comprehend a text acts as an outline that guides a reader in organizing a text during the process of encoding. Likewise, during recall, a skilled reader activates this same kind of schema and uses it to retrieve information about a text which is stored in memory.

2.5.5.1 Text structure approach

Meyer's text structure approach (1984:113-138) provides a useful description of aspects of the rhetorical structure of texts, and how competent readers process texts.

Meyer proposes a model depicting the interaction of reader and text variables that affect the quality and quantity of recall from hierarchically organized text. The model recognizes the signalling of text structure to be one factor in a series of interacting reader and text variables that affect recall. The relative effects of signalling on recall are seen to be dependent on such reader attributes as a reader's ability to use the 'structure strategy' (described below) in reading, adequacy of text organization skills, as well as the difficulty of the text being read.

Through application of Meyer's structure strategy (1975, 1977, 1979, 1984), all the information from a text is represented in a detailed outline called a content structure. The content structure depicts three important aspects of text: *top-level structure*, *macropropositions*, and *micropropositions*.

- The top-level structure is the rhetorical relationship that ties all of the propositions in a text together and gives it its overall organization. Top-level structures are typical forms of text that define it as a certain type,

such as comparison, causation, collection, description, etc. They are ways of organizing topics, but are independent of the topics.

- Macropropositions include the top-level structure of a text and the content and relationships in propositions occurring at the top third of the content structure. They are the main ideas from passages and are better remembered than micropropositions. Frequently, in well-written texts, macropropositions are explicitly stated. In text of poorer quality, macropropositions must be inferred by a reader from micropropositions.
- Micropropositions include the propositions at the middle and bottom levels of the content structure. These propositions are found in clauses and sentences, and are connected to each other by referential clauses and sentences; by referential identity and such rhetorical relationships as collections, temporally ordered collections, and antecedent/consequent relations.

To summarize, the text structure specifies the interrelationships among items of information that compose a text, as well as indicating the subordination and coordination of this information. Thus, a text structure or a macrostructure provides an organizational structure that can be used during reading for understanding information and judging its importance.

According to Kintsch and Van Dyk (1978:363-373), using this model, a reader forms a top-level structure for the important ideas in a text that are to be remembered. This is a reader's summary of the important information in a text. The reader then uses this top-level structure to recall a more detailed version of a text passage. This hierarchical summary, is a reader's summary of the main ideas in a text listed in the correct sequence.

It follows that if a reader possesses and activates the appropriate rhetorical schemata during reading, comprehension and recall are facilitated. If, on the other hand, a reader does not access, or does not possess the appropriate schemata during reading, he will operate in the 'default mode'. The result, revealed in attempts to recall, is that all information is perceived as equally important and items are recalled as a list of points. There is no clear recall of logical relationships in a text and total recall of the content is poor.

Even if a reader does possess and activate the appropriate schemata, Meyer's model accounts for other factors that may cause a reader to operate in the default mode. These include:

- Difficulty level of a text
- Reader's adequacy of decoding and lexical access skills
- Signalling of relationships among major propositions.

2.5.5.2

Further important considerations

CULTURAL FACTORS

Carrell (1984a:465) reports that ESL students may fail to identify the rhetorical organization of texts successfully because they may not possess the appropriate formal schemata. This is particularly so if students come from a non-European background, and may be encountering 'interference from the preferred native rhetorical patterns' (464).

CHILDREN'S AWARENESS OF TEXT STRUCTURE

Investigations into the effects of text structure on recall of written discourse have demonstrated that adults are aware of aspects of text structure and use them in the process of reading and recall. The evidence is less clear, however,

with regard to young children (McGee, 1982:583), with studies by Tierney, Bridge and Cera (1978-79) and Taylor (1980) producing conflicting evidence.

While there is evidence that children can be taught to recognize and use *narrative* text structure to improve their reading comprehension (Fitzgerald and Spiegel, 1983 in Kinney, 1985), there is little evidence to support children's understanding of *expository* text structure. Studies report that children of all ages, including high school children, have trouble comprehending the structure of expository prose (Meyer, Brand and Bluth, 1980; Taylor, 1980; McGee, 1982).

Kinney (1988:855) points out that the root of the problem may lie in the fact that children in elementary school lack experience with expository text because they encounter mostly narrative forms. She suggests giving them practice with expository text as early as possible. However, expository texts used in schools are frequently organized according to a hierarchical pattern of main ideas and supporting details that is text specific. That is, most expository selections found in content textbooks are not organized according to a well-defined conventional structure.

In conclusion, Taylor's research (1982:339) lends some support to the notion that children who are more successful at producing hierarchical summaries (content structures) have better recall for expository text than students who are less successful at summarizing. However, she warns, it may be that even though instruction in a study strategy focusing on text structure can enhance elementary school students' memory for expository material, it seems that students must be able to perform the study strategy reasonably well before it will improve their recall markedly (323). McGee (590) points out that even when using the top-level structure of text to guide reading, 'young readers were able to remember less than 40 % of the information present in expository text'.

2.5.5.3 Visual material

In his discussion of text structure, Lanham (1990a and b:180) includes pictures or diagrams important for the meaning of a text. Van Rooyen(1990:18) reports that research has been divided on the effect of visuals on ESL text comprehension, and that research conducted to determine whether illustrations, graphs, etc., helped or hindered comprehension, seem to be inconclusive. There is, however, evidence to suggest that children 'have to be taught explicitly to attend to pictures, graphs and tables in their texts, as they do not seem to do this naturally' (Reynolds and Baker, 1987).

What does seem to be clear, is not so much the inconclusiveness of the research, but rather that, as in the reading process, there are two factors that determine whether or not an illustration is 'readable', namely, the *reader* and the *visual* (and by implication the artist). It would seem that research has been inconclusive precisely because it has studied visuals in isolation, in the same way that early reading research focused on text.

VISUAL LITERACY

That methods of reading pictures have to be 'learnt, like one learns to read pages of a book' (Lanham, 1990b:1), is often taken for granted because learning to read pictures seems to be an informal process that goes on automatically in a society where a variety of pictures are presented daily through different media. However, Fugelsang (1978:154) reports that:

In social environments with no pictorial tradition or very few pictorial representations, the informal process of learning to read

pictures simply does not occur. It should therefore be recognized that people's ability to read pictures is correlated by the amount of pictorial stimulation to which they have been exposed in their social environment.

In this connection, Benjamin (1989:23) cites Blacquiere (1987) who reports that there is 'little doubt that the deprived ecology of South Africa's black communities has, (in this particular regard) stunted their development to educational maturation'. Blacquiere suggests that, depending on socio-economic conditions, fairly severe problems with visual literacy may be encountered in many black schools, particularly in a rural environment. Blacquiere (in Benjamin, 1989:18) goes on to point out that visual support for learning materials will have to take into account the difficulties arising from visual literacy in black education and that care should be taken to ensure that visual materials are not likely to accentuate learning difficulties. This means, in effect, that textbooks written and illustrated for white schools are, as far as illustrations and other visual support are concerned, not likely to be suitable for all black learners in South Africa.

2.5.5.4 Text structure and readability

UNPRINCIPLED PARAGRAPHING

The young ESL reader's need for a 'supportive text' that provides clear, well organized paragraphs, logically connected ideas and propositions following sequentially, has been made clear in previous sections. Lanham (1990a:180) points to two examples of paragraph writing strategies typically employed, that make reading difficult for the ESL reader.

- Preponderance of one-sentence paragraphs that is 'popularly regarded as a means of simplifying texts'. However, misconceptions about what it means to simplify texts lead some writers to omit important details when simplifying materials for young readers.
- Topic lines broken by paragraph divisions. When text is not thematically constructed, topic lines (or the logical development of ideas) in paragraphs are interrupted by unprincipled paragraph divisions, which in effect, break up the topic. The result is that what is, in fact, supposed to be the development of a single topic, appears to be several separate topic areas. It is difficult for young ESL readers, reading this kind of text, to 'discern a main thread from topic-revealing sentences and sentence grouping in paragraphs' (Lanham, 1986:9).

INADEQUACY OF CUES

- Misleading or non-revealing titles and headings.

Lanham points out that misleading or non-revealing titles and headings pose serious readability problems for the young ESL reader. In the light of the importance of a reader's activated background knowledge, it is crucial that headings should be both meaningful and predictive (Williams, 1985:56; Lanham, 1986:9, 1990a:180; Van Rooyen, 1986:16). Williams (1985:56) points out that in practice headings, instead of being specific, are often cryptic, as if the writer 'wishes to hide the contents of the section rather than make it transparent'.

- Pictures or diagrams which the child cannot interpret.

Davies and Green (1984:6) also point out that the provision of learner support aids by authors and publishers (including tabulation, graphs, photographs, drawings, maps of different types, charts and calendars) only

facilitate pupil learning, 'if they are properly and actively utilized by teachers and pupils'. Harris and Sipay (1979:368) add that each chart or graph can be treated as a 'reading selection, whose structure needs to be understood, whose concepts need to be mastered, and whose meanings and details are worth explaining'. They also warn that data representations like pie charts, bar graphs and line graphs may occur in geography textbooks 'long before their interpretation is presented in mathematics'. Dale (1946); Finn (1953), and Dwyer (1970) in Benjamin, (1989:17) suggest the following criteria against which to evaluate the potential effectiveness of educational illustrations:

- Only essential information must be included – distracting cues can cause details to be missed.
- Where greater detail is included more time should be allowed for reading the pictures.
- With complex pictures the learner will benefit from being directed by a teacher to important items.

(For a detailed discussion of illustrating conventions likely to cause interpretation difficulties for young ESL readers, see Langhan, 1990:92-95).

Moore and Skinner's (1985:47) hypothesis that 'illustrations can help to integrate materials presented and help the reader make inferences from a text, thereby improving comprehension', is only likely to be true for the young ESL reader if:

- the factors discussed above, are taken into account in the preparation, production and integration of textbook illustrations;
- teachers are able to direct pupils to illustrations and guide pupils' interpretation of them.

2.6 CONCLUSION

This chapter has provided evidence to show that writing readable and comprehensible textbooks intended for young ESL readers is a complex process. It demands an understanding of the second language reading process, the special cognitive demands of particular subjects, the linguistic factors affecting the intelligibility of texts and at least some idea of the intended readers' probable reading competence. Chapter 4 investigates the impact of textbooks, written without such understanding, on the teaching and learning of geography in Std 3 in Transkei, Ciskei and East Cape schools.

3 RESEARCH METHODS

This chapter deals with the following:

- The research methods and data-collection techniques employed
- Selection and characteristics of interviewees
- The design of the research instruments.

3.1 RESEARCH METHODS AND DATA-COLLECTION TECHNIQUES

This study is concerned primarily with the description of a particular aspect of a South African educational situation 'as it is', over a period of three years in order to evaluate the situation in the light of current research, and to identify and experiment with ways of improving it.

The inquiry therefore falls within the interpretive or descriptive, primary research paradigm. More accurately, it can be described as illuminative, longitudinal, case-study-type research, employing combined levels of triangulation to counter the effects of subjectivity (Cohen and Manion, 1985; Brown, 1988).

- It is primary research (Brown, 1988:2), in that data is gathered from primary sources, namely, pupils and teachers learning and teaching geography through the medium of English.
- It is descriptive in that it does not seek to manipulate variables to determine effects as in statistical studies (Brown, 1988:4). Rather, it describes events and processes as they occur, conditions that exist, practices that prevail and effects observed (Alderson, 1986:14; Cohen and Manion, 1985:68,69).
- It is illuminative in that, by describing what is, it 'seeks to open out an educational situation to intelligent criticism and appraisal' (Hamilton, 1976:39). The research also follows the three main stages of illuminative research as outlined by Parlett and Hamilton (1975:92). The stages are:
 - investigator(s) observe,
 - inquire further, and then
 - seek to explain.
- It is a longitudinal case-study in that data was gathered over a period of three years, where successive measures were taken at different times, from the same limited number of respondents (Cohen and Manion, 1985:68; Brown, 1988:2). According to Cohen and Manion (1985:71), one of the most significant disadvantages of a longitudinal study is that of 'control effect'. That is, repeated interviewing can influence the behaviour of subjects, 'sensitizing them to matters that have hitherto passed unnoticed'. Section 3.3 below provides details on measures taken to avoid this effect as far as possible.

Triangulation techniques were applied for the following reasons:

- The use of two or more methods of collecting the same data enables a researcher to make use of quantitative as well as qualitative data (Cohen and Manion, 1985:254).
- Exclusive reliance on one method may bias or distort a researcher's picture of the phenomenon under investigation.

Triangulation techniques were applied as follows:

METHODOLOGICAL TRIANGULATION

Three different data collection methods were used on the same subjects, namely, classroom observation, informal interviews and structured interviews. The interview technique was selected over a questionnaire, mainly because it is more appropriate when looking for information representing a process rather than a product. In addition, an interviewer is able to answer questions concerning both the purpose of the interview and any misunderstandings experienced by an interviewee. S/he can also conduct the interview at an appropriate speed. Questionnaires on the other hand, are often filled in hurriedly and can present problems to people unused to this method of investigating attitudes and practices (Cohen and Manion, 1985:263).

TIME TRIANGULATION

Each of the above methods was used once with the same subjects at three different times, over a three year period (1987-1989), in order to account for factors of change over time (Cohen and Manion, 1985:257).

SPACE TRIANGULATION

Cohen and Manion (1985:257) explain that space triangulation is normally employed in an attempt 'to overcome the parochialism of studies conducted in the same country'. In an attempt to do this, subjects were selected from three independent education departments, namely, Transkei, Ciskei and eastern Cape, in South Africa. Although the Transkei and Ciskei education departments emulate the Department of Education and Training in many ways, they are regarded as independent territories and were, therefore, treated as such in this investigation.

3.2 RESEARCH METHODS AND DATA-COLLECTION TECHNIQUES IN THIS STUDY

Following Parlett and Hamilton's (1975:92) three stages of data collection in illuminative research, and Cohen and Manion's (1985:254) methodological, time and space triangulation, the data collection followed these main stages:

- Stage 1: Observe – Informal, semi-structured interviews – 1987, April, May.
– Classroom observation – 1987, April, May, June.
- Stage 2: Enquire – Structured Interview 1 – 1989, May.
– Structured Interview 2 – 1989, October.
- Stage 3: Explain – Analysis of data (see Chapter 4).

STAGE 1 INVESTIGATOR(S) OBSERVE

Informal interviews

Fourteen teachers and two principals, from six schools in Transkei, Ciskei and eastern Cape, participated in the informal interviews conducted during May 1987. In May 1989 it was decided to add another two eastern Cape teachers, who would provide an urban contrast to the mainly semi-urban group of teachers already participating in the research. Participants were interviewed about teaching and learning in the content subjects through the medium of English.

Classroom observation

Permission was obtained from the Transkei and Ciskei education departments to observe lessons and conduct interviews with Std 3 content subject teachers and their principals at two selected schools in each region. Because of strict DET policies governing research projects in schools under their jurisdiction, the same was not possible in the four selected eastern Cape schools. However, permission was granted to conduct interviews with the DET teachers after school hours. Consequently, the report on classroom observation in Chapter 4 of this study, reflects only classroom procedures as observed in Transkei and Ciskei. It will be shown that the responses to questions in both the informal and formal interviews revealed that teaching practices in the 'unobserved' schools were no different from those that were 'observed'.

STAGE 2 INQUIRE FURTHER (TWO STRUCTURED INTERVIEWS)

Two different structured interviews were conducted during April/May and September/October 1989. The participants were six randomly selected teachers from the original group of 12 interviewed in 1987, as well as two from the new eastern Cape schools.

In order to prepare the two structured interview schedules it was necessary to do the following:

- Schedule for Structured Interview 1:
 - Analyze the data from the 1987 informal interviews (see Chapter 4)
 - Select interviewees (see the discussion in 3.3)
 - Select, and analyze textbook passages in terms of the properties of expository discourse affecting readability and comprehensibility (see the discussion in section 3.6).
- Schedule for Structured Interview 2:
 - Analyze the data from the first structured interview (see Chapter 4)
 - Rewrite the selected textbook passages implementing premises and principles of expository discourse for ESL readers (see the discussion in section 3.6).

STAGE 3. EXPLAIN - ANALYSIS OF DATA (SEE CHAPTER 4)

The data gathered during both the observation and inquiry stages of the research are analyzed and explained in Chapter 4.

3.3 SELECTION AND CHARACTERISTICS OF INTERVIEWEES

SELECTION OF PARTICIPATING SCHOOLS

Interviewees were selected according to Cohen and Manion's (1985:100) principle of 'convenience sampling'. That is, interviewees were selected in terms of 'ease of access' to schools. As it turned out, the two schools selected in each region were regarded (both by the teachers and their education departments) as the best schools in each of the areas. This means that the findings of this study are likely to represent the best case in attempting to confirm the hypothesis that governs this inquiry.

In all cases, the principals and teachers in the identified schools were approached (usually by personal visit), in order to establish whether or not

they were willing to participate in the research. Following this, the relevant education departments were approached and permission was granted to conduct interviews with teachers.

SELECTION OF INTERVIEWEES

Selecting interviewees for informal (semi-structured) interviews - May 1987

All Std 3 teachers and principals at each school were invited to participate. This resulted in an average of three interviewees at each of the six selected schools.

Selecting interviewees for structured interviews

Since all the teachers had indicated their willingness to participate in further research activities, one teacher from each school was randomly selected to participate in 'further research activities'. This would take the form of two further detailed structured interviews.

Interviewees were selected randomly in order to avoid 'self-selection', thus avoiding the possibility of the more motivated, and possibly 'better candidates' volunteering, which may have unrealistically influenced the results (Brown, 1988:31). At this stage, setting a date for the next 'research activity' was deliberately avoided to reduce the possibility of the 'practice' and 'reactivity effects' (Brown, 1988:38).

CHARACTERISTICS OF INTERVIEWEES

Informal interviews

Fourteen Std 3 teachers and three higher primary school principals were interviewed. All of the interviewees had experience teaching geography through the medium of English in Std 3. All interviewees, apart from the principals, were class teachers, i.e. they taught all the subjects in the Std 3 curriculum, and had extensive exposure to the difficulties encountered in the first year of English-medium instruction.

Structured interviews

Of nine higher primary teachers:

- Seven were female and two male
- Seven had matriculated and two had passed Std 8
- Eight had obtained a Primary Teacher's Certificate, while one had a Secondary Education Certificate
- Nine had taught geography in Std 3 for five or more years, while only one was in her second year of primary education after 16 years in a secondary school
- Six had taught geography at other levels in the higher primary school for four years or more, while three had not taught geography at any other level
- All had a minimum of seven years of general teaching experience, with the longest teaching careers spanning 21 and 37 years
- All had received formal training in all primary school subjects.

3.4 DESIGN OF RESEARCH INSTRUMENTS

STAGE 1: INITIAL SURVEY: APRIL – MAY 1987

According to Cohen and Manion (1985:94-127), surveys typically involve structured or semistructured interviews and must fulfil three prerequisites. These are, the specification of the exact purpose of the enquiry; the population on which it is to focus; and the resources that are available (finance, time, personnel, etc.).

The purpose of the initial survey was to conduct an inquiry into the situation as it is, in Std 3 content subject classes, to describe the situation, and to ensure that follow-up research activities were appropriate. The sample population is discussed in detail in the above section on selecting the interviewees. There were no difficulties as far as available resources were concerned. This was primarily due to the fact that regular school visits were part of the researcher's routine at the time. It was, therefore, possible to 'attach' research visits onto other scheduled official school monitoring and teacher-support visits to the selected regions.

Conducting informal interview

The aims of the interview were:

- To describe existing conditions in the content subject classroom
- To determine the nature of the problems experienced in the teaching/learning of geography from observation and from the teacher's point of view
- To uncover evidence relating to the textbooks as a likely cause of the difficulty of learning through the medium of English.

The 13 interview questions (see Appendix 1) – subsequently repeated in the first structured interview – are mainly open-ended, allowing the interviewer to:

...clear up any misunderstandings... to test the limits of the respondent's knowledge; encourage cooperation and establish rapport, and they allow the interviewer to make a truer assessment of what the respondent really believes.... They can also result in unexpected or unanticipated answers which may suggest hitherto unthought of relationships or hypotheses (Cohen and Manion, 1985:297).

Teachers were interviewed informally in groups of three or four at each school in order to set them at ease, to remove any sense of one-on-one intimidation, and to allow spontaneous, free responses to the questions which focused their attention on particular issues. It was also hoped that by including all the teachers (an average of three per school) there would be more chance of gaining broader, more realistic insights into their perceptions of problems. Thus providing a broad data base that would provide insights into possible areas of focus in later, more detailed structured interviews with pairs of teachers.

Classroom observation

To ensure that teachers were not 'window dressing' for the sake of the researcher, every attempt was made to be as unobtrusive and as natural as possible when observing lessons. Several unexpected, completely informal visits were made to the schools during which time content subject lessons

were observed and teachers were encouraged to discuss their difficulties with the lessons or sections being covered at the time. The natural, informal observation style was preserved by avoiding tape-recording lessons or taking notes in the classroom. A record of observations was kept in the form of 'field notes' made after each visit (Cohen and Manion: 127).

STAGE 2: TEXTBOOK ANALYSES AND STRUCTURED INTERVIEWS

Preliminary textbook analysis

During the informal interviews and classroom observation in 1987, it was established that the content subject textbooks (geography, history and general science) used by the selected teachers were:

Geography:

- *Geography can be Fun, Standard 3*. L. B. Hurry (1980), Via Afrika Ltd (used by 6 of the 9 teachers).
- *Our New World 3*. Hattingh L.L., Michell S.D., Chambers D.J. and Beck J.D. (1981), Maskew Miller Longman (used by 3 Transkei teachers).

History:

- *History Can Be Fun, Standard 3*. Mocke, H.A., Wallis, H.C. (1987), Via Africa Ltd.
- *History 3*. Lambrechts, H.A., Van Schoor, J.A.M., Bester, C.L., Potgieter, D. (1980), Nasau Ltd.

Science

- *General Science Can Be Fun, Standard 3*. Fourie, D.I., Kaske, C.M.E.M., Msi, Z.I.M., (1982) Via Afrika Ltd.
- *General Science in Action 3* (new syllabus) Metrowich T.P., Hitchcock, I., Basson, N.J.S., Redelinghuys, R.B. (1981), Juta & Co Ltd.
- *General Science for Today 3*. Redelinghuys, R.B., Hitchcock, I., Basson, N.J.S., (1988), Juta & Co. Ltd.

(Note: According to their publishers, all of the above textbooks are marketed widely throughout southern Africa.)

Following the observation stage, which highlighted particular problems encountered by both pupils and teachers using these textbooks (see Chapter 4); the above textbooks were analyzed in terms of the demands they make on Std 3 children in their first year of English-medium instruction under the following broad headings:

- Assumptions about language competence
- Assumptions about classroom learning strategies
- Assumptions about task appropriacy

The findings, discussed in Chapter 4 of this study were then used as a foundation for the more detailed text analysis discussed below.

3.5 SELECTION OF PASSAGES FROM GEOGRAPHY TEXTBOOKS FOR STRUCTURED INTERVIEW 1, PART 2

Based on the following interviewees' responses to question 3a in the semi-structured interview of 1987, three passages were selected for analysis.

Q3a: *Which parts of the syllabus would you say the pupils find most difficult?*

Answers:

- *The whole syllabus (as it is treated in the textbooks)* – three teachers
- *Maps and charts* – four teachers
- *The weather/climate* – three teachers
- *Relief* – three teachers
- *Raw materials* – two teachers
- *Vegetation* – two teachers

Based on the above responses the whole syllabus is perceived to be difficult to teach through the medium of English. The following chapters from the two geography textbooks were selected for analysis because they were listed as three of the five more difficult sections of the syllabus:

- Mining in South Africa (raw materials) – *Geography Can Be Fun*, 48-49
- What South Africa looks like from space (relief) – *Geography Can Be Fun*, 50-51
- The climate of the RSA – *Our New World 3*, 52-53.

Since seven out of the nine teachers were using *Geography Can Be Fun*, two passages were selected from this text and only one from *Our New World 3*.

ANALYSIS OF SELECTED PASSAGES

The recent South African research, discussed in Chapter 1, suggests that existing content subject textbooks are likely to seriously hamper young ESL learners' ability to extract information and, therefore, to learn from them through the medium of English. What such research has not yet shown, however, is that some existing textbooks *actually* cause reading and comprehension difficulties. In order to determine whether this is, in fact, the case, the following steps were followed in this study:

- Those properties of expository discourse most likely to cause reading and comprehension problems for young ESL readers and their teachers are identified.
- The three selected textbook passages are analyzed in terms of the properties referred to above.
- Interview schedules for each of the passages are prepared to assess Std 3 teacher's ability to read and comprehend the passages, and identify those properties of the passages which cause reading and comprehension difficulties.
- Teachers' responses to the interview questions are analyzed in terms of the first two points.

The first three of the above steps are discussed below, while the fourth is discussed in Chapter 4.

3.6 PROPERTIES OF EXPOSITORY DISCOURSE MOST LIKELY TO CAUSE READING AND COMPREHENSION DIFFICULTIES

With reference to the properties of expository texts discussed in Chapter 2, and with ESL readers specifically in mind, Lanham (personal communication, 1990) proposes that the following are necessary discourse properties:

- Accessibility of background knowledge with particular reference to supporting headings, maps and diagrams
- Thematic coherence
- Propositional fullness and explicitness (the explicit expression of important information)
- Avoiding obscure reference
- Establishing concepts before applying them as subject-specific terms, and providing semantic support for unknown vocabulary
- Overall coherence and logical relations.

(Note that adequate control of syntactic and lexical complexity is a necessary property of all texts.) Below is a brief explication of each of these properties as they are applied in the analysis.

ACCESSIBILITY OF BACKGROUND KNOWLEDGE AND SUPPORTING INFORMATION

The importance of a topic being set against accessible background knowledge is discussed in detail in Chapter 2. However, there are at least two important applications of that discussion in the analysis of the selected passages. First, misleading or non-revealing titles and headings are culpable in that they either activate inappropriate background knowledge, or fail to activate it at all. Either way, an important part of the interactive reading process is lost. Second, constant reference within a text to maps and diagrams that provide supporting information, makes it important that these graphics are interpretable. If however, a map or a diagram is uninterpretable, background/supporting information is not available to readers for constructing the message of a passage.

THEMATIC COHERENCE

Theme and topic are discussed together because, conceptually, they are similar. The only difference being their levels of application within discourse; theme at a higher, and topic at a lower level. Coherence is applied in the analyses in the following sense:

The logical progression of ideas which is not disrupted by non-sequiturs, tangential topic lines or information gaps (implicit information – including false assumptions about "global knowledge"). Sentences have a topic – comment structure. New topic lines are clearly marked as such. Lanham (per. comm., 1990).

If the above conventions are not adhered to, the reader is unable to gain a sense of the coherence of propositions expressed and main ideas supported by other propositions.

PROPOSITIONAL (INFORMATIONAL) FULLNESS AND EXPLICITNESS

The young ESL reader expects a text to 'tell him everything'. Thus it is crucial that false assumptions should not be made about a reader's ability to infer and supply missing information. Unrealistic assumptions can result in the exclusion of crucial information, without which a reader is unable to make necessary links in the development of a topic. It is, therefore, preferable to 'state the obvious'.

AVOIDING OBSCURE REFERENCE

There are two important aspects to consider. The first is identifying the referent. This could be in the text, part of a supporting diagram, or outside the text in the real world (the geography of South Africa, in this case). Unless readers can identify the referent and draw it into the message they are constructing, it is impossible for them to read with understanding. The second relates to the introduction of unknown vocabulary and register terms discussed below.

ESTABLISHING CONCEPTS BEFORE APPLYING THEM

It is vital to establish the nature and essential properties of an unknown referent, (i.e. establishing it conceptually in the mind of a reader before applying it as 'assumed knowledge' in the world of geography). This is particularly important when a referent, crucial for understanding a passage, is found only in a supporting map or diagram. For example, the use of 'interior plateau' as a labelling term, without 'plateau' being conceptually established. If such a term is not conceptually established, it cannot be found. Referents should, therefore, be clearly established through 'mutually delimiting co-occurrence associations' (Lanham 1990, personal communication). This is because the meaning understood by a reader is likely to be a 'first meaning' for a word from 'general English', that is specific to its original context and unrelated to the world of geography.

LOGICAL RELATIONS

It is crucial for the young ESL reader to avoid the following when establishing concepts:

- Points of confusion, for instance, an unprincipled use of different terms for the same referent such as, *raw materials* and *minerals* – see Textbook Passage 1, paragraphs 2 to 4 on page 43; *climate* and *weather* – see Textbook Passage 3, paragraph 1 on page 47.
- Apparent contradictions, for example, the descriptions of *plateau slopes* and a *coastal plain* in Textbook Passage 2, paragraphs 7 and 9 on page 45.
- Sequences of simple sentences, sparse in cohesive links, without logical connection (for example, *because, thereafter*), see for instance, paragraphs 2 to 4, Textbook Passage 1. This is a false strategy in simplifying text, as is the following item.
- Single-sentence paragraphs, see Textbook Passages 1 and 2.
- Illogical time/space ordering, see for example, Textbook Passage 3, paragraph 2 lines 4 to 10.

If a text intended for ESL readers can be shown to fail as expository discourse in terms of the above properties at the macro-level, there is little doubt that it will be difficult to read and understand. In addition to the above attributes, selected examples of micro-level properties such as syntactic complexity and unfamiliar cohesion devices that compound reading problems are included in the following text analyses in section 3.7.

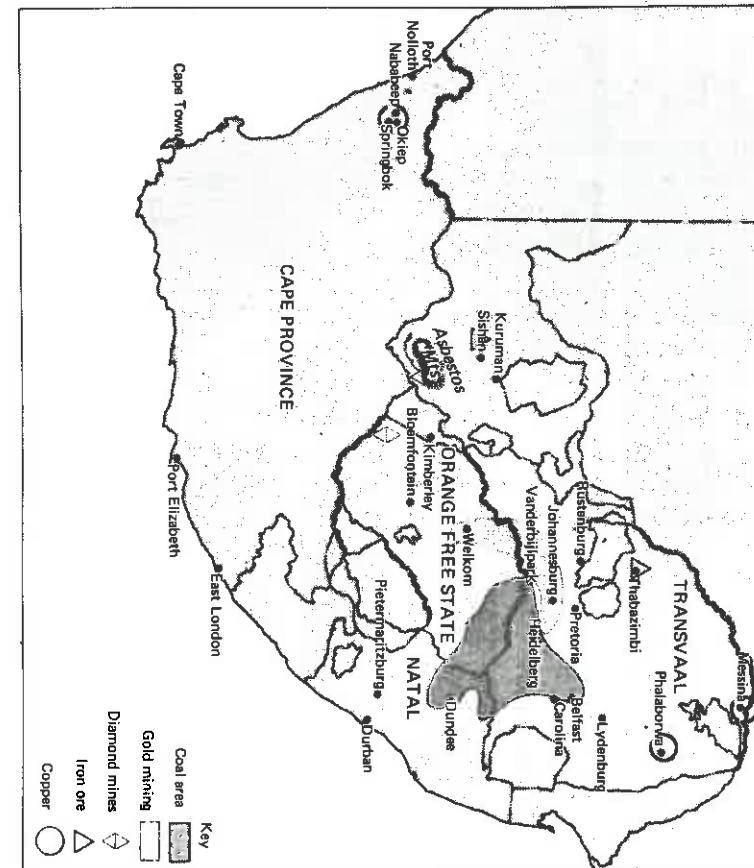


Figure 53 Important minerals.

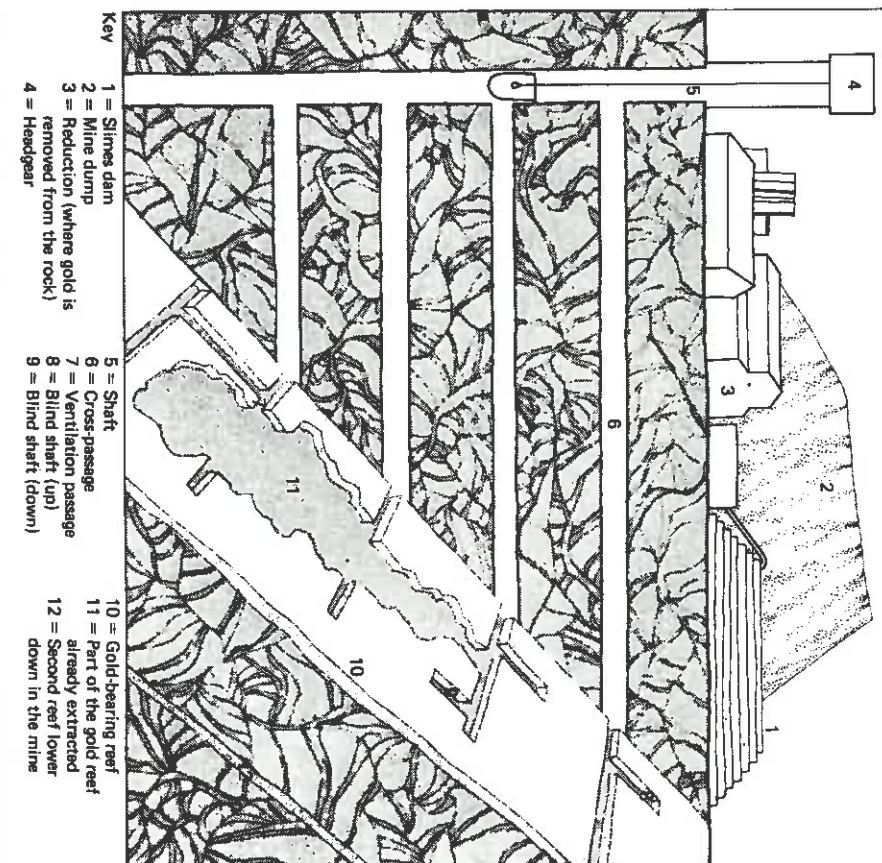


Figure 54 Inside a goldmine.

6. Mining in South Africa

Study for yourself

- 1 Make a list of all the things that you can see around you. Include desks, pens, windows and other objects. Next to each word write down what each object is made of. For example, a desk is made of wood, iron nails, steel screws and brass hinges. A window is made of glass and wood or steel, and a pen is made from plastic.
- 2 The things that are needed to make the objects around you are called *raw materials*. Raw materials may be wood, water, coal, iron or other minerals.
- 3 In this chapter we will learn something about South Africa's minerals.
- 4 You need to study only ONE of the following: Gold, diamonds, coal, copper or iron ore.

(a) Gold

- 5 South Africa is the world's biggest producer of gold. Much of all the gold mined in the world comes from South Africa.
- 6 Figure 53 shows you where the gold is mined. The mines are found in an arc which begins in the Orange Free State and which ends at Heidelberg to the east of Johannesburg.

4. What South Africa looks like from space

If you could fly very high in a satellite, or a space-ship, you would be able to see the whole of South Africa far below you. You would be able to see the mountains and the rivers and all the land in between them. These things make up what is called the *relief* of South Africa. Figure 25 shows you the relief of South Africa on a map.

Look carefully at figure 25 and note the following points.

- 7^a Many of the towns and cities along this arc began as gold mining towns.
- 7^b The most famous of these is *Johannesburg*. When gold was first discovered there was no town. Within a few years the town had grown out of the veld.
- 7^c Today it is the biggest city in South Africa.
- 8 South Africa has some of the *deepest* gold mines in the world. A number of gold mines are over 3 000 metres deep into the ground. Mining so deep is dangerous and mining engineers have had to work out ways of protecting the miners from accidents.
- 9 Figure 54 shows you what a gold mine looks like. The rock with the gold in it is known as a *reef*. You can see how the gold reef slopes at an angle into the earth. This also makes mining a difficult task. South African mining engineers, who have to overcome these problems, are among the best in the world.
- 10 People come from all over Southern Africa to work in South African mines. They earn money which they can send back to their families.
- 11 South Africa *sells gold* to many other countries. The gold earns money for South Africa. This money can be used to buy things that the country needs, like machinery, ships, clothes, books and motor cars. Figure 55 shows you how important gold is to South Africa. Without gold South Africa would have far less money coming in.

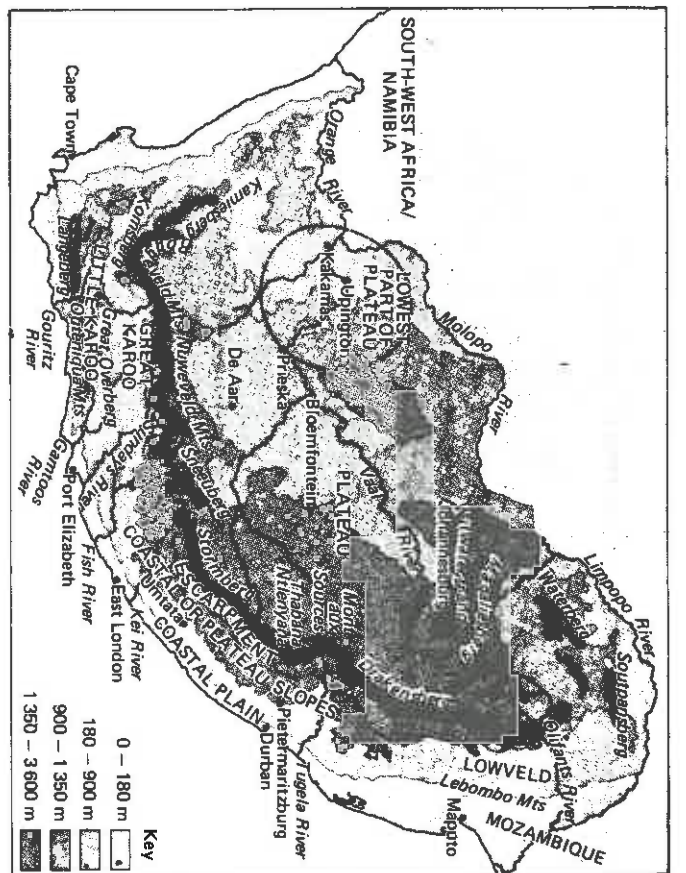


Figure 25 The relief of South Africa.

(a) General

- 2 South Africa's relief looks like a saucer that has been turned upside down.
- 3 The base of the saucer is the line of mountains stretching from the Kamiesberg in the South-western Cape to the Drakensberg in the Transvaal.

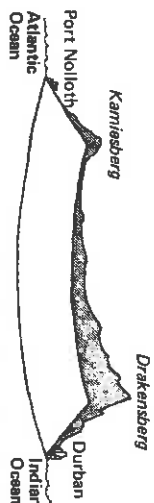


Figure 26 The relief of South Africa looks like an upturned saucer.

Value of gold	Value of diamonds	Value of other goods
---------------	-------------------	----------------------

Figure 55 The importance of gold and diamonds.

(e) Other mountains

There are some mountains that do *not* form part of the escarpment. These are:

- the Magaliesberg near Pretoria
- the Waterberg near Potgietersrust
- the Zoutpansberg near Louis Trichardt.

The Witwatersrand is not a mountain but a line of hills. This is the area where Johannesburg and other very important cities are found.

(f) The coastal areas

Look at figure 25 again. Would you say that the coastline (that is the line along the sea) was *smooth* or *rough*? Between the coastline and the plateau slopes the land is fairly flat. This is known as the *coastal plain*. The coastal plain is widest in northern Natal and narrowest along the southern Cape coast.

Is the coastal plain wider along the Transkei coast than it is along the coast in the western Cape?

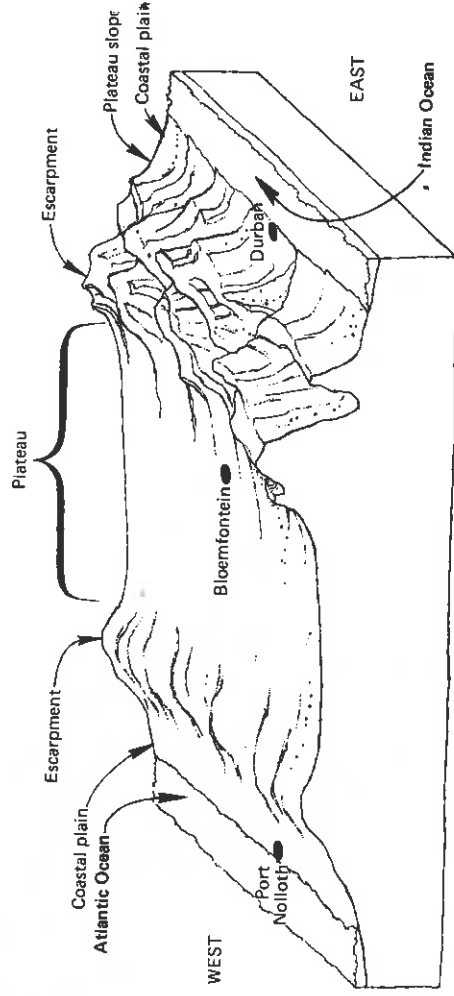


Figure 27

(b) The plateau

The high flat part of South Africa is known as the *plateau*. (See figure 27).

The plateau is highest in the east and lowest in the west.

The plateau is very flat. Another word for plateau is "table-land".

(c) The escarpment

The mountains that form the edge of the plateau are called the *escarpment*.

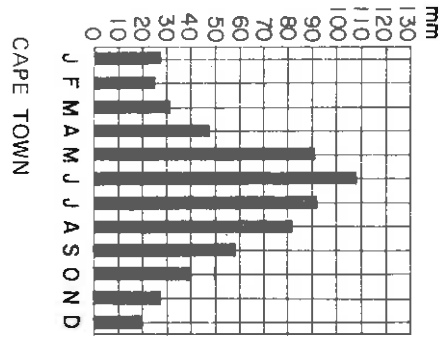
The highest point of the escarpment in South Africa is the top of Mont-aux-Sources in Natal. This is 3 480 metres above sea level.

Many mountain ranges go to make up the escarpment. The Nuweveld Mountains, the Sneeuberg, the Stormberg and the Drakensberg are only a few.

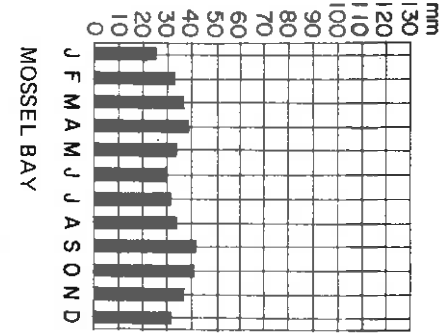
(d) The plateau slopes

Between the escarpment and the sea the land is called the *plateau slopes*. These parts of South Africa are very hilly. Examples of the plateau slopes are the Transkei and the Tugela Valley.

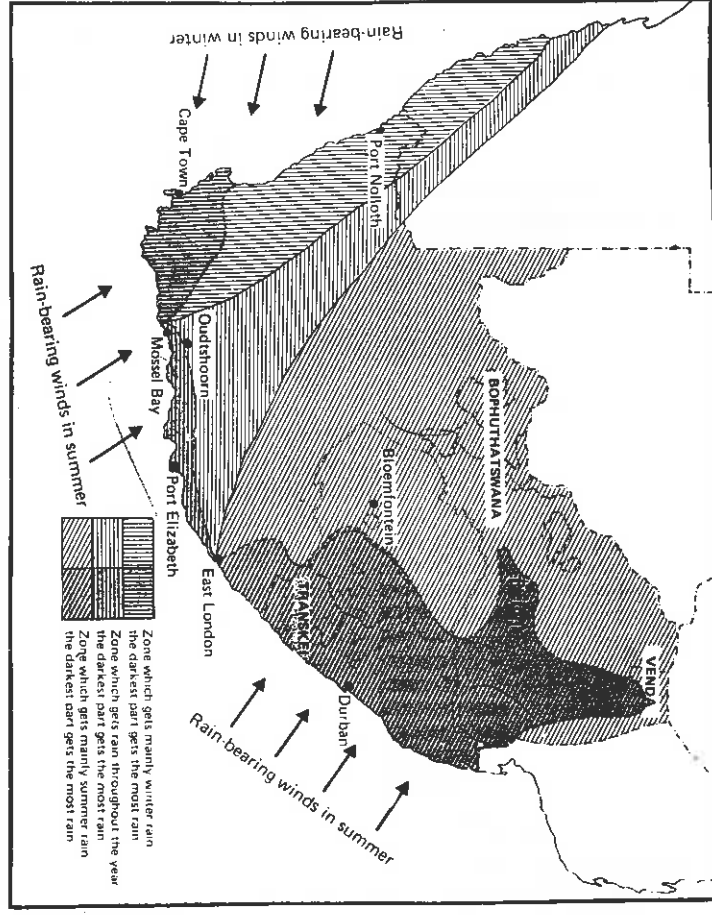
Rainfall in Cape Town



Rainfall in Mossel Bay



Map 1: The rainfall zones of the RSA



The following map (no. 1) indicates the

THE RAINFALL ZONES OF THE RSA

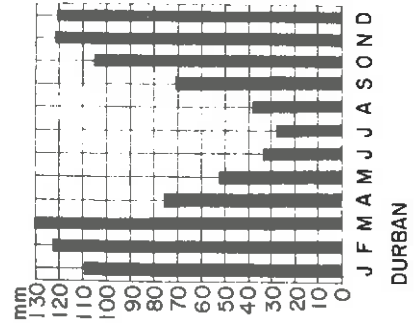
As you probably already know, wind brings moisture to the land. As you remember from standard 2, hot air rises and cold air sinks. In the interior of the RSA the summers are hot, so the air rises. Warm, moist air from over the Indian Ocean flows in to take its place. This causes summer thunderstorms. When the moist air reaches the escarpment it is forced to rise and rain falls. There is also a lot of mist in this area. Thus, the air loses a lot of its moisture before crossing the mountains of the escarpment. This is why less rain falls on the western side of the mountains and the climate gets drier and drier the further west one goes. It gets so dry that there is a desert along the west coast of southern Africa (mainly in Namibia). Find out what this desert is called.

The Climate of the RSA

Climate is the weather pattern of a particular area. For instance, in the south-western Cape Province the climate in winter is spells of cool, rainy weather followed by lovely sunny days. In chapter 2 you learned about the weather. You should by now have started making your own weather chart (see p. 10). Study it and say what the weather pattern in your area has been lately.

RAIN-BEARING WINDS

As you probably already know, wind brings moisture to the land. As you remember from standard 2, hot air rises and cold air sinks. In the interior of the RSA the summers are hot, so the air rises. Warm, moist air from over the Indian Ocean flows in to take its place. This causes summer thunderstorms. When the moist air reaches the escarpment it is forced to rise and rain falls. There is also a lot of mist in this area. Thus, the air loses a lot of its moisture before crossing the mountains of the escarpment. This is why less rain falls on the western side of the mountains and the climate gets drier and drier the further west one goes. It gets so dry that there is a desert along the west coast of southern Africa (mainly in Namibia). Find out what this desert is called.



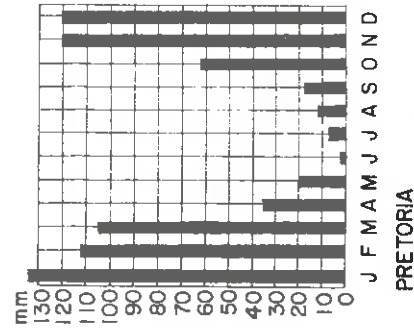
Rainfall in Durban

rain-bearing winds, the season when they blow and the rainfall zones of the RSA. Study it carefully and then answer these questions:

- In which rainfall zone is your town or city situated?
- When does Cape Town get most of its rain?
- Does Cape Town or Port Nolloth get more rain?
- When does Mossel Bay get its rain?
- When do Durban and Bloemfontein get their rain?
- Does Durban or Bloemfontein get more rain?

4 The diagrams above show how much rain usually falls each year in Cape Town, Mossel Bay, Pretoria and Durban. Each black line stands for a month. The longer the black line, the more rain usually falls in that month. The numbers up the side show how many mm rain usually fall. So, 130 mm rain usually falls in Pretoria during the month of January and 30 mm rain usually falls in Mossel Bay during the month of June.

5 Study the diagrams and decide in which rainfall zone each town or city falls. Now find the places on the map and see whether you were right.



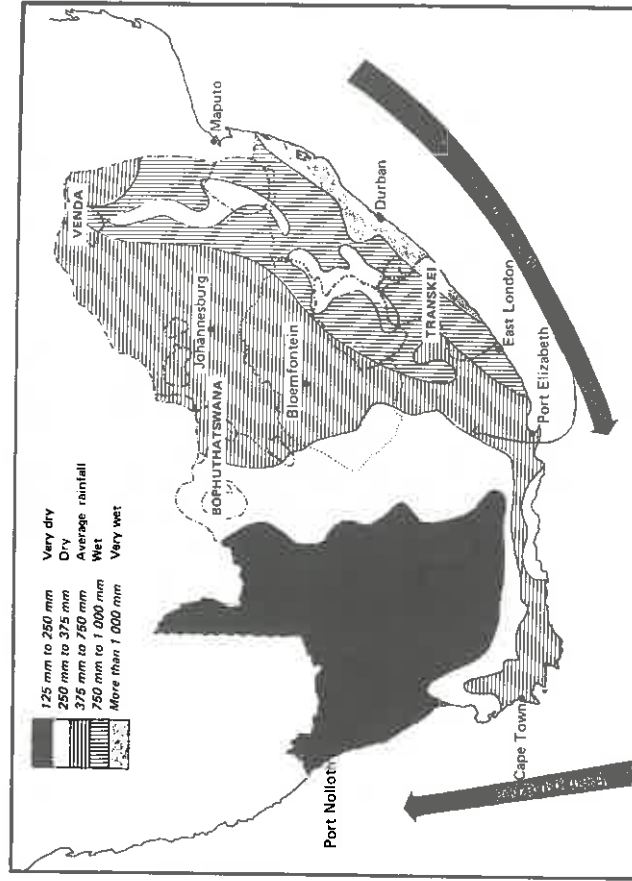
Rainfall in Pretoria

6 HOW MUCH RAIN FALLS IN THE RSA
Map no. 2 shows how much rain usually falls in the RSA every year. Study it carefully and then answer the following questions:

- Name three regions which have more than 1 000 mm rain per year.
- Think about what you learned about rain-bearing winds. Now try to explain why these areas have so much rain.
- Which area of the RSA has the lowest rainfall per year? Why?
- Does East London or Cape Town usually have more rain each year? How much rain usually falls in Johannesburg each year?
- Work out where your home town or city is on the map.
- Now say how much rain usually falls each year where you live.

RELIABILITY OF THE RAINFALL

7 When we learnt about rain-bearing winds (p. 28) we saw that when the moist air from the Indian Ocean is forced to rise against the slopes of the escarpment, it loses most of its moisture, so the areas west of the



Map 2: Average annual rainfall

escarpment are dry. Look at a map and you will see that this means that most of the RSA is dry. In other words, it has a low rainfall which mostly falls in the form of scattered thunderstorms. These areas often suffer from drought. A drought is when far less rain than normal falls in an area. Often in these areas the rain falls in strips. This means that while one farm gets a good fall of rain during a thunderstorm, its neighbour gets none.

3.7 DETAILED ANALYSES OF THREE SELECTED PASSAGES

In the following discussion, each of the selected passages is analyzed in terms of the six properties discussed in section 3.6, as they affect the readability and comprehensibility of the texts.

TEXTBOOK PASSAGE 1: MINING IN SOUTH AFRICA

This passage consists of two main parts. The first, paragraphs 1 to 4, introduces the theme of 'Mining in South Africa'. The second, paragraphs 5 to 11, develops the theme 'Gold' which might be more explicitly titled 'Gold Mining in South Africa'. The following topic lines are presented:

Paragraph 1: The listing of 'all the things around you' constitutes a 'task'. Although it attempts to draw on the readers' background knowledge, the task is so open-ended that it cannot support the announced topic.

Paragraph 2: Raw materials are identified as 'things needed to make objects'.

Paragraph 3: South Africa's minerals. (Thematically this topic runs across the paragraph break into paragraph 4.)

Paragraph 4: South Africa's minerals are, by implication: gold, diamonds, coal, copper and iron ore. (Thematically this refers beyond the following passage, to the whole chapter on mining.)

Paragraph 5: South Africa – the world's biggest gold producer. (Thematically this links with the topic line in paragraph 11 and Figure 55 referred to in that paragraph.)

Paragraph 6: The location of the gold mines. (Thematically this runs across the paragraph break to paragraph 7.)

Paragraph 7: Gold mining towns developed as a result of the discovery of gold.

Paragraph 8: Gold mines are deep and dangerous. (Thematically this links with the last two sentences of paragraph 9.)

Paragraph 9: How gold is found below the ground.

Paragraph 10: Workers on the gold mines.

Paragraph 11: Gold provides wealth for purchasing commodities abroad.

Comments bearing on thematic incoherence, propositional (informational) deficiency and logical relations

- No topic (with the possible exception of paragraph 11), is sufficiently supported to establish it in the mind of the reader, for example:
 - In paragraph 1, the open-ended listing exercise is of little relevance to the theme under discussion. Instead of 'activating' appropriate thematic background knowledge, the activity diverts the reader's attention from it. In paragraphs 1 to 4, the meanings of 'mining' and 'minerals' are unexplained. (See sentences S, T and U.) There is also reference to Figure 53 which adds no new information to the explanation.
 - In paragraph 9, the way gold is mined (or exists below the ground) – surely a major topic to be developed – has two inexplicit sentences, x and y. There is also reference to Figure 54, an uninterpretable illustration, discussed below (see obscure reference).

- The passage is propositionally deficient, see in particular:
 - Paragraph 2: It is implied that the open-ended list of substances are raw materials. 'Minerals' are never identified explicitly. (See sentences S, T, U and V).
 - Paragraph 3: That 'minerals are mined' is not explicitly stated. (There is a propositional leap between the two sentences in this paragraph).
 - Paragraph 4: The missing proposition, 'gold is a mineral', is to be inferred by the reader.
 - Paragraph 5: The second sentence iterates the first with little semantic enrichment (i.e. without purpose).
 - Paragraph 6: The term 'arc' (likely to be an unknown lexical item), is not explicated. In addition, it is difficult to identify in Figure 53.
- Propositional (information) flow ignores normal conventions of logical relations.
 - In paragraph 7, sentences c and d explicate the term 'gold mining town', introduced in focal position in sentence a. Sentences b and e extend the concept to Johannesburg (actually an illustrative example). Note the 'leap-frogging' order.
 - In paragraph 9, the information flow can be represented thus:

Mining —> difficult
 SA engineers (solve problems) —> the best

Compare this with a suggested 'normal' information flow:

Mining —> difficult
 difficulties —> problems
 problems are solved —> best engineers

- In propositional development and discourse structure, the paragraphs have little coherence. Topic lines are broken by paragraph divisions and topics broken off in one paragraph are taken up in another. (See, in particular, paragraphs 1 and 2, 3 and 4, 6 and 7, 8 and 9.) Also, minor topics stand isolated between major topics. (See, in particular, paragraph 10.)

Comments bearing on obscure reference, background knowledge and subject-specific terms

- 'Mining', in the heading 'Mining in South Africa', is semantically opaque, and therefore likely to be an obscure reference. A sentence such as the following could have made it more transparent: *Miners bring gold and coal from under the ground.*
- Obscure references to maps and diagrams are common. Figure 53 on which the text relies for showing 'important minerals', depends on the implicit proposition: gold, diamonds, coal, etc. are minerals. Also, at least two of the referents (gold and coal mining areas) are unrecognizable by a child using the key. (Notice that three of the symbols – the circle, triangle and diamond, are reproduced exactly on the map, while the two colour-coded rectangles are not).

Figure 54 on which the text relies for showing 'what a gold mine looks like' is extensively uninterpretable because:

- Numerous technical mining terms are in the key without explication.

- The representation of the 'reef' is highly stylized, requiring several levels of interpretation for the reef to be seen as a sliver of gold 'sandwiched' between layers of rock.
- Underground, a vertical cross-section (two dimensional in one part), leads to a three-dimensional, angled view of the reef.
- The illustration is cluttered with unlabelled tangles of lines apparently intended to show the earth below ground.
- Figure 55 on which the text relies for showing 'the importance of gold' as wealth, contains the following obscure referents:
 - A highly unconventional representation of propositions gives no indication of what the 'whole' amounts to. (The reader is therefore unable to infer what the 'other goods' are, and whether they are imports or exports.)
 - The precise meaning of 'value' is unclear. Neither the passage nor the figure reveal whether the reference is to the inherent value of the goods, or the 'money earned' by selling them.
- The meanings of key register terms are not established. For example, see paragraphs 2 to 4 in which semantic relations between: *raw materials* – *minerals* – *gold*, *diamonds*, etc. remain inexplicit. Hence an 'obscure reference' for each of these terms. None of the terms 'gold' (paragraphs 5 to 11), 'arc' (paragraph 6,) or 'reef' (paragraph 9), are established in terms of their nature and properties. They are therefore also obscure references.

Comments bearing on syntactic complexity, unfamiliar cohesion devices and unfamiliar expressions

- Paragraph 2 includes a passive sentence with a deleted agent (sentence p), which requires the reader to interpret the passive transformation and to supply the deleted agent (i.e. manufacturers).
- In paragraph 7, the expression 'grown out of', is likely to be unfamiliar, thus reducing readability.
- In paragraph 9, the anaphoric reference, 'these problems', refers to one problem in paragraph 9 (sentence V), and another in paragraph 8 (sentence W). This reference across two paragraphs makes the second referent difficult to identify.

TEXTBOOK PASSAGE 2: WHAT SOUTH AFRICA LOOKS LIKE FROM SPACE

Ten paragraphs develop the theme that might be more appropriately titled, 'What South Africa looks like from high up in the sky'. The following topic lines are presented:

Paragraph 1: The relief-view of South Africa, seen from space. (Thematically this runs across the paragraph break to paragraph 2.)

Paragraph 2: South Africa's relief likened to an upturned saucer. (Thematically this runs across the paragraph break to paragraph 3.)

Paragraph 3: The line of mountains (the escarpment), likened to the base of a saucer.

Paragraph 4: The plateau is high and flat.

Paragraph 5: The escarpment is made up of the mountains forming the edge of the plateau. Note that the last two sentences do not contribute to

the topic. (Note also that the topic in this paragraph runs across the paragraph break to paragraph 6.)

Paragraph 6: The mountain ranges that make up the escarpment.

Paragraph 7: The plateau slopes are between the escarpment and the sea. (Thematically this logically precedes paragraph 9.)

Paragraph 8: A list of mountains that do not form part of the escarpment. (Thematically this follows on logically after paragraphs 5 and 6.) Note also that sentence k is thematically incoherent, introducing an unrelated topic.

Paragraph 9: The coastline and coastal plain defined. (Thematically this runs across the paragraph break to paragraph 10.)

Paragraph 10: An instruction to find the coastal plain.

Comments bearing on thematic incoherence and propositional (informational) deficiency.

- No topic is sufficiently supported to establish it in the mind of the reader. In particular relief, the macro theme and the topic of paragraphs 1 to 3, is not explicated. Its meaning has to be worked out from the text and illustrations that do not provide adequate support. There are, for example, four obscure references in paragraph 1 at a), b), c) and d). (Figure 25 is the referent of d) discussed under obscure reference below.) In addition, in the last line of this paragraph, no relation is established between 'map' and 'relief'. Paragraphs 2 and 3 contain two more obscure references at e) and f). Figure 26 has to be recognized as a cross-section, and is not even referred to in the text.

The topics in paragraphs 4 to 7 rely heavily on Figure 27 although this is not sufficiently integrated into the text and is confusing in parts. (See the discussion of Figure 27 under obscure reference below.)

- Paragraphs are often propositionally deficient (or important ideas are not explicitly stated). See, in particular, paragraph 4 – it does not explicitly state what a plateau is. Also note that sentence g) iterates part of the propositional content of sentence h), with little semantic enrichment. Sentence i) is an incomplete statement of the intended idea or proposition, it gives the plateau another name, without adding any new meaning.
- In propositional development and discourse structure, the ten paragraphs have little coherence, for example:
 - There is no explicit link between 'space' in the title, and the discussion of a 'space-ship' in paragraph 1. The implicit proposition – space-ships fly in space – is crucial for understanding the view of a continent from above, and essential for establishing the concept 'relief'.
 - Topic lines are broken by paragraph divisions. (See, in particular, paragraphs 1, 2 and 3.)
 - Topics broken off in one paragraph are taken up in another. (See, in particular, paragraphs 5 and 6.)
 - Minor topics stand isolated between major topics. (See, in particular, sentences l) and m) of paragraph 5, and sentence k) of paragraph 8.

Comments bearing on obscure reference, background knowledge, subject-specific knowledge and logical relations

- Non-revealing headings are common. For example, the title of the passage is not likely to activate appropriate background knowledge. See also the

heading for paragraphs 2 and 3, 'General', which is not likely to activate any background knowledge at all.

Note also that unfamiliar register terms used as headings are likely to be obscure references. (See, in particular, the headings for paragraphs 4, 5, 7 and 9.)

- Maps and diagrams are uninterpretable, or at least confusing and inadequately integrated into the text. They do not, therefore, provide the support for which they are intended, for example, Figure 25, on which the text relies to show 'The relief of South Africa' presents the following difficulties:
 - It is a two-dimensional representation of a three-dimensional form, i.e. relief. That 'relief' is essentially three-dimensional, is not apparent.
 - It has stylized shading conventions that show height and require explication.
 - It is overcrowded with a mixture of names for physical features and descriptive terms (for example, Bloemfontein, Orange River, Lower Part of the Plateau, Mozambique, Escarpment).
 - Figure 26, on which the text relies for showing that 'The relief of South Africa looks like an upturned saucer', is problematic.
 - It is an obscure referent because no reference is made to it in the passage. The implicit assumption is that the reader will know when to refer to it.
 - It is uninterpretable because it is a two-dimensional, vertical cross-section of a saucer. The reader has to reconstruct a mental, three-dimensional image of a saucer, or 'supply' the missing part of the diagram in order to 'see' a saucer. It is therefore difficult to identify a saucer in the diagram. It is impossible to identify the 'line of mountains stretching from the Kamiesberg in the South-western Cape to the Drakensberg in the Transvaal', because it is not shown. Instead, the reader is misled into thinking that what it does illustrate – (a cross-section of the relief from east to west), is the line of mountains.
- Note also: Figures 25 and 26 are both labelled as 'The relief of South Africa', but they are unrelated.
- Figure 27, on which the text relies to support a discussion of five features of the relief of South Africa, is yet another entirely different illustration of relief. It is also difficult to interpret for the following reasons:
 - It is a 'slice' of a three-dimensional sand-table view, with an unexplained blank bottom section. This unfamiliar view makes heavy demands on young readers.
 - It does not illustrate clearly the features described in the passage, nor are the labels adequately integrated into the diagram. For example, the plateau described as 'The high flat part' (paragraph 4), is not clearly shown to be very much higher than the sea. In addition, the label seems to point only at the line along the northern extreme of the plateau.
 - The 'plateau slopes' (paragraph 7), and the 'coastal plain' (paragraph 9) are obscure referents because they are not clearly illustrated or labelled in the figure. Notice that the arrows pointing to these two features, appear to be pointing at the same 'slope'.

- The following are obscure referents because they are either not shown, or not labelled on the figure:
 - 'The mountains' that form the edge of the plateau (paragraph 5)
 - The 'highest point' on the escarpment (Mont-aux-Sources, paragraph 5)
 - The cited examples of the plateau slopes – 'Transkei and the Tugela Valley' (paragraph 7)
 - The mountains that 'do not form part of the escarpment' (paragraph 8).

Also notice that apart from paragraph 4, there are no explicit instructions to refer to Figure 27 for supporting details. Finally, in paragraph 9, the reference to Figure 25 is misleading because the remainder of the discussion in that paragraph relies on Figure 27.

- Particularly characteristic of this passage is the application of subject-specific terms before they are established conceptually. See for example:

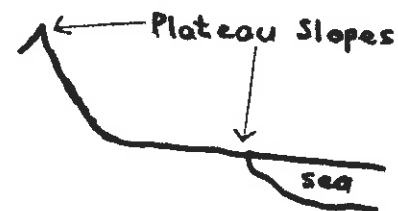
Paragraph 1: The key terms 'space' and 'relief', crucial for understanding the passage, are not established. Neither are 'satellite' or 'space-ship'.

The same applies to the following: 'plateau' (paragraph 4); 'escarpment' and 'height above sea level' (paragraph 5); 'ranges' (paragraph 6); 'plateau slopes' (paragraph 7); and 'coastline' and 'coastal plain.' (paragraph 9).

Note also the instances of confusion and contradiction (poor logical relations) in paragraph 8, where mountains are defined in terms of what they are 'not' and paragraph 10, that concludes the passage with an open-ended question to which the answer is not apparent.

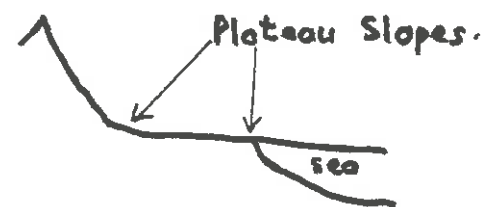
For an instance of contradiction within the text, see paragraphs 7 and 9, in which the boundary between the 'plateau slopes' and the 'coastal plain' is blurred and incorrect. Paragraph 7 locates the plateau slopes between the escarpment and the sea as follows:

This is incorrect.



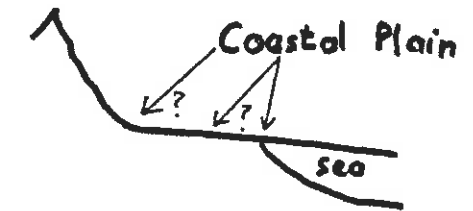
But note that in paragraph 5, (sentence J), the mountains are the escarpment. This 'reduces' the plateau slopes to between the foot of the mountains and the sea as follows:

This is also incorrect.

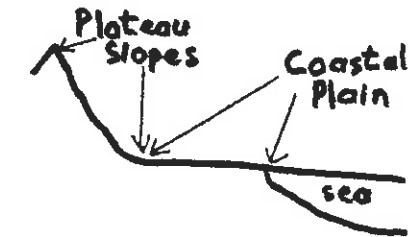


Paragraph 9 then describes the coastal plain as being 'between the coastline and the plateau slopes' as follows:

Where is the boundary?



Compare the above explanations with this correct illustration:



Comments bearing on reduced readability and an unfamiliar cohesion device

In paragraph 6 the expression, 'go to make up', is likely to be unfamiliar and not sufficiently transparent. The ellipsis of 'mountain ranges' in 'The Nuweveld Mountains... are only a few' (of these mountain ranges) – is also likely to reduce readability.

TEXTBOOK PASSAGE 3: THE CLIMATE OF THE RSA

The first paragraph, which might have been more appropriately titled 'The weather of South Africa', introduces the broad theme climate/weather. The following six paragraphs develop the sub-theme, rain. This is not, however, clearly indicated by a heading such as 'Rain in South Africa'.

The following topic lines are presented:

Paragraph 1: Climate is explicated. The last 5 lines are, however, outside the theme.

Paragraph 2: How wind brings rain to South Africa. (This topic line is continued in paragraph 7.)

Paragraph 3: Where and when rain falls in South Africa.

Paragraph 4: Annual and seasonal rainfall is displayed. (Thematically this links with the topic line in paragraph 6.)

Paragraph 5: A task requiring pupils to show their understanding of paragraphs 4 and 5.

Paragraph 6: How much rain falls in South Africa per year/average annual rainfall. (This links with the topic line begun in sentence 2, paragraph 7.)

Paragraph 7: South Africa is a dry country because of low rainfall.

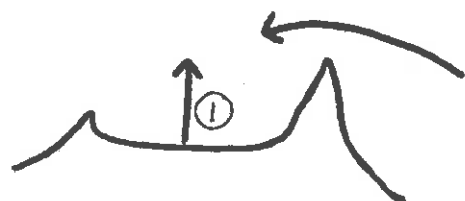
Comments bearing on thematic coherence, propositional (informational) deficiency and logical relations

- None of the topics, with the possible exception of paragraph 7, are sufficiently supported, for example:
 - Paragraph 1: The meaning of the 'climate' is not established in the explication. Furthermore, in its application, 'climate' is used inter-

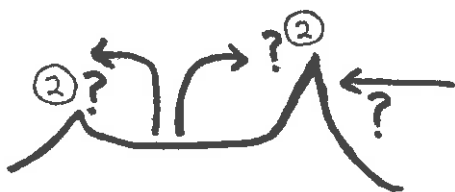
changeably with 'weather'. (Climate is a superordinate term, describing weather conditions on a macro-scale. For example, the weather conditions for a country as a whole. Weather refers to local conditions, including daily changes.) The introduction of the unfamiliar word 'spells', reduces readability further. The last 5 lines of the paragraph introduce an unrelated topic.

- Paragraph 2: 'Rain-bearing winds' is syntactically complex and likely to be an unfamiliar term. As a heading it is therefore likely to be non-revealing. There is poor topic support in this paragraph such as in the high density of information; the absence of supporting illustrations, for example, a 'comic-strip' series of pictures illustrating the formation of rain as moist air is forced up the plateau slopes. (Note also that the escarpment is not shown on Map 1.) There are also eight obscure references (see obscure reference discussed below); two instances of thematic incoherence (see below); and six instances of propositional deficiency (see below).
- In propositional development and discourse structure the paragraphs have little coherence. Topic lines are broken by paragraph divisions and topics broken off in one paragraph are taken up in another. (See, in particular, paragraphs 2 and 7, 4 and 6.)
- Propositional (information) flow ignores normal logical relation conventions. See in particular, paragraph 2, from line 4 onwards, as illustrated below. The information flow in the passage is as follows:

Warm, moist air from the Indian Ocean results in thunderstorms in the interior



Moist air at the escarpment. (Which escarpment?):



Little rain on the western side of the escarpment. (Which escarpment?):



Compare the preceding with this suggested alternative:

Warm, moist air from the Indian Ocean is blown against the escarpment. Some moist air goes over the escarpment:



Thunderstorms in the interior:



Little rain on the west side of the escarpment:



Note: Only at the end of the whole passage (lines 2 to 5 of paragraph 7), is it implied that the escarpment referred to in paragraph 2 (lines 6 to 9), is on the east side of the country, and that the moist air is from the 'Indian Ocean'.

See also paragraph 7, where sentences a and d expand the topic – 'areas of low rainfall in the form of thunderstorms'. Sentences b and c introduce a new topic – 'droughts', which should follow after sentence e. Compare this 'leap-frogging' order, with the more logical arrangement as follows: a, d, e, b, c.

- The passage is propositionally deficient (does not state the important ideas explicitly). See for example, paragraphs 1, 2 and 4 discussed below.
- Paragraph 1: In sentence 1, 'climate' is not explicated. The distinction between climate and weather is not supplied, and the example in sentence 2 does not adequately support the distinction between the terms.
- Paragraph 2: There are propositional leaps (information gaps) between sentences 1 and 2, and 2 and 3. The missing information is: sentences 1 and 2 – moisture comes from the sea; sentence 3 and 4 – hot weather makes air hot. Sentence 6 assumes a great deal of background knowledge. Missing information to be supplied by the reader is includes wind blows moist air from the ocean towards the mountains; this air

rises up the plateau slopes and rain forms as the air rises up the plateau slopes.

- There is a propositional leap between sentences 7 and 8. The information to be inferred is: mist is moist air.
- Paragraph 4: The explication of how to interpret graphs is inadequate. For example, in sentence 2, the missing information in the expression 'stands for a month' is: 'stands for (how much rain in millimetres falls in one) month.'

Comments bearing on obscure reference, subject-specific terms and background knowledge

- Several subject-specific terms and unfamiliar words are applied before they are conceptually established, resulting in obscure references, for example:
 - Paragraph 1: 'climate', 'weather', 'spells'.
 - Paragraph 2: The title 'Rain-bearing winds' is syntactically complex and the sense of 'bear' is probably unknown to the child. See also 'interior' (sentence 3), 'moist air' (sentence 4), 'thunderstorms' (sentence 5), 'escarpment' (sentence 6), 'mist' (sentence 7), 'desert' (sentence 10)
 - Paragraph 3: 'Zones' in the heading is a word that is not likely to be in the vocabulary of the children or the teachers. (This is likely to affect their ability to interpret Map 1 – 'Rainfall zones', and to answer questions a) to f) in this paragraph.)
 - Paragraph 4: The explication of 'diagrams' (lines 1 to 7), assumes familiarity with the abstract nature and properties of graphs.
 - Paragraph 6: 'Average' and 'annual' in the title of Map 2 (referred to in sentence 1), are likely to be unknown. 'Average', is particularly obscure because it is a highly abstract concept. Notice also that there is no explicit propositional link between paragraph 6 and the map's title. It is not obvious that 'Average annual rainfall' (the map's title), is a substitute expression for 'how much rain usually falls... every year' (sentence 1).
 - Paragraph 7: 'Reliability' in the heading is likely to be an unknown term, the meaning of which remains semantically obscure. The meaning of 'drought' (sentence 4), has not been established and may be confused with 'desert' (paragraph 2); 'strips' (sentence d) is likely to be unfamiliar.
- There are several obscure references to maps and diagrams such as in Map 1, on which the text relies for showing 'The rainfall zones of the RSA', the key requires several levels of interpretation as follows:
 - Zones that get mainly winter rain – (discriminate between vertical, horizontal and angled lines in the key and on the map).
 - The darkest part gets the most rain – (discriminate between light and dark areas in the key and on the map). Notice that the shading convention does not clearly distinguish between the light or the dark zones on the map.
 - The 'diagrams' (graphs) upon which the text relies to show 'how much rain usually falls each year' in four cities are unclear:
 - 'Each black line' (sentence 2, paragraph 4), is confusing insofar as there are many black lines – horizontal and vertical.
 - Without adequate explication, the diagrams are not conceptually established. It is likely, therefore, that the task in paragraph 5 (which

requires the correlation of information retrieved from the diagrams, with that in Map 1), will be difficult for the child.

Map 2, upon which the text relies to show 'Average annual rainfall' is also problematic. The key is complex, demanding a sophisticated integration of the following three sets of information before the map can be interpreted:

- The 'key code' itself → rainfall in millimetres for each code →
- A brief description of the area to be identified on the map.

Note: Questions a) to e) in paragraph 6 depend entirely on a reader's ability to extract this information from the key and apply it to the map. Note also the uncertainty as to 'what map', in the reference to 'a map' in paragraph 7, sentence 2. It is significant to note that to the best of the researcher's knowledge, children are never formally taught how to use keys in any prescribed text.

Each of the three selected passages has been shown to fail extensively as expository discourse suitable for young ESL readers and their teachers, with restricted competence in English. Given that such texts are, for the ESL reader, likely to be neither readable nor comprehensible in any real sense, it would not be surprising to find that:

- pupils have great difficulty comprehending such texts,
- teachers have some difficulty comprehending them, and
- that teachers who rely heavily on such texts as a primary (if not only) source of information, adopt the rote method as a teaching and learning survival strategy.

In order to determine the actual impact of such texts on the teaching/learning situation in Std 3, classroom observation was undertaken, as were informal and structured interviews, the findings of which are discussed in Chapter 4.

3.8 PREPARING AND CONDUCTING STRUCTURED INTERVIEW 1 (APPENDICES 1 AND 2)

PREPARING THE INTERVIEW SCHEDULE

The aims of the interview were:

- To identify specific problem areas experienced by *teachers* reading the selected, analyzed passages, to assess the extent to which earlier research predictions, about children's difficulties with such texts, apply to their teachers.
- To use the above information to inform the development of alternative versions of the analyzed passages to be tested in terms of their readability and comprehensibility in a second structured interview (Structured Interview 2).

The interview schedule (see Appendices 1 and 2) was prepared by drawing on the following information in an attempt to produce a reliable, valid interview instrument (Hatch and Farhady, 1982; Kitwood in Cohen and Manion, 1985; Brown, 1988):

- The aims discussed above
- The principles of the interactive reading process

- The properties of expository discourse *most likely* to cause reading and comprehension problems discussed in Chapter 2 and in section 3.6 of this chapter
- The 1987 semi-structured interview questions.

The questions were divided into three categories to match as closely as possible the four main cognitive strategies in competent reading, discussed in Chapter 2, section 4 as follows:

- Pre-reading questions
- Text-interaction questions
- Post-reading questions.

TESTING THE INTERVIEW SCHEDULE (STRUCTURED INTERVIEW 1)

The first interviews, conducted in the eastern Cape and Ciskei, were used to test the schedule. These interviews revealed that the schedule was valid in that it actually tested the readability and comprehensibility of the passages, but that there was scope for further, more probing questions. Based on this finding, a second schedule was designed. This was tested in a second series of interviews with the same groups of teachers and also found to be valid. A few of the less penetrating questions from each of the Level 1 and Level 2 schedules were omitted and the two levels were conflated to make up the final schedule for Structured Interview 1, Part 2 (see Appendix 2). This was then used in the interviews with Transkei and Port Elizabeth teachers. Since all the interviewees had answered the same questions (with the exception of the few that were omitted), and similar results were produced in each case, the schedule appeared to be a reliable instrument.

3.9 ANALYZING DATA AND REWRITING SELECTED PASSAGES

ANALYZING DATA FROM STRUCTURED INTERVIEW 1, PARTS 1 AND 2

The tape-recorded data from each of the four structured interviews (four interviews with two teachers at a time) were transcribed. Exact responses and pronunciation were preserved as far as possible. The data are analyzed in Chapter 4, in terms of the research objectives.

REWRITING THE SELECTED PASSAGES

The aims of rewriting the passages were:

- To present the same conceptual content targeted at the same syllabus requirements
- To present it in a readable and comprehensible form without changing the propositional content.

The rewriting of the passages was guided by:

- The main components of the interactive reading process, summarized in the flow diagram in Chapter 2, section 2.1
- The properties of expository discourse discussed in Chapter 2, section 2.5
- The discourse properties identified in Section 3.6 of this chapter as *most likely* to cause reading and comprehension problems for ESL readers

- The factors identified in the analysis of the data gathered from Structured Interview 1, as *actually* causing reading and comprehension problems (see Chapter 5)

- The content of the original passages and syllabus requirements.

In contrast to the textbook passages, the rewritten passages are characterized, in particular, by the following properties:

- Thematic coherence
- Propositional fullness and explicitness
- Logical relations between propositions
- Transparent cohesive links
- Control of lexical and syntactic complexity
- New vocabulary and register terms are established before they are applied, and semantically reinforced in their application
- Use of familiar expressions
- Interpretable maps and illustrations, integrated logically into the text.

REWRITTEN PASSAGE 1

MINING IN SOUTH AFRICA

We need raw materials

What do we need to make the desks in the classroom? We need wood and iron nails or screws. What do we need to build your school? We need wood and bricks which are made with soil and water. We need iron and glass for the windows. Water, wood and iron are raw materials. Some raw materials like iron come from mines which miners dig in the ground. Raw materials which come from mines are called minerals.

Remember: We need **raw materials** to make things.


Some raw materials are **minerals** which come from mines.

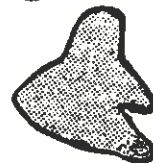
Mines give **minerals**.


Minerals and Mines


When you walk on the ground in some places in South Africa you are walking on coal. Deep in the ground under your feet there is coal. In other places there is iron or copper or there are diamonds. In other places there is gold. Gold, iron, coal and diamonds are called minerals and they come from under the ground. They come from mines which men have dug into the ground to get these minerals.


On the map of South Africa below:

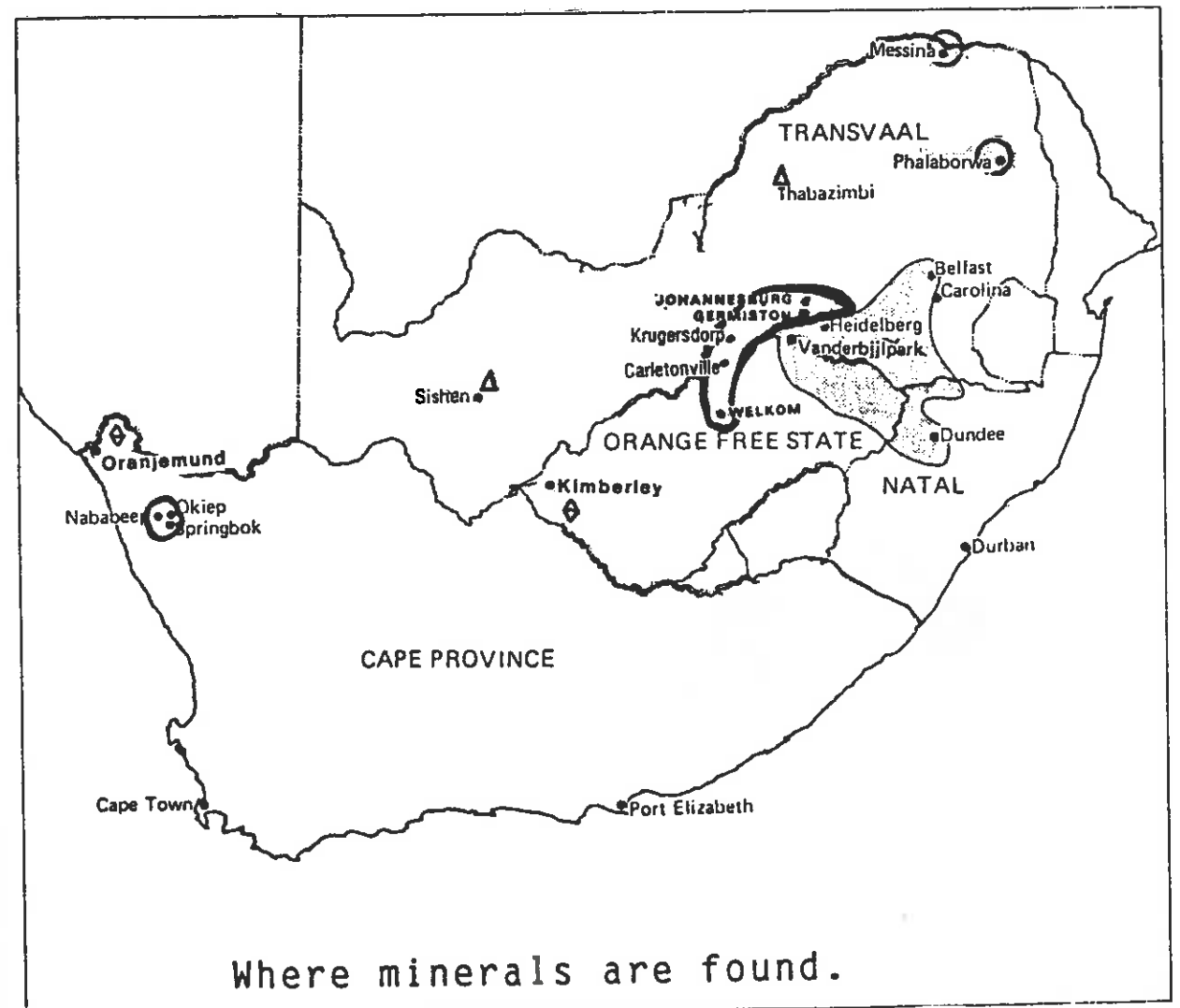
This arc  shows where there is gold.

This shape  shows where there is coal.

This diamond shape  shows where there are diamonds.

This triangle  shows where there is iron.

This circle  shows where there is copper.



Where minerals are found.

Gold

Which towns and cities are in places where there is gold? Look at the shape of the arc on the map on page 2 and read the names inside the arc. They are Johannesburg, Germiston, Krugersdorp, Carletonville and Welkom. These are all gold mining towns and cities. Johannesburg is the biggest city in South Africa. People all over the world know about Johannesburg. Before men knew about the gold under the ground there were no towns or cities in these places. After gold was found people came to dig the mines and the towns grew up very quickly.

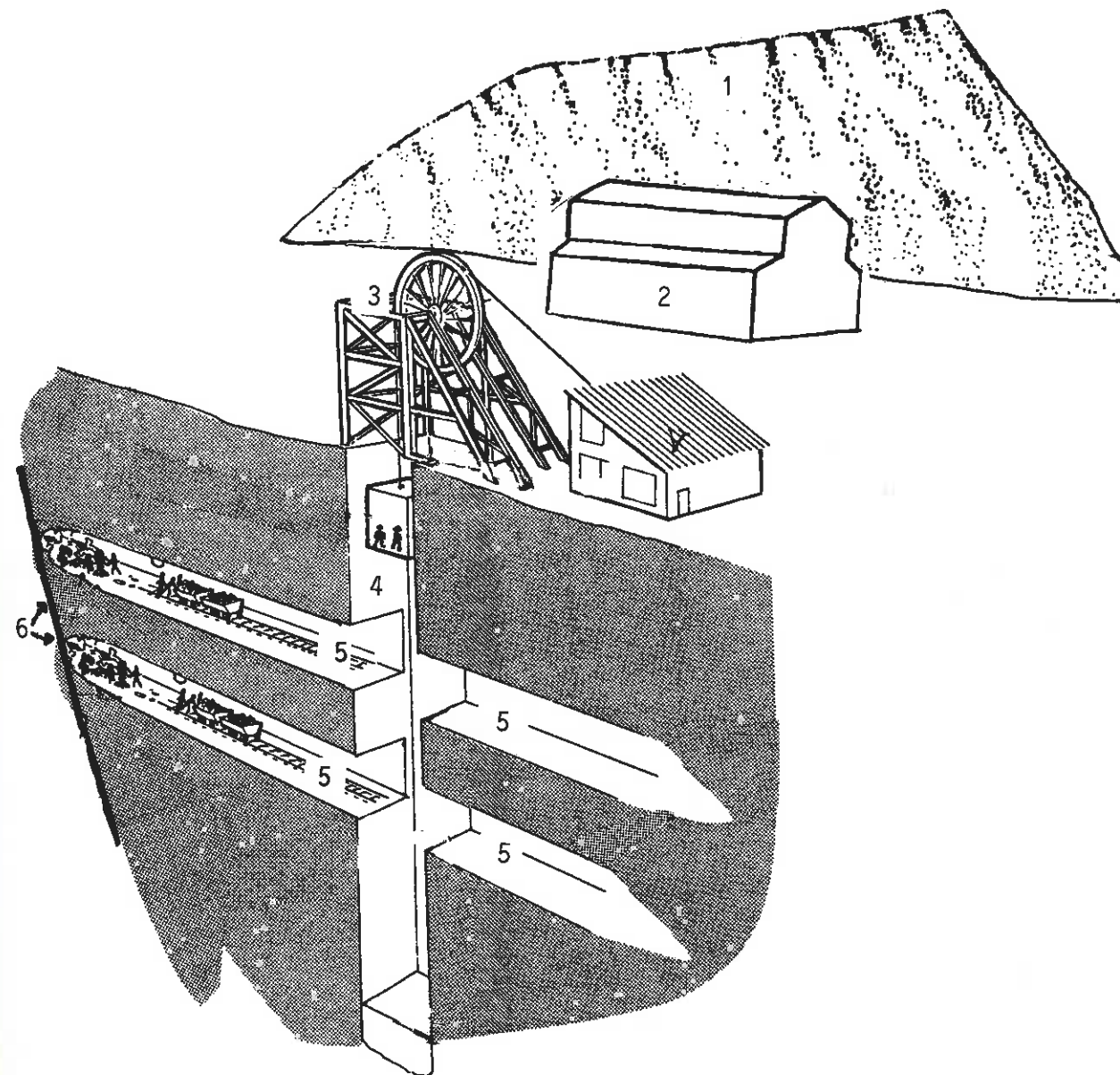
Some gold mines in South Africa are the biggest and the deepest mines in the world. In some mines men go down 3000 metres into the ground. (3000 metres is 3 kilometres.) When men go down so deep into the ground then it is very difficult to get the gold and it is very dangerous. The men work in tunnels and great rocks can come loose and fall on them. The men go down a shaft into the mine in a box which is called a skip. The rope which holds the skip can break and then the skip falls to the bottom of the shaft. Sometimes the miners who are in the skip die when this happens. The engineers who work on the mines do many things to protect the miners and stop accidents. For example, they check the ropes that hold the skip so that they do not break. They also help the miners to find the best way to dig rocks out of the tunnels. Another thing the engineers do is to make sure that all the miners wear a thick, hard hat which protects their head when rocks fall.



These miners are going out of the skip to the place where they will work under the ground. You can see their hard hats.

What does a mine look like?

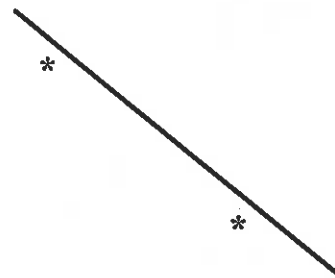
Here is a picture of what a mine looks like.



1. is the mine dump.
2. is the reduction works where they crush the rocks.
3. is the headgear which lifts and lowers the skip.
4. is the shaft which goes down into the mine.
5. shows the tunnels where the miners dig for gold.
6. is the line of gold. It is called a gold reef.

The picture on page 4 shows the mine on top of the ground and also the mine under the ground. Look at number 4 in the picture and see the men going down in the shaft in a skip. They get out of the skip and go into the tunnels which have the number 5 in the picture. They walk to the end of the tunnel to where there are rocks which have thin lines of gold in them. The men dig out the rocks and put them into the skip which goes up the shaft to the top of the mine.

The thin, flat line of gold which is in the rock is called the reef. Look at number 6 in the picture on page 4. The arrows point at the gold reef in the picture. The reef goes down deep into the ground. It does not go straight down. It goes at an angle like this:

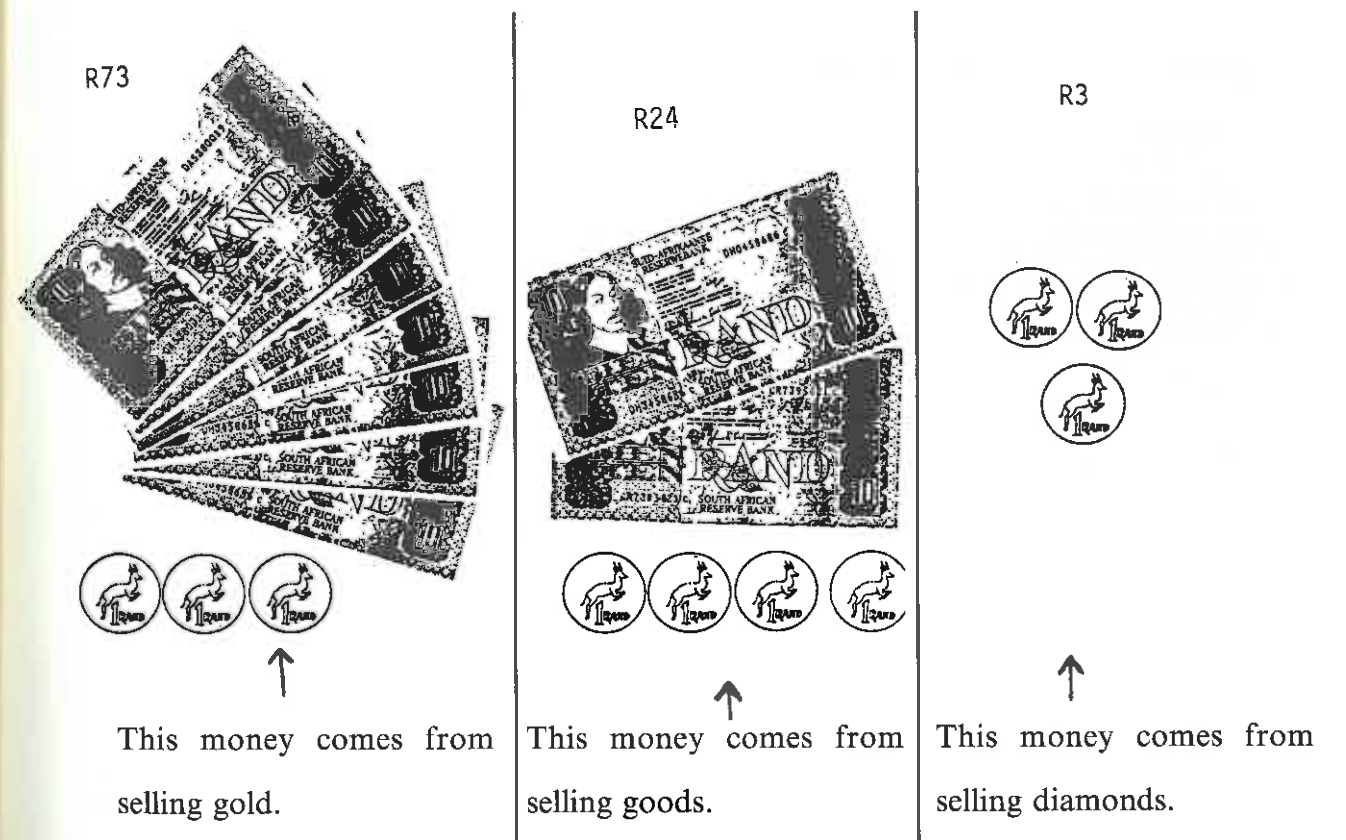


That is why there is one tunnel underneath another tunnel. The tunnels go deeper and deeper so that miners can get the gold.

On top of the ground you can see the buildings and the high heap of sand called a mine dump. When the rocks with the gold are crushed into small pieces there is much sand left over and this makes the mine dumps.

Gold brings much money to South Africa

People in South Africa take gold from the mines over the sea to people in other countries who buy gold. South Africa sells the gold and also diamonds and other goods. With the money from the gold, diamonds and other goods, South Africa buys ships, machinery, books, motor cars and other things which we need. South Africa must have this money which is many hundreds of rand every year. If you take just R100 of that money (think of one lot of R100 in that money) then this picture shows that gold brings much more money than selling diamonds or other goods. So gold is important for all of us.



Many men who work on the mines live in South Africa. Others come from Lesotho, Transkei and other countries. They earn money which they send to their families to buy food and clothes.

Things to do

1. Here is a list of things which we use:

Write this list in your book.

tables

jerseys

door

tyres

shirts

bricks

Here is a list of raw materials:

cotton

water

wool

soil

rubber

wood

The things we use are made from raw materials. Choose the right raw material for each thing in the list you have written in your writing book. Write the raw material next to the thing that is made from it.

2. Write this list of names of towns in your book. Next to each one write the name of the mineral which is mined there.

Welkom

Phalaborwa

Dundee

Johannesburg

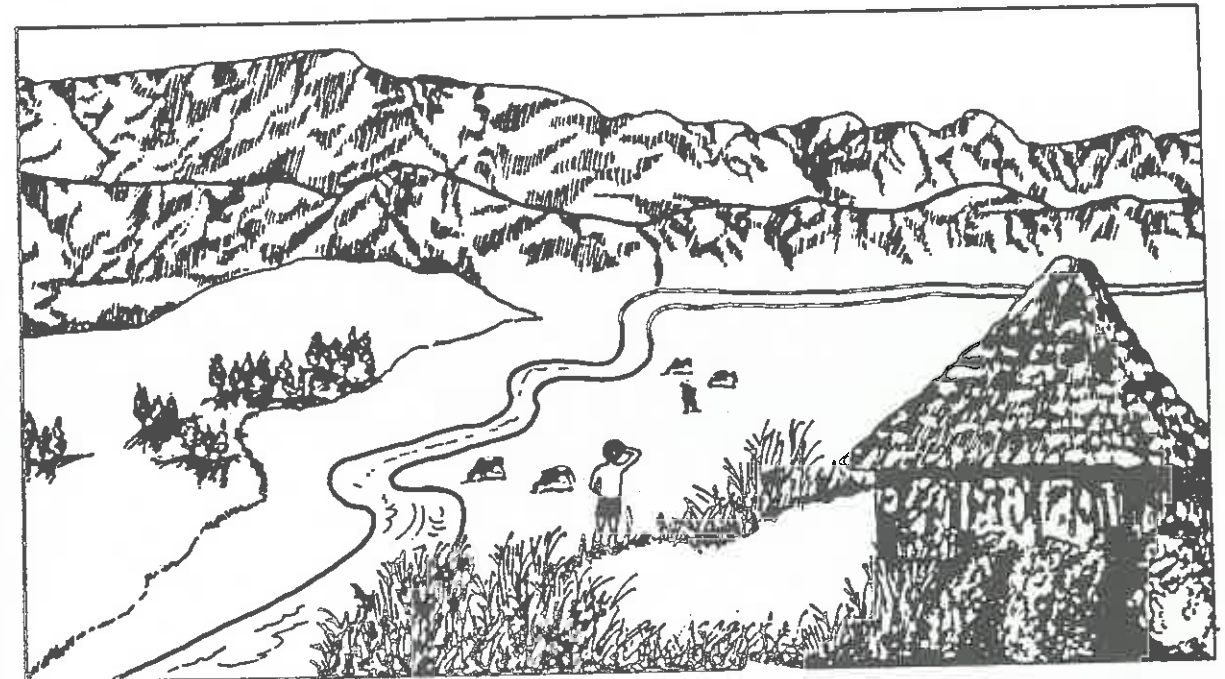
Vanderbijlpark

Belfast

Germiston

RE-WRITTEN PASSAGE 2**THE LAND OF SOUTH AFRICA**1. What the land looks like

Look at this picture of a boy standing outside his father's house.



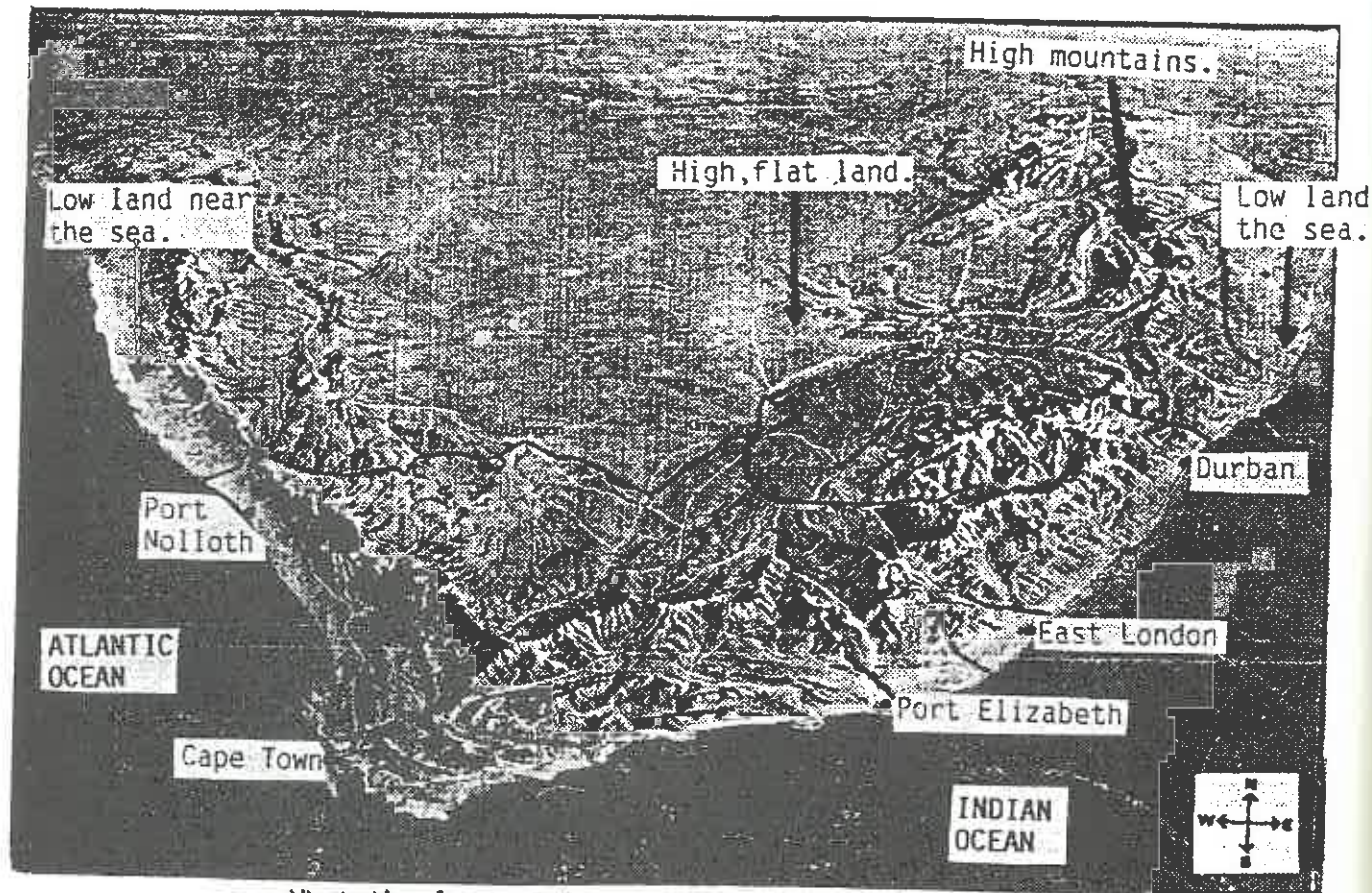
This boy lives in KwaZulu. His house is on a hill. When he stands outside he can see hills, valleys and mountains. There is a river at the bottom of the valley. There are also cattle eating grass on the flat land near the river. In KwaZulu there are many hills and high mountains.

In Bophuthatswana the land is flat in many parts. There are not many mountains and they are not high. So the land is different in different parts of South Africa.

When you stand outside your house, what do you see?

2. What the land of South Africa looks like from high up in the sky

A man who goes high up in the sky in a space rocket can look down and see the whole of South Africa. Here is a picture of what he can see when he looks down at the land of South Africa.



What the land of South Africa looks like.

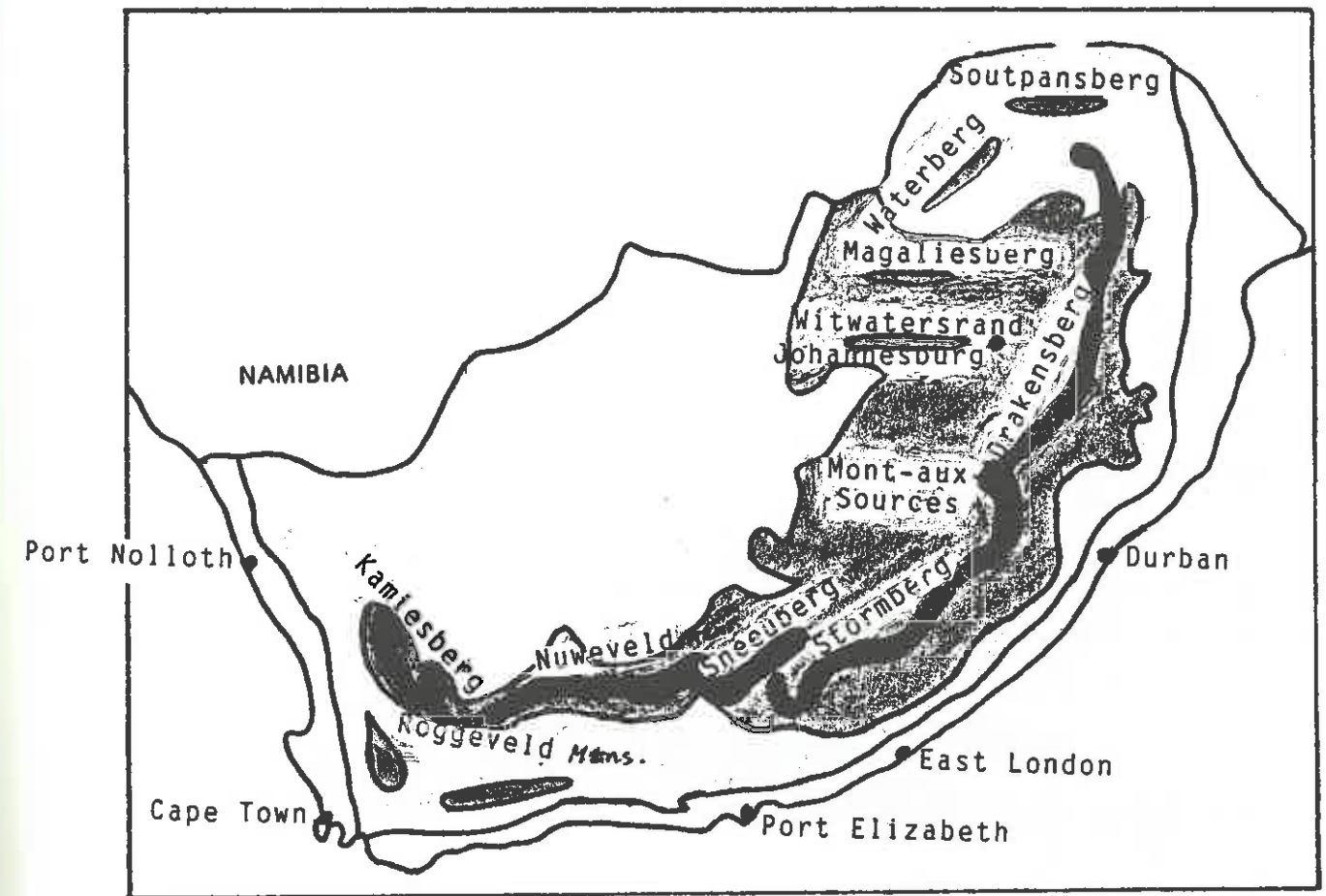
What the land of South Africa looks like.

He can see the high mountains in the east and the south and the flat land in the middle. He can see the rivers in the south, the east and the west. This picture shows the land, the rivers and the oceans of South Africa. But it also shows where there are high parts and low parts on the land. It is a picture of the relief of South Africa.

Remember: A picture of the relief of South Africa is a picture which shows the high and low parts of the land of South Africa.

3. A relief map shows the relief of South Africa

Look at this relief map of South Africa. It shows the same land that is in the picture of the relief on page 2.



Look at the next page and see how this relief map shows the high parts and the low parts of South Africa.

<u>The high parts</u>	<u>The low parts</u>
<p>■ This shows that there are very high mountains. Look at the long line of high mountains in the east and the south.</p>	<p>■ This shows that there are low mountains and hills with land between them.</p>
<p>■ This shows two things:</p> <ol style="list-style-type: none"> 1) On the east side of the high mountains there are steep slopes and lower mountains which go down to the land near the sea. 2) On the other side of the high mountains the land is high but it is flat. 	<p>■ This shows that the land low and it is mostly flat. You can see that it is near the sea.</p>

Remember: On the relief map on page 3, the black parts are high and the white parts are low.

4. The names of the four main parts of the relief of South Africa

The very high mountains

Look at the line of the high Drakensberg mountains on the map on page 3. A line of mountains like the Drakensberg mountains is called a range of mountains. The Drakensberg and the Stormberg are the two main mountain ranges in the east. In the south these are the main mountain ranges: Sneeuberg, Nuweveld mountains, Roggeveld mountains and Kamiesberg.

The line along the top of the mountain ranges in the east and the south is the escarpment. Here is a picture of a part of the escarpment. The arrow shows the line of the escarpment along the top of the high mountains.



The highest mountain on the escarpment is Mont-aux-Sources in Natal. We find out how high the top of a mountain is by measuring how high it is above the level of the sea. The lowest land is next to the sea. Mont-aux-Sources is 3480 metres above the lowest land at sea-level.

Remember: The escarpment is the line along the top of the highest mountains.

The high flat land

The high flat land on the other side of the escarpment away from the sea is the plateau. Another name for the high flat land of the plateau is the 'table-land'.

There are some low mountains on the plateau. Look for these mountains on the relief map on page 3:

The Witwatersrand near Johannesburg

The Magaliesberg

The Waterberg

The Soutpansberg

These mountains are not on the escarpment.

Remember: The plateau is high flat land in the middle part of South Africa.

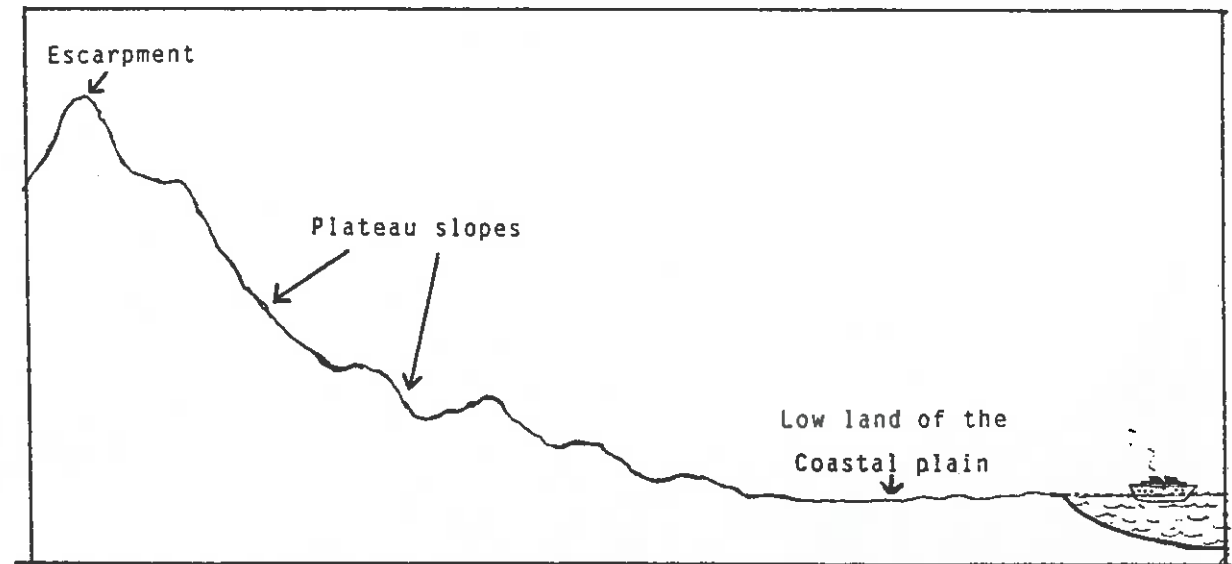
The low land near the sea

Look at the low land near the sea in the picture on page 2. The coast is the edge of the land where the land meets the sea. These places are on the coast of South Africa: Durban, East London, Port Elizabeth, Cape Town and Port Nolloth. The low land near the sea is called the coastal plain.

Remember: The coastal plain is the low land near the sea.

The land between the escarpment and the coastal plain

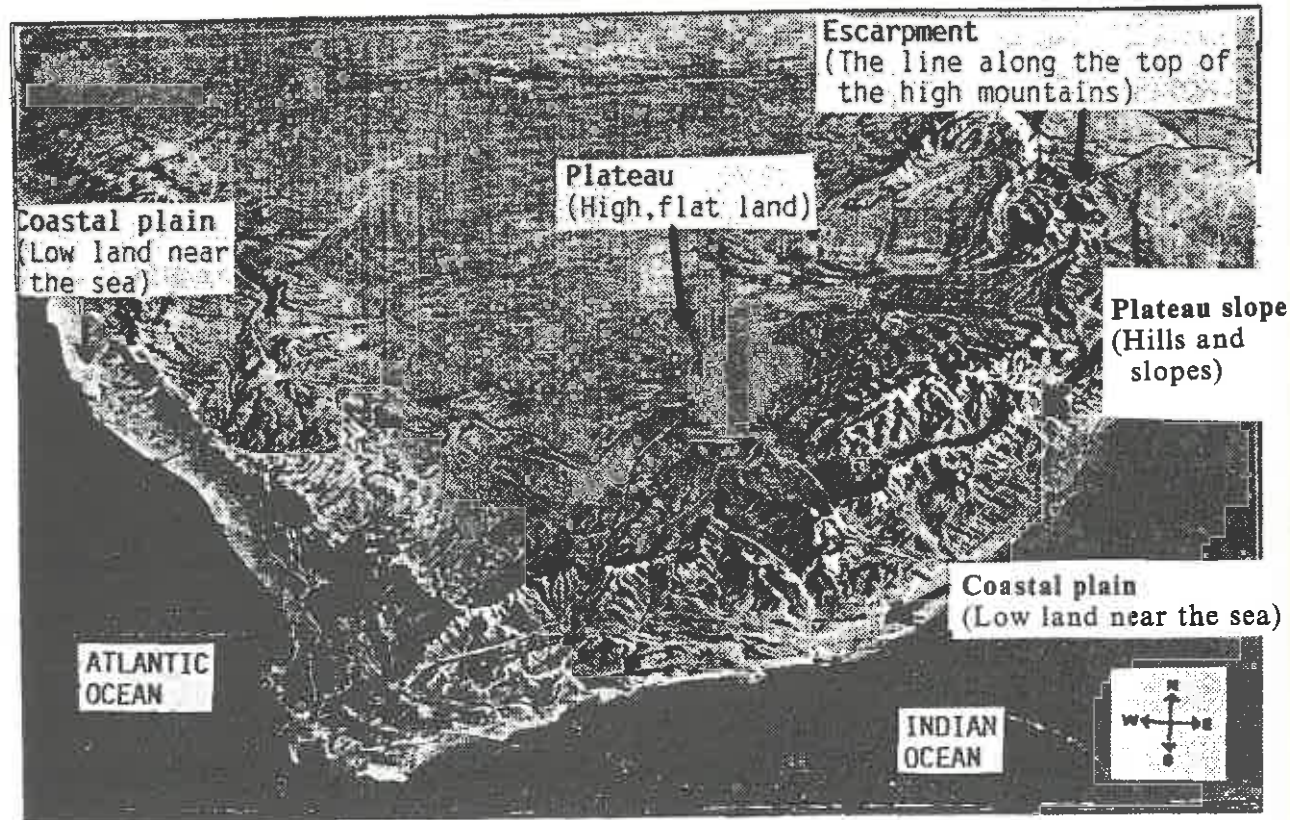
Here is a picture of the land between the escarpment and the coastal plain. It is called the plateau slopes.



The land of the plateau slopes goes up from the coastal plain to the high mountains. If you climb up from the coastal plain to the escarpment, then you are climbing up the plateau slopes.

Remember: The plateau slopes are where the land goes up from the coastal plain to the escarpment.

Now you know the four main parts of the relief of South Africa. Here is the picture of the relief of South Africa again. But now it has the names of the parts of the relief on it:



The RELIEF of South Africa.

Task

Fill in the missing words.

When you are walking on the land near the sea you are walking on the _____.
 _____ When you climb up to the high mountains you are climbing up the
 _____. When you get to the top of the high mountains, you are
 standing on the _____. When you look at the land on the other side of the
 high mountains, you are looking at the _____.

RE-WRITTEN PASSAGE 3

THE WEATHER IN SOUTH AFRICA

1. The weather changes

What is the weather like today? Look outside and see. What was the weather like yesterday? If the weather has changed then today is not like yesterday. Perhaps the weather today is rainy and wet and yesterday it was dry and there was no rain. When the weather is rainy then people wear raincoats to keep their clothes dry. When the weather is dry then people don't need raincoats. We change our clothes when the weather changes. When it is cold we wear warm clothes. When it is hot we don't need to wear warm clothes.

The weather changes between winter and summer. In summer most days are hot but some days are cooler. In winter most days are cold, but some days are warmer. So the weather changes from winter to summer. Sometimes it changes from one day to the next.

When we tell about the weather

on all the days of winter

or all the days of summer

or all the days of a year, then we are talking about the climate of a place or a country. For example, the climate in Cape Town is cold and rainy in winter and hot and dry in summer.

Remember: The weather is changing all the time. The climate of a place is the story of the weather in winter or summer or for the whole year.

2. The climate is different in different places

In Bophuthatswana most of the rainy days are in summer. So the climate in summer is hot and on some days it is rainy and wet. In Cape Town there is very little rain in summer. So the climate in summer is hot and dry.

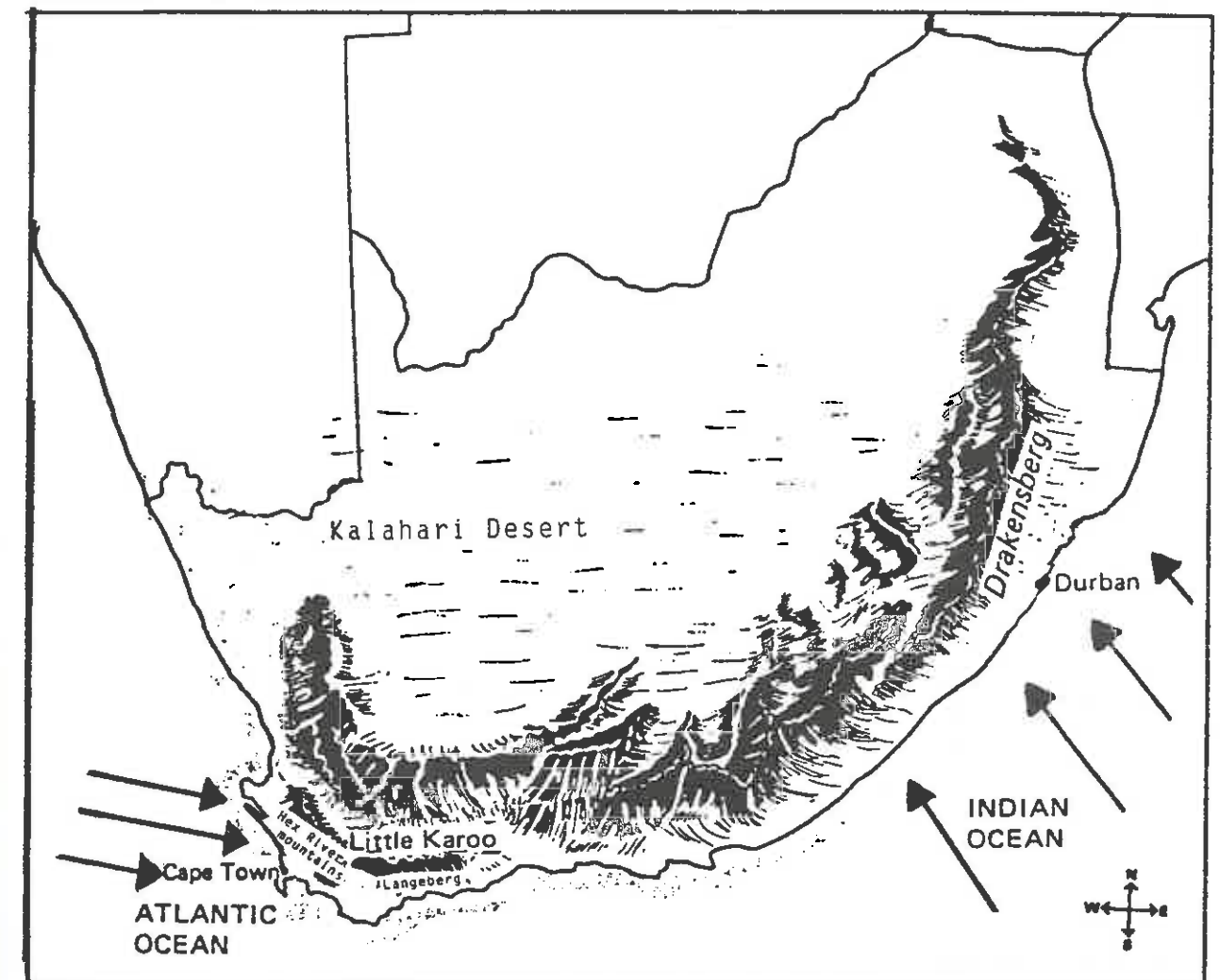
In Cape Town most of the rainy days are in winter. So the climate in winter is rainy and wet and cold. In Bophuthatswana there is very little rain in winter. The climate in winter is cold and dry with very little rain. So the climate is different in different places.

Remember: In some parts of South Africa it is rainy in summer. In some parts it is rainy in winter.

3. The wind brings rain to some parts of South Africa

People who live in Cape Town and Durban live near the sea. When they feel the wind blowing from the sea to the land, they know that it will bring clouds to the land. When the wind brings many big clouds, the people know that it can be rainy.

Here is a map of South Africa. Find Cape Town and Durban on the map.



The arrows on the map show the winds which are blowing from the sea to the land. These winds often bring rain to the land so they are called **rain-bearing** winds.

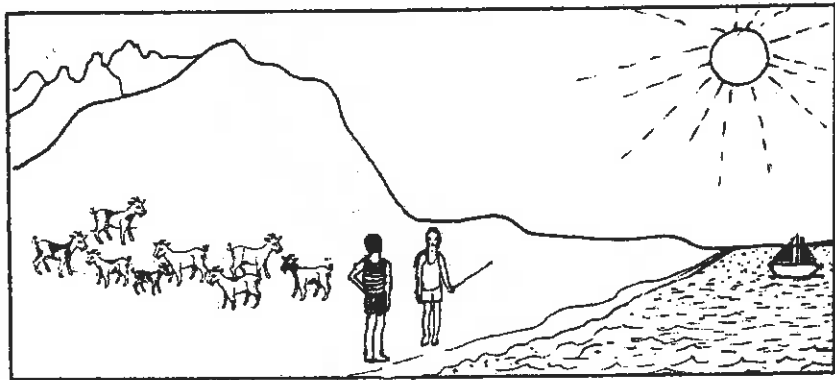
Look at Durban on the map. The rain-bearing winds are blowing off the Indian Ocean. They bring rain to Durban from the Indian Ocean. In Cape Town the rain-bearing winds blow off the Atlantic Ocean. They bring rain from the Atlantic Ocean.

Remember: Wind which blows off the sea often brings rain. Winds which bring rain are **rain-bearing** winds.

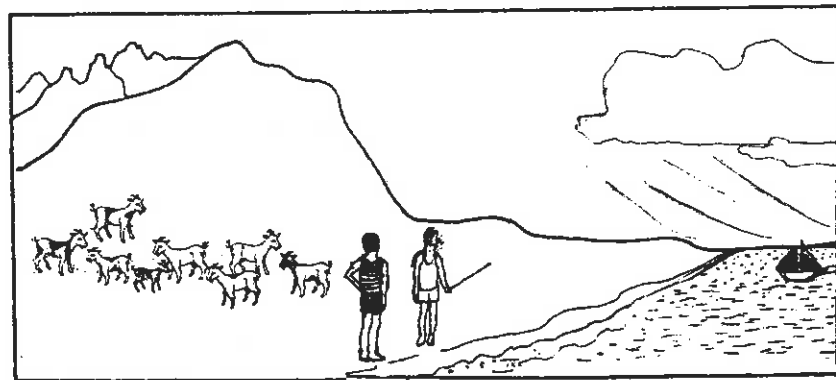
4. Some parts of South Africa get a lot of rain

Cape Town is a place which gets a lot of rain. There are two things which help to make the weather rainy and wet there. The first thing is the rain-bearing wind. The second thing is that there are high mountains near Cape Town. Look at the map on page 3 and see the Hex River mountains and the Langeberg mountains.

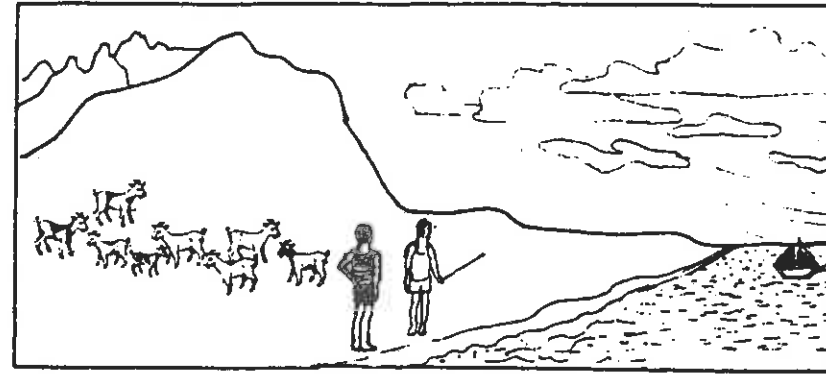
Here is a picture story about two boys looking after their father's goats. It shows you how the rain-bearing wind and the high mountains make the weather rainy and wet.



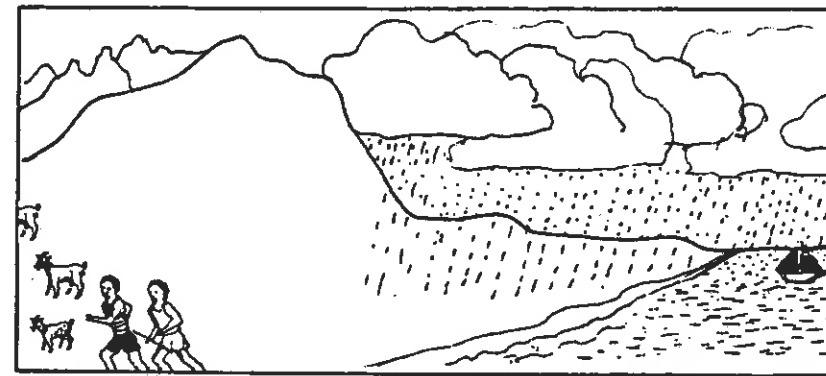
The sun is shining. It is a dry day. Two boys are looking after their father's goats.



The wind starts to blow. The boys can see big clouds over the sea. (Remember, clouds are made of very small drops of water).



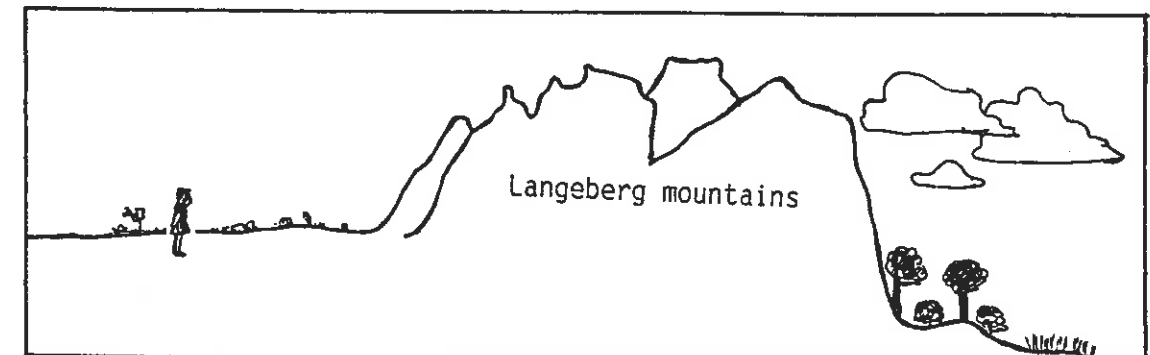
Now they can see that the wind is blowing many big clouds over the land. The wind blows the clouds towards mountains.



The wind blows the clouds against the mountains. When the clouds come near the mountains, drops of water fall out of the clouds. It begins to rain. The boys run home so that they do not get wet.

5. Some parts of South Africa are dry because they get only a little rain

Here is a picture of the land on the other side of the Langeberg mountains near Cape Town. It is the Little Karoo.

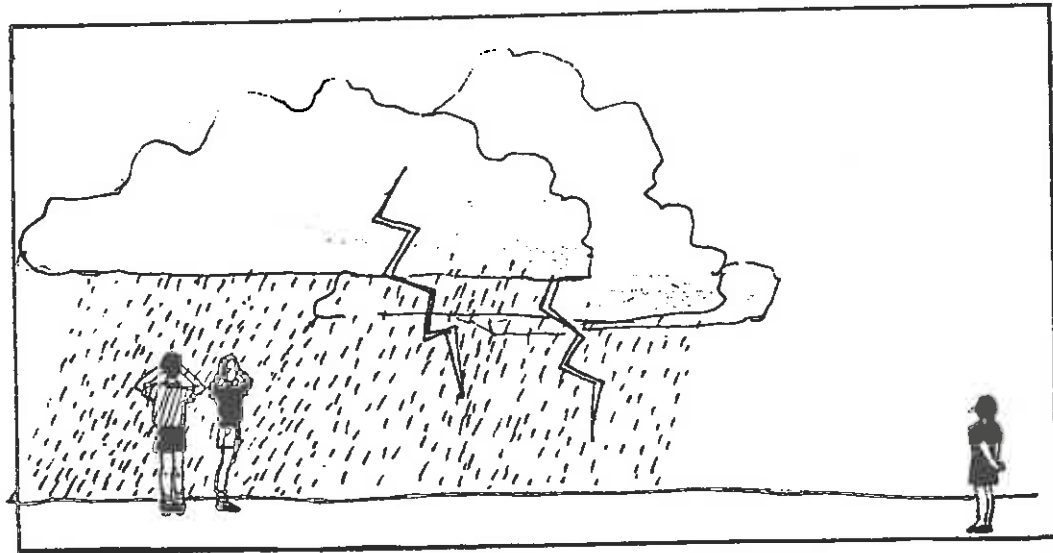


The mountains stop the big clouds from getting to the Little Karoo. So it is often dry in the Little Karoo when it is wet in Cape Town. Look at the map on page 3. You can see the Little Karoo on the other side of the Langeberg mountains.

Remember: The most rain usually falls on the land between the sea and the mountains. If the clouds do not reach the land on the other side of the mountains, it is dry.

6. Some dry parts do not get rain from rain-bearing winds

Bophuthatswana is a dry part which does not get rain from rain-bearing winds. When it rains in summer there are big dark clouds in the sky and the people hear the noise of thunder and see lightning which flashes. When there is thunder and lightning and rain together it is a **thunderstorm**. Here is a picture of what happens when there is a thunderstorm.



The three children in the picture can hear the noise of thunder and see the flashes of lightning. The two boys are getting wet because rain from the thunderstorm is falling where they are. But the girl is dry because the rain is not falling where she is. So when there is a thunderstorm there is rain in some places and other places stay dry. When there is no rain for a long time in the dry parts, the plants and animals die because there is no water for them. We say that there is a **drought** when there is very little rain for a long time.

Remember: A drought means a time when there is not enough rain to give people and animals water to drink.

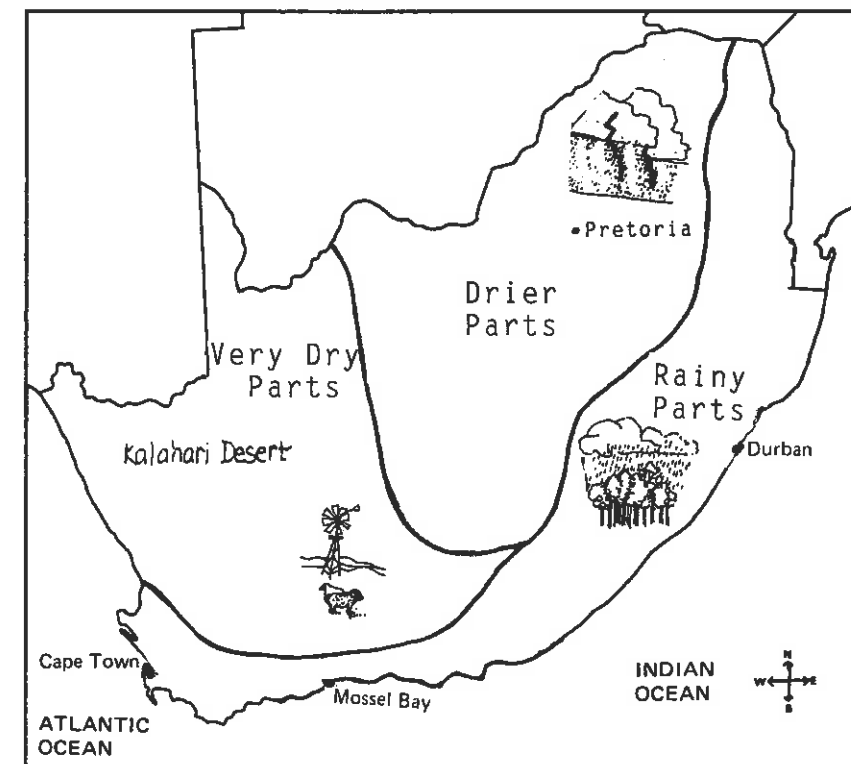
7. The dry parts of South Africa

Look at the map of South Africa on page 3 and find the Atlantic Ocean. It is on the west side of South Africa. The land on the west side near the Atlantic Ocean is very dry. There are only a few plants and animals there because it is dry all the time. The driest part is the Kalahari Desert where there is dry sand in many places and only a few trees and a little bit of grass.

Remember: The dry parts of South Africa are on the west side.

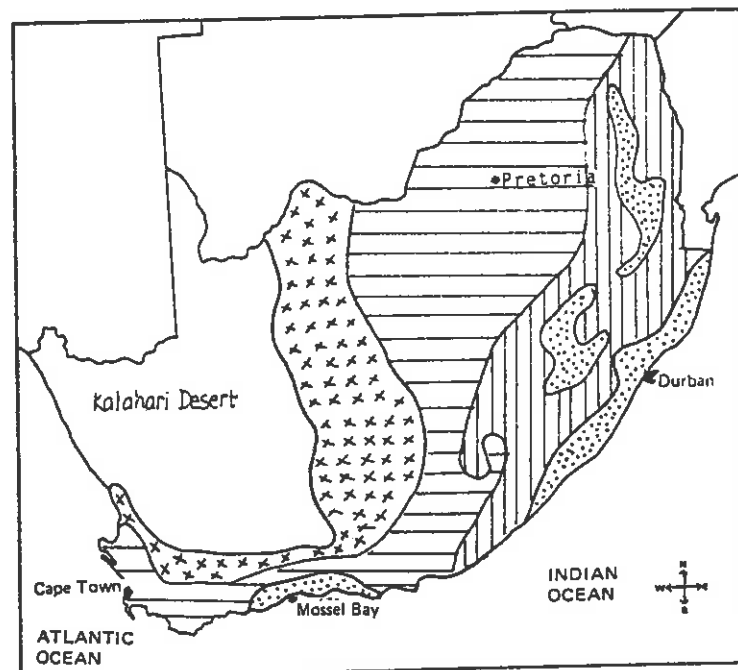
8. The rainy parts and dry parts of South Africa

Here is a funny picture of South Africa. It shows the rainy parts, the drier parts and the very dry parts.



Look at the funny picture above carefully. The rainy parts are in the south and on the east sides of South Africa. The drier parts are in the middle and the driest parts are on the west side.


Here is a real map of South Africa. It also shows the rainy parts, the drier parts and the driest parts. The map below shows **how much** rain falls in these parts in a year.




This map shows how much rain falls in different parts in a year.


This is how this map shows us how much rain falls in a year:

1. Places which get a lot of rain


 This shows that these places get a lot of rain. It is very wet. More than 1000 millimetres of rain falls there in a year. (We will see later how we can measure how much rain has fallen.)


 This shows that these places get quite a lot of rain. It is wet. Between 750 to 1000 millimetres of rain falls there in a year.

2. Places which are not very wet and not very dry

 This shows that these places are a not very wet and not very dry. Between 375 and 750 millimetres of rain falls there in a year.

3. Places which get little or no rain

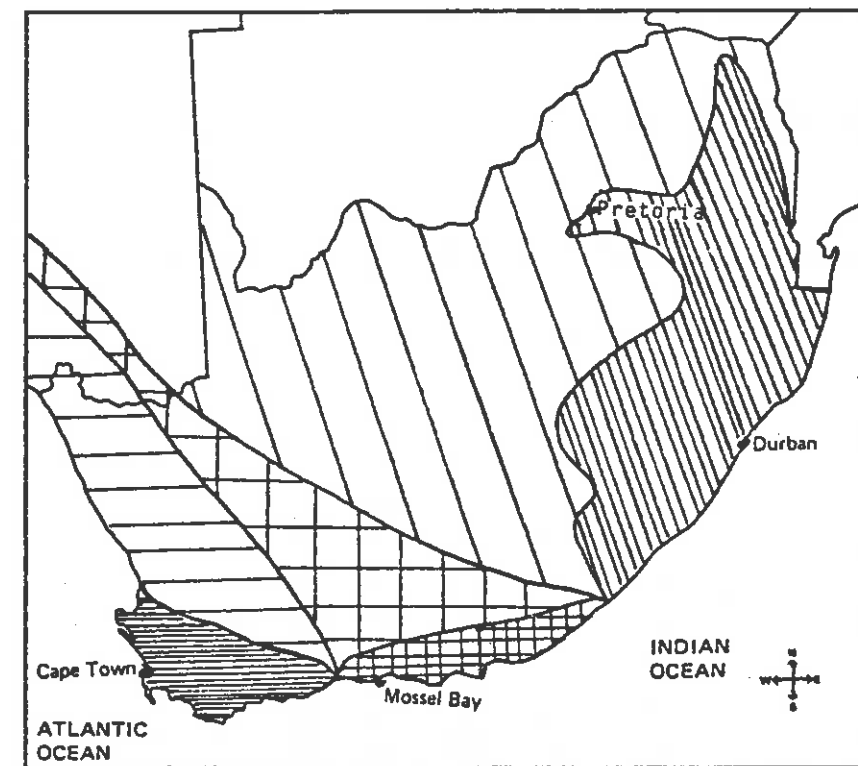
 This shows that these places are dry. There is very little rain there. This part gets 250 to 375 millimetres of rain in a year.

 This shows that these places are very dry. There is little or no rain there. These parts get 125 to 250 millimetres of rain.

Remember: The wettest parts are on the east side of South Africa. The driest parts are on the west side.







9. Different places get rain in different seasons

Here is another map which tells about rain in South Africa. It is different because it shows **the times** in the year when the rain falls. Some parts get rain in summer. Some parts get rain in winter. Other parts get rain in winter and summer.



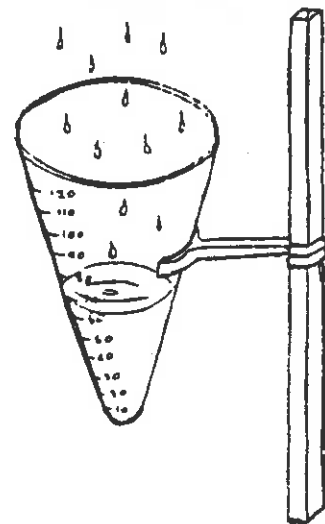
This map shows when rain falls in different parts.

On the next page you can see how this map shows the times in the year when the rain falls.

<p><u>1. Places which get summer rain</u></p> <p> This shows that in summer a lot of rain falls in this part.</p> <p> This shows that in summer only a little rain falls in this part.</p>	<p><u>2. Places which get winter rain</u></p> <p> This shows that in winter a lot of rain falls in these parts.</p> <p> This shows that in winter only a little rain falls in this parts.</p>
<p><u>3. Places which get winter and summer rain</u></p> <p> This shows that in winter and summer there is a lot of rain in this part.</p> <p> This shows that in winter and summer there is only a little rain.</p>	

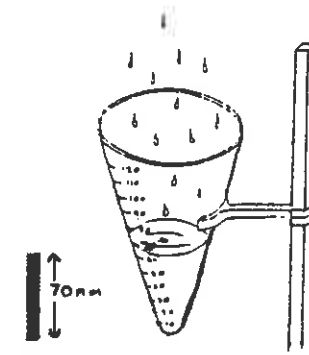
10. How we can measure how much rain has fallen

If you want to measure how much rain falls in summer and winter in your town you will need a rain gauge. A rain gauge is open at the top like a cup so that raindrops can fall into it. Here is a picture of a rain gauge. Drops of rain are falling into it.



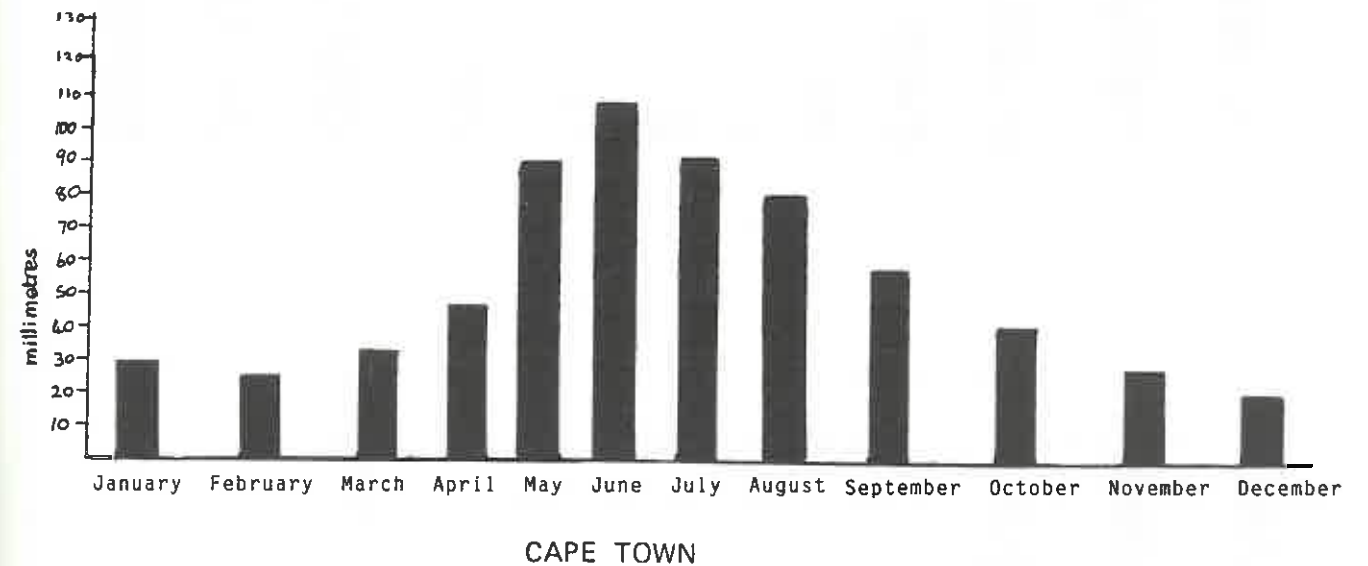
The picture shows the scale going from the bottom to the top. The scale shows 70 millimetres of rain. This means that 70 millimetres of rain has fallen into the rain gauge in one day.

Here is a picture of a line which also shows you that 70 millimetres of rain has fallen into the rain gauge. It is called a bar.



So you can show how much rain falls into a rain gauge by drawing a bar. Here is a picture which is called a graph.

Here is a picture which is called a graph.



This graph shows a bar for each month of the year in Cape Town. The bars on the graph show how much rain there is in each month. So from this graph we can see if there is more rain in winter or summer.

In Cape Town:

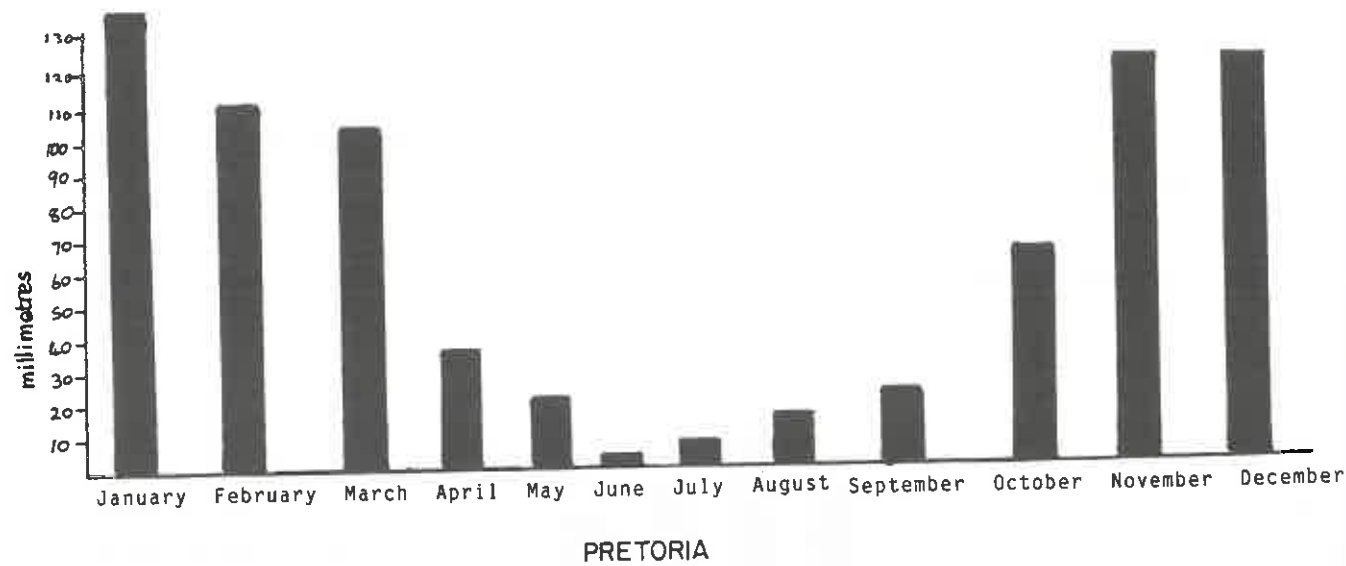
- a) There is a lot of rain in May, June, July and August. These are the winter months. Look at the map on page 9. You will see that Cape Town is in the part that gets a lot of rain in winter.12

b) There is not so much rain in January, February, March and November and December. These are the summer months.

So in Cape Town most of the rain falls in winter.

In Pretoria it is different. Most of the rain falls in summer. This graph shows which months get the most rain in Pretoria.

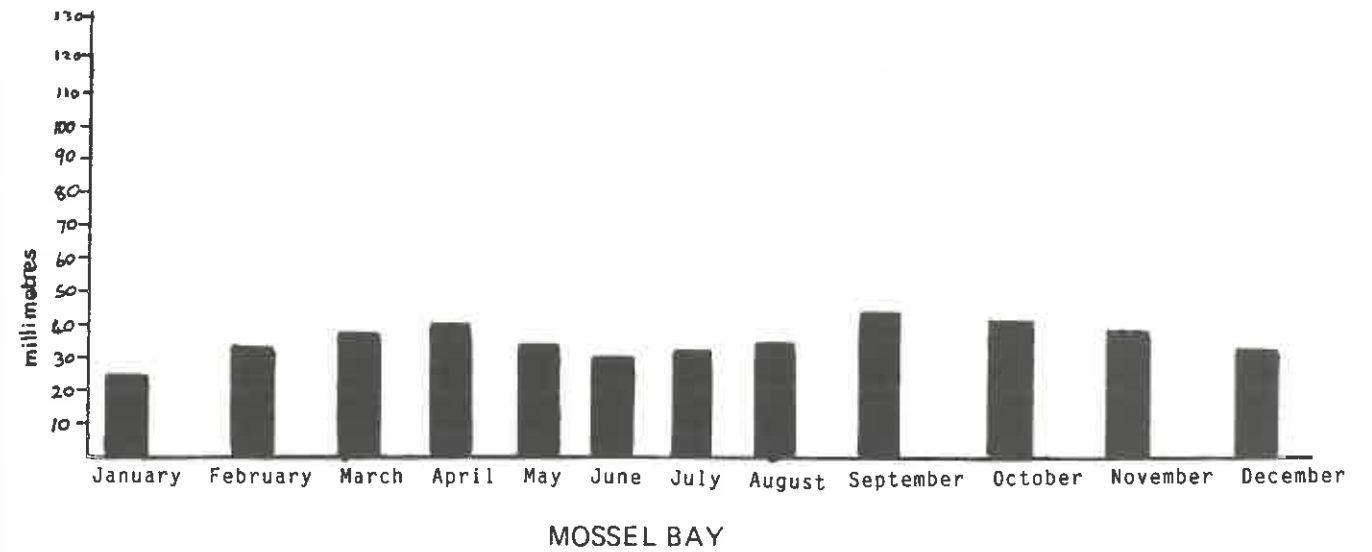
In Pretoria:



a) There is a lot of rain in January, February, March and November and December. These are the summer months. Look at the map on page 9. Pretoria is in the part that gets a lot of rain in summer.

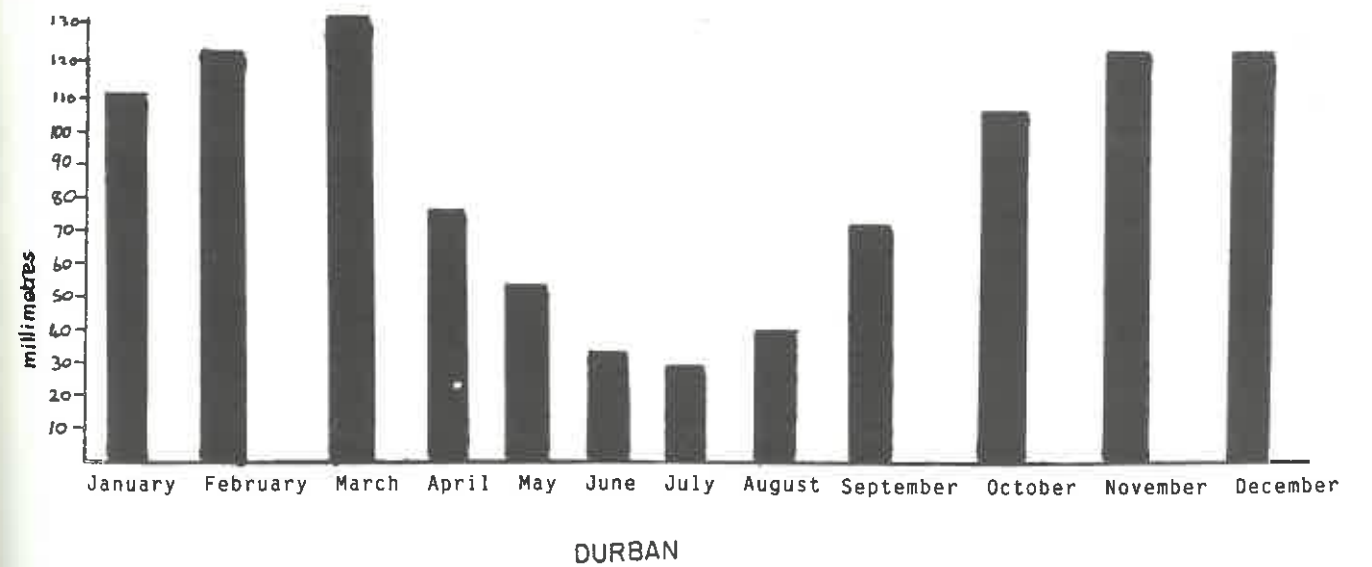
b) There is very little rain in June and July. These are the winter months.

In Mossel Bay there is rain in winter and summer. Look at this graph:



In Mossel Bay there is rain all year. There is about the same amount of rain in winter and summer. Look at the map on page 9 Mossel Bay is in the part which gets a lot of rain in winter and summer.

In Durban most of the rain falls in summer. This graph shows which months the rain falls in:



Look at the map on page 9. Durban is in the part that gets a lot of rain in summer.

Tasks:

1) Which place gets the most rain; Durban, Cape Town, Pretoria or Mossel Bay?

2) Look at the map on page 9:

a) Find the towns in South Africa that get rain in summer

Find a town which gets rain in winter.

c) Find a town which gets rain in winter and summer.

3.10 PREPARING AND CONDUCTING STRUCTURED INTERVIEW 2 (APPENDIX 3)

PREPARING THE INTERVIEW SCHEDULE

The steps described for the preparation of the schedule for Structured Interview 1, were followed in the preparation of the schedule for the second structured interview. It is, therefore, in most respects, the same as that used in the first structured interview. The only differences are:

- *The aims:*
 - To account for factors of change between the two interviews
 - To determine to what extent the rewritten passages were *actually* more readable, and facilitated reading comprehension
 - To identify specific problem areas experienced by the teachers reading the *rewritten* passages.
- *The questions*, which are essentially unchanged, were 'modified' only in relation to changes made in the rewritten texts to ensure the 'compatibility' of passage and questions.

The interview was conducted and the data transcribed in the same way as for Structured Interview 1. The same teachers were involved in all areas except the Transkei, where Brown's (1988:31) 'mortality effect' resulted in the replacement of one interviewee.

3.11 ANALYSIS OF RESEARCH INSTRUMENTS

STRUCTURED INTERVIEW 1, PART 1 – TEACHING AND LEARNING GEOGRAPHY IN STD 3 (APPENDIX 1)

The questions in this part of the interview are grouped according to what they reveal about teaching and learning geography.

Questions 1 to 5 deal with teachers' opinions about:

- The problems associated with learning geography
- The pupils' difficulties (perceived by the teacher)
- The geography textbook and the pupil.

Questions 6 to 13 deal with teachers' opinions about:

- Their experience of teaching geography
- The geography textbook and the teacher.

In the analysis of this data (see Chapter 4), questions 3b and 13 are omitted because preceding responses render them redundant. The responses to all other questions are, however, discussed for two main reasons:

- They are intended to reveal changes in the teaching/learning situation over the two-year period between the informal survey and the first structured interview.
- The data obtained (together with that from the informal interview), provide the context for the interpretation of the textbook data in Part 2 of the interview.

Analysis of the questions in Structured Interview 1 Part 2 (Appendix 2) and Structured Interview 2: The readability and comprehensibility of the

geography textbook passages and the rewritten passages for Std 3 teachers (Appendix 3)

For the purposes of this report the detailed analysis of the questions in Structured Interviews 1 and 2 in terms of the discourse properties they focus on are omitted as they are dealt with in some detail in Chapter 4.

4 DATA ANALYSIS

This chapter deals with the following:

- 4.1 Informal, semi-structured interview, classroom observation and preliminary textbook analysis – April/May 1987
- 4.2 Structured Interview 1, Part 1 – April/May 1989 (Appendix 1)
- 4.3 Structured Interview 1, Part 2 – April/May 1989 (Appendix 2)
- 4.4 Structured Interview 2 – August/September 1989 (Appendix 3)

4.1 INFORMAL, SEMI-STRUCTURED INTERVIEW, CLASSROOM OBSERVATION AND PRELIMINARY TEXTBOOK ANALYSIS – APRIL/MAY 1987

INTRODUCTION

The informal interview, classroom observation and preliminary textbook analysis formed the main components of the initial survey for the empirical research. The main purpose of this stage of the research, described in Chapter 3, was to collect data that described the teaching-learning situation in Std 3 as it is. This information could then be used to inform further, more detailed research activities.

The findings discussed below are based on:

- Informal, semi-structured interviews conducted with 14 Std 3 teachers and three higher primary school principals from Transkei, Ciskei and eastern Cape schools.
- Classroom observation in half of these teachers' classes over a two month period, together with an examination of pupils' written work covering the first four months of the school year.
- An analysis of a number of the content-subject textbooks used by the teachers.

INITIAL FINDINGS

The initial survey confirmed that the following interrelated factors, discussed in Chapter 1 of this study, are the most likely sources of difficulty in teaching and learning content subjects in the first year of English-medium instruction:

- The absence of continuity in the transition from mother-tongue to English-medium instruction
- Pupils' low level of English competence
- The mismatch between content subject textbooks and their Std 3 users
- A heavy reliance on rote learning.

UNREADABLE TEXTBOOKS

All interviewees reported that content subject textbooks were one of the major causes of difficulty for their pupils. They pointed out that in the junior primary phase pupils are neither expected to use textbooks for the content subjects, nor are they supplied with them. Pupils entering Std 3 are therefore unfamiliar with textbooks. As a result, the teachers report, pupils are overwhelmed when for the first time in their experience, they are issued with a separate textbook for each content subject.

All 17 interviewees either cited the following as evidence of the problem, or agreed that pupils are unable to:

- Locate pages in textbooks when directed to do so
- Find exercises or sections referred to by the teacher
- Understand subject-specific vocabulary
- Most significantly – to read the English of the textbooks with understanding.

Because of these kinds of problems, teachers reported that it is in fact the norm not to issue pupils with textbooks supplied by education departments. They pointed to the fact that for pupils to try to use textbooks that they could not read, was a waste of teaching time, and proved to be frustrating. Consequently, the interviewees reported that in the Transkei, Ciskei and eastern Cape, the teacher is the only member of the class who actually uses content subject textbooks. This has a number of serious implications for classroom teaching and learning procedures. These are discussed below under inappropriate teaching and learning methods.

PRELIMINARY TEXTBOOK ANALYSIS

The overarching question guiding the preliminary analysis was: Are the textbooks realistic in their demands on Std 3 children? In analyzing six textbooks commonly used in the teaching of geography, history and general science (see titles listed in Chapter 3), it was found that at least three implicit false assumptions influenced the design and development of all the texts. These were:

- Pupils' language competence and subject-specific background knowledge
- Task appropriacy
- Classroom teaching and learning procedures.

ASSUMPTIONS ABOUT PUPILS' LANGUAGE COMPETENCE AND SUBJECT-SPECIFIC BACKGROUND KNOWLEDGE.

In particular, it is assumed that pupils are competent readers of English, and that they have already developed an extensive range of subject-specific English vocabulary. See Figure 4.1 below for a typical sample of the subject-specific vocabulary and concept load that a Std 3 pupil is assumed to be able to cope with in a normal three-day teaching period for geography, history and general science.

It is important to note that this list is embedded in ordinary language items used with specialist reference, embedded in turn, in complex syntax, and mixed with English-specific collocations. This sample does not include vocabulary and concepts encountered in maths, health education, physical education, agriculture and English, over the same period.

GEOGRAPHY:	rotation, imaginary line, equator, planet, globe, heavenly bodies, hemisphere, continent, island, ocean, coastal plain, escarpment, plateau, relief
HISTORY:	appoint, refreshment, journey/voyage, expedition, depart, fort, barter, diary, industrious, inferior, tedious
SCIENCE:	cotyledon, plumule, axis, radicle, embryo, germination, mineral salts, adventitious (roots) fibrous (roots), vegetative reproduction

Extracted (repectively) from: *Our New World 3*. (1982); *History 3*, (1980); *General Science for Today 3*, (1981).
(From Langhan, 1988:100)

According to the interviewees, Std 3 pupils are not competent readers of English. They have also not had the opportunity to learn English equivalents for the very few subject-specific terms that they might have come across in their mother-tongue medium instruction in Std. 2.

The interviewees pointed out that:

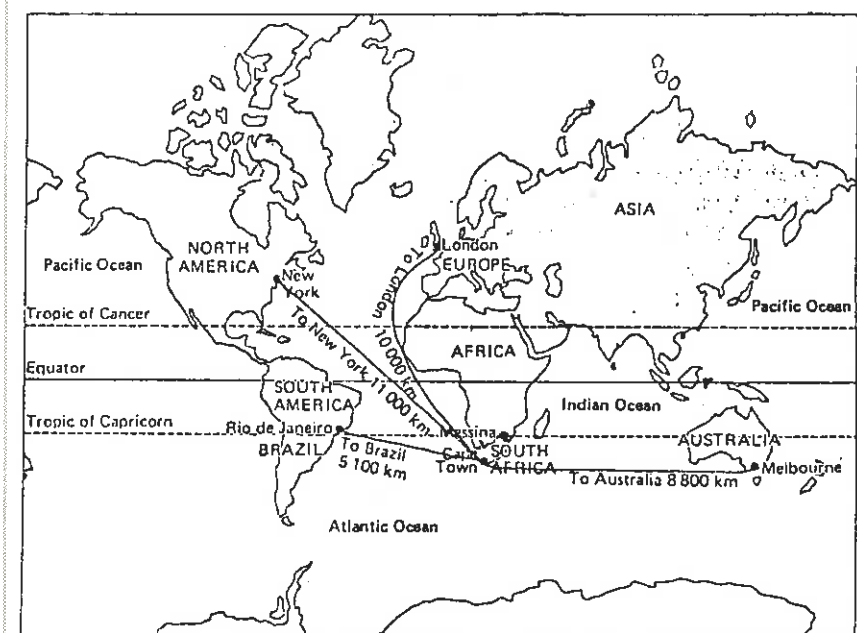
- There is very little continuity between environmental studies in Std 2 (the umbrella subject introducing pupils to social studies in Std 3) and geography in Std 3. There is also 'hardly any geography in environmental studies'. Macdonald (1990) pointed out that disjunctures in the curriculum of the junior and senior primary phases were as serious a difficulty as the language policy itself.
- There is so much new vocabulary (particularly terminology) in Std 3 geography, that pupils do not have the time to acquire it meaningfully.
- There has been a total failure by textbook authors to grasp the fact that all previous learning has taken place in the mother-tongue, with little or no transfer to English.

ASSUMPTIONS ABOUT TASK APPROPRIACY

During the classroom observation stage of the research, it was evident that pupils did not use textbooks, and that they did not do textbook exercises or tasks, either as classwork or for homework. In the classes observed, pupil's exercise books revealed only 'notes' apparently copied off the board. There was no evidence of any independent task or exercise work done by the pupils at any stage. The interviewees reported that the children could not do the exercises in the textbooks for two reasons:

- Pupils (and sometimes teachers), found the language of the tasks difficult. That is, even the teachers did not always understand what the tasks required them to do.
- The level of difficulty of the tasks was too high and pupils could not 'cope up with the exercises'.

The following is a typical example of a task identified by the interviewees as too difficult for the pupils.



(From Langhan, 1988:100)

Figure 4.1
A sample of subject-specific vocabulary and concept load on a Std 3 pupil over a three day period for only three subjects: history, geography and general science.

Look at figure 21. It shows the position of South Africa in relation to the different continents and oceans.

Questions to answer:

- Which pole do you think is closest to South Africa, the north pole or the south pole?
- Which distance is the greater, from the Limpopo River to Cape Town or from the Limpopo River to the equator?
- How long would an aeroplane take to fly from South Africa to each of the following places, at an average speed of 500 kilometres per hour: London, Rio de Janeiro in Brazil, New York?

From: Geography Can be Fun, Std 3 (1980).

Notice that the answers to questions a) and b) above cannot be found in Figure 21. The poles are not identified for a), and the Limpopo is not shown on the map for b). Based on mathematics syllabus requirements, question c) is too difficult for Std 3 pupils. Most of the teachers admitted that they did not know how to do c) either. Consequently, exercises and tasks which are often central to understanding lessons are either avoided or incorporated into the teacher's notes for pupils to copy into their books.

On analyzing the history, geography and general science textbooks used by the interviewees, 12 major task-types (that pupils are assumed to be familiar with) emerged. These are listed in Figure 4.2 below. Of these tasks, the eight marked with asterisks lend themselves to memorization, while the remaining four depend on several other linguistic and cognitive skills.

Figure 4.2
A Summary of the kinds of tasks pupils are required to do in the content subjects: history, geography and general science

* 1	One word answers or answers which are not sentences
* 2	Naming – (parts of a flower, etc.)
* 3	Reproducing lists – (names, dates, factors, etc.)
* 4	Choose/fill in the correct/missing word
* 5	True or false statements
* 6	Constructing full sentences
7	Constructing coherent, logical paragraphs. For example, explanations, descriptions and reports
* 8	Labelling maps/diagram
9	Extracting information from maps, graphs and diagrams to show understanding
10	Matching columns – (semantic association and collocation)
* 11	Completing tables – (association and collocation)
12	Arithmetical problems stated in words.

(From Langan, 1988:102).

It has already been said that teachers feel that they have to 'incorporate' tasks into notes to compensate for the pupils' inability to do them. An analysis of pupil's written work for the first two terms of 1987 confirmed this interview evidence and revealed that only tasks which lent themselves to memorization were incorporated into 'notes'. The other task-types (7, 9, 10 and 12) were avoided because, according to the interviewees, pupils were not capable of doing them, particularly if they involved writing original sentences.

INAPPROPRIATE TEACHING AND LEARNING METHODS

Assumptions about teaching and learning procedures

The above assumptions (in textbooks) about language competence and task appropriacy, are accompanied by similarly incorrect assumptions about teaching and learning procedures in the Std 3 EMI classroom. These assumptions, it would seem, reveal authors' and publishers' ignorance about the prevailing conditions and factors affecting the first year of EMI discussed above. To illustrate the point, Figure 4.3 below contrasts the teaching and learning demands implicit in the analyzed textbooks with observed classroom practice.

Figure 4.3
Teaching and learning procedures in Std 3 content subject lessons

Implicit demands of the textbook (Assumed learning procedure)	vs	Observed classroom practice (Actual learning procedure)
1 Teacher 'teachers' in English. pupils interact with the textbook.		1 Teacher 'teachers' in mother-tongue. Pupils do not interact with the textbook.
2 Class does textbook exercises.		2 Teacher 'gives' notes in English.
3 Teacher gives summary/notes.		3 Pupils memorize teacher's notes.
4 Pupils do homework, using textbook as guide and source of reference.		4 Tests – test recall of teacher's notes.

(From Langan, 1988:101)

The interviewees gave the following reasons for adopting the observed teaching and learning procedures, in what are supposed to be English-medium lessons:

- The teacher teaches mainly in the mother-tongue because:
 - Pupils lack English subject-specific vocabulary
 - Pupils are unable to cope with the English of the textbooks
 - Pupils are unable to read the textbooks, and therefore to interact with them
 - Teachers often lack confidence in their own ability to communicate effectively in English.
- Pupils are given notes, written in English, in an attempt to compensate for their inability to interact with the textbook. In order to achieve this, teachers simplify and summarize lesson content in point-form notes that pupils copy verbatim into their notebooks. It is important to realize that in such contexts, pupils are entirely dependent on the teacher's notes.

Interviewees gave further reasons for this approach:

- It can sometimes take up to two weeks to teach one lesson properly in English. This is not permitted because teachers are under tremendous pressure to cover the syllabus and to keep up with their weekly work schedule.
- Teachers have to prove that a certain number of tests have been written each term. Consequently, some teachers feel forced into an unproductive teaching pattern that encourages rote learning with little or no focus on comprehension.
- Some teachers feel unable to express themselves adequately in English, so avoid explanation by giving notes to be memorized. Pupils memorize

teacher's notes for the above reasons. To assist the memorization process, notes are 'drilled' as a class exercise because pupils often do not actually understand the notes.

- Tests simply require accurate recall of teacher's notes that have been memorized. Comprehension is rarely, if ever, tested because pupils do not understand what they have learned.

As evidence in support of the discussion of observed classroom procedures, extracts from three content subject textbooks, together with corresponding notes and tests from pupils' exercise books are provided below (Langhan 1988:104-114). Each of the three random samples was taken from a different class, revealing the teaching and learning procedures of three different teachers.

The three sample lessons below reveal that:

- Pupils are unable to, or do not read their textbooks.
- Pupils are dependent on the teacher for the information they learn.
- Teachers rely heavily on the textbook as their source of information.
- Teachers rely on the rote learning approach.

Sample 1a) A history lesson from *History 3*. 1980.

Jan van Riebeeck's youth

Who was this Jan van Riebeeck who was appointed by the Council of Seventeen to establish a refreshment station at the Cape? In 1619 Jan van Riebeeck was born in Culemborg in the Netherlands. His father, Antonie van Riebeeck, was a ship's captain. Both his mother and father were important people. When Jan was about eleven years old his mother died. His mother's father, Govert Anthoniszoon, brought him up as his father was constantly away on long journeys. His grandfather was mayor of Culemborg. He saw to it that his grandson attended school.

b) Corresponding pupil's notebook page.

Jan van Riebeeck's Youth
Jan van Riebeeck was born in Culemborg
His father Antonie van Riebeeck was the ship's captain
When he was about 11 years old his mother died.
His grandfather brought him up as his father was
constantly away on long journeys.
His grandfather was the mayor of Culemborg
He saw to it that his grandson attended
school.

c) Corresponding pupil's testbook page - note that this page was taken from a different pupil in the same class.

17 February 1987 History Test set III

Jan van Riebeeck's Youth

1. Jan van Riebeeck was born in Culemborg.
2. His father Antonie van Riebeeck was the ship captain.
3. His mother died when he was 11 years old.
4. His grandfather brought him up as his father was constantly away on long journeys.
5. His grandfather was the mayor of Culemborg.
6. He saw to it that the grandson attended school.

Notice that the pupil's notes at b), show that the teacher, in making notes for the pupils has lifted sentences verbatim from the textbook and written them as unrelated, numbered points, losing coherence and contextual support in the process.

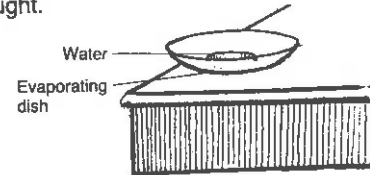
The pupil's test at c) reveals that learners are simply required to recall the teacher's notes verbatim; that very little understanding is required to pass this test; and that this kind of accurate (probably meaningless) regurgitation of facts is rewarded.

a) The textbook pages.

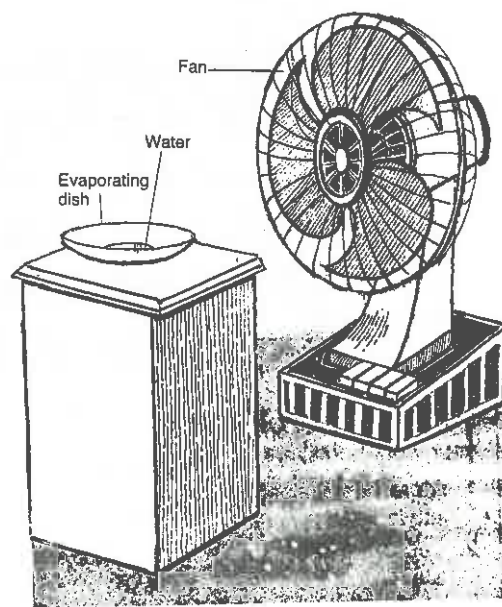
What helps evaporation?

Something for you to do

1. Take two similar evaporating dishes.
2. Measure out three teaspoonfuls of water into each.
3. Place one dish on a table away from a draught.



4. Place the other evaporating dish in an open window where there is a draught, or in front of a fan.

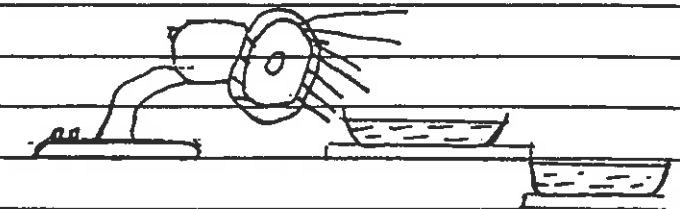


Questions

- (a) After some time, is there as much water in the evaporating dish in the open window, or in front of the fan, as at the beginning?
- (b) After some time, is there as much water in the evaporating dish on the table as at the beginning?
- (c) What has happened to all the water in the evaporating dish in the open window, or in front of the fan, after a very long time?
- (d) After a very long time can you notice any difference in the amount of water in the evaporating dish on the table?

b) The corresponding pupil's book page.

to evaporate!
Does the wind also help to



Method
Something to do

Take two saucers that are similar (the same) put a table's spoon full of water into each. Place one saucer in front of an electric fan that is switched on or in a draught of a fan open window. Keep the other saucer in the classroom.

What have we learnt

1. The water in front of the turning fan dries up quite quickly.
- The fan helped the air to move.
- The moving air or wind helped the water to evaporate quickly.

2 The water on the other
 source evaporates very
 slowly because it does
 not have so much moving
 air around it.

3 Heat and wind are the
 two main things in nature
 that help the evaporation
 of water.
 Heat and wind and bigger
 surface help the evapora-
 tion of water.

Notice that the pupil's notes at b) show how, instead of helping the pupil to do the task and make his own observations; the teacher 'incorporates' the task into her notes. By simplifying the content of the task and converting the questions into answers 1 to 4, she provides the notes which the pupil copies from the board.

Sample 3 A geography lesson from *Our New World 3*, 1981

a) Pages from the textbook.

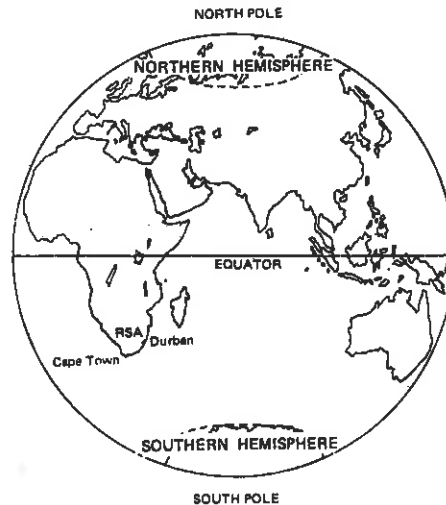
We usually call our country South Africa, but its full name is THE REPUBLIC OF SOUTH AFRICA. We shorten this to 'The RSA'.

THE RSA'S PLACE (POSITION) ON EARTH

If you look up into the sky on a clear night, you will see stars, planets and the moon. Everything you can see in the clear night sky, as well as the sun and the earth, is part of the universe. Many parts of the universe are so far away that they have not yet been discovered.

The earth is a planet. Planets are heavenly bodies which move round the sun. Each planet stays on its own path each time it goes round. Like all planets the earth is shaped like a big ball, flattened at the top and the bottom. Ask your teacher to show you a model of the earth. This sort of model is called a globe.

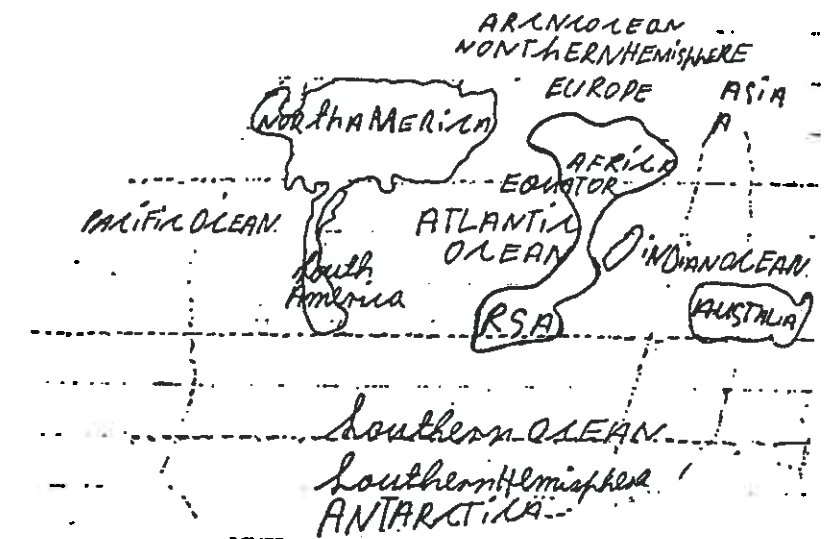
Look at this picture of one side of the earth.



Map 1: One side of the earth

The imaginary line which cuts the earth in half from west to east is called the equator. The halves of the earth, north and south of the equator are called hemispheres. The RSA is situated in the southern hemisphere.

b) Corresponding pages from a pupil's book



Position of the RSA on earth

1. The earth is a planet
2. Planets are heavenly bodies which move round the sun
3. Each planet stays on its own path each time it goes round

EQUATOR

1. An equator is an imaginary line which cuts the earth into half from West to East.
2. The halves of the earth, north and south of the equator are called hemispheres.
3. The RSA is situated in the southern hemisphere.

Continents

1. A continent is a very big piece of land
2. There are seven continents on earth
 - a. Asia
 - b. Africa
 - c. North America
 - d. South America
 - e. Antarctica
 - f. Europe

c) Corresponding pages from pupil's test book

- 22-5-87 38
110
1. Cape province → Cape town ✓
 2. Orange free state → Bloemfontein ✓
 3. Free Transkei → Umtata ✓
 4. Portswara → Makhel Mafutso ✓
 5. A
 6. ~~land~~ Inland is the very big bits of land ✓
 7. Asia ✓
 8. Africa ✓
 9. Australia ✓
 10. Northern America ✓
 11. Southern America ✓
 12. Antarctica ✓
 13. light ✓
 14. South Africa ✓
 15. We called inqutu ✓
 16. A hatou is a very big bits of land ✓
 17. Freeport is one ✓
 18. Orange River ✓

Notice that the pupil's notes at b) show how the teacher has lifted sentences verbatim from the textbook and given information in point form without attempting to show meaningful relations (coherence is lost).

The pupil's test at c) shows that the accurate recall of one-word or one-sentence answers is required; that the pupils was unable to construct (or recall) coherent, logical sentences where memory has failed (see answers 15, 16 and 17); and the meanings of the words 'island' and 'plateau' have not been clearly established (see answers 6 and 16).

4.2 STRUCTURED INTERVIEW 1, PARTS 1 AND 2, APRIL/MAY 1989

PART 1 – APRIL/MAY 1989 (APPENDIX 1)

Teaching and learning geography in Std 3

Learning geography – the pupils' difficulties

Under teachers' general impressions about how their pupils were coping with geography (questions 1 and 2), all teachers felt that their pupils experienced overwhelming difficulties. Comments like this express both the extent of the pupils' difficulties and the teachers' sense of helplessness:

Gl: Pupils are finding a big jump from Std 2 to Std 3... its a totally different world... the language is too much for them... its much advanced... there is a big gap which we don't know how to close it.

Among the difficulties cited by the teachers are the following:

- There is a 'big jump' in terms of language demands and the levels of difficulty in the transition between environment studies in Std 2 and geography in Std 3.
- English as the medium of instruction for pupils who 'do not understand English', means that much of the teaching is done in the mother tongue.
- That notes have to be given in English after the teaching has been done in the mother tongue. This means that pupils often do not understand the notes. Also, pupils cannot write very well. 'Writing is a problem, they cannot write down points from the board.'
- As a result of the pupils' poor comprehension, there is not enough time to complete lessons within geography periods and the syllabus is not covered.
- There are too many textbooks for the first year of EMI. In some cases this does not apply in reality because textbook supplies do not reach schools anyway.

In response to question 2a, *Can you say what they (pupils) find difficult/easy?*, many of the issues raised by question 1 are repeated as they are among the major problems perceived by the teachers. The textbook was certainly identified as a major source of difficulty. Teachers pointed out that textbooks are of no value to children as they are too difficult for them to read. The most significant difficulties are: the language is too difficult; the terminology is too sophisticated; the texts are written incomprehensibly; and pupils lack the background knowledge necessary to understand the content. According to two of the teachers, there is not really anything in the textbooks within the pupils' competence range, and in their experience, 80 % of pupils cannot cope with geography lessons in Std 3.

The textbook and the pupil

Questions 2b, c, d, 4 and 5 all focus on the pupils' ability to use the textbook. In particular, the questions focus on whether the pupils can read the textbooks, understand the language in the texts, make notes from the texts, do the tasks, and understand maps and diagrams in them.

The unanimous response to question 2b is that Std 3 pupils cannot read their geography textbooks:

G1: *No, never. They can't read.*

G2: *They cannot even write and copy properly.*

C1&2: *No, they can't, no they can't.*

TP&N: *They can never in Std 3.*

According to two teachers, even in Std 4, when some pupils can 'read the words written... because they are doing reading in English... they are not reading with understanding'.

On the question of pupils making notes from the textbook (Q2c), the teachers agreed that pupils who could hardly copy notes from the board, were not likely to be able to make notes from a book that they could not read:

C1: *Even notes on the board – they just read not with understanding.*

It is significant to note that in spite of the fact that English is 'upgraded' in Transkei schools, Std 3 pupils are still unable to read and make notes from their textbooks (Q2a):

TP: *I think teachers have to make some notes. Simplify the language in short form, point form, so to make it easy for the child – and not make as we are supposed to and not let these children to read. I don't think they can gain anything from these textbooks on their own, unless the teacher has her own simple notes.*

Also significant is the fact that, according to the teachers, children fed into the higher primary school from outlying, 'non-upgraded' schools are less competent than those described in this study. This is significant since it suggests that the situation is likely to be worse in average and below-average schools in the respective regions.

Only the Transkei teachers disagreed that pupils could not do the textbook tasks (Q2d) for the reasons already mentioned. It was interesting to note, however, that the Transkei pupils' exercise books revealed that what their teachers understood to be 'doing the tasks' was in fact teachers 'incorporating' tasks into notes for the pupils. The evidence suggests, not only that pupils cannot do the tasks, but also that at least some of the teachers do not fully understand the purpose of tasks.

All teachers agreed that their pupils had great difficulty understanding maps and graphs in the textbooks (Q5). In spite of the fact that the syllabus requires that pupils learn to interpret simple maps and graphs in Std 3, PE2 is convinced that pupils are not required to do so. It was interesting to note that none of the teachers interviewed had a personal copy of the syllabus. Also interesting to note, is the 'drilling' method of teaching maps. This method suggests that either the teachers do not know of any other way of teaching maps, or that because of their lack of familiarity with maps and map conventions, drilling and memorization is the only strategy available to teachers and pupils alike.

The language of the textbooks (Q2a and 4), is clearly central in the discussion of pupils' problems. The teachers unanimous response to question 2a is clear:

T1: *The real problem is language, language, language... terminologies especially, in Std 3.*

C1: *...big new words – you have to try to simplify as much as you can, in so much that you take the mother-tongue so that they can understand it. If you can't touch mother-tongue, it seems they will open their eyes out – don't understand it, and you have to repeat it time and again.*

PE1: *They can't read it because the terminology used in that textbook is very difficult for them. There are words like 'relief', 'hemisphere', 'rotation'. They are very, very difficult even to explain.*

G1 points to the consequences of the problems discussed so far, by noting that '10 % (of the pupils) cope and about 80 % are not coping in the class'.

At least two teachers pointed out that there was more to the language problem than just terminology:

G1(Q2a): *...it is more than the language, I'm sure its the way what they have written the textbook. They must simplify it – in fact (so) that (it) is something that can be understandable. We can't even give the child (the book) to go home and read at home – they won't know it...*

TN1(Q4): *Language in the textbooks needs some modification to drive the meanings home.*

Finally, as far as the syllabus is concerned (questions 3a and b), two teachers pointed out that the whole syllabus is difficult because of the language problem:

G1: *I don't know how to comment because... eh... I think its tantamount of the language problem there and... they don't see it...*

G1&2: *For the child the whole syllabus is difficult if it is dealt with as the textbook does.*

In addition to the language problem, the syllabus is perceived to be too long:

PE2&C1: *The syllabus is too long. You know, when you are doing the second quarter's work you find out that you are not even... that they don't even understand the first quarter's work and you are going (into) the fourth quarter.*

PE1: *Yes the last chapters, we don't even touch them. So we don't cover the syllabus in Std 3.*

Teaching geography – teacher's problems

In response to questions 6 and 7, only C2 did not find teaching geography difficult. She did, however agree with all the other teachers who felt that the pupils were a major problem. 'Without the pupils' difficulties,' they said, 'teaching geography would be easy'.

Apart from the pupils' problems the teachers also identified the following difficulties:

- Geography classes are not equipped; there are no teaching aids.
- There is a shortage of good, helpful textbooks. Those that are available are of no real help and are beyond the pupils' understanding.
- Class teaching means having one teacher to teach all subjects, usually, to overcrowded classes.

- Poor learner competence together with pressure from inspectors to complete the syllabus, puts teachers under a lot of pressure. Nevertheless C1 and C2 reported that, as a result of the slow progress caused by repetition and memorization, they barely manage to complete a quarter of the work they plan for any single week. Needless to say, the syllabus is never completed by any of the teachers.
- Two teachers, PE1 and TN2, implied that teacher training in colleges is very general and does not allow for specialization. Consequently, they do not understand geography themselves, nor do they like it, and they find it difficult to teach.

Each pair of teachers had a different method of dealing with their problems (Q8). This is probably a function of the emphases of the various in-service groups operating in the different regions. For instance, in Grahamstown, G1 and G2 tried to reduce the amount of language used in lessons by using demonstrations and activities. In Port Elizabeth, PE1 and PE2 discussed difficulties with their schools' head of department. In Ciskei, the use of goup work is a direct result of the influence of the Hlaziya In-Service upgrading programme in the region. However, C1 and C2 had not found this method entirely satisfactory as they complained that there was not sufficient time to implement it properly. Significantly, none of the teachers seemed to be able to explain how the problems they experienced affected their teaching methods, or how they tried to cope with the problems. Either the question was not understood or the teachers did not see the link between the two.

In response to question 9, only in Transkei, where English is introduced as medium of instruction in Std 2, do teachers find that they can teach mainly in English. For the rest, the teachers rely heavily on the mother-tongue as a tool for explaining the content of lessons. The teachers were all aware of the departmental requirement that teaching is conducted in English, but found it impossible to comply with this regulation.

In answer to question 10, six teachers claimed that between a third and three-quarters of any lesson is actually taught in Xhosa. If this is not done:

C1: *You can see on their eyes, they just look out...*

Responses to questions 10a and b reveal that most of the teachers tried to follow the formal steps they were trained to use when conducting lessons: *Introduction, Presentation, Conclusion*. However, all teachers reported that they could never complete a lesson they had prepared for a 30-minute period. All teachers agreed that it took them between two and four periods to teach such a lesson to their satisfaction. The following extract from the interview with the Grahamstown teachers appears to reflect the typical teacher's experience:

G1&2: *If you introduce a lesson in English.... when you ask questions to link up, you find they are just looking at you. Then you try to explain, now in vernacular. That takes another time, thats our problem. Then you have to give them a few lines on the board, because they can't go to the textbook. That's where another struggle - in thirty minuts... won't do to write.... They copy them, but the time is up. So you have to carry on in the next lesson or the next day....*

Q: *Do the children understand the notes they have in their books?*

G1: *After a struggle. You have to read with them time and again.*

Q: *And when it comes to testing?*

G1: *...some of them will be able to answer... you will find that about nine of them get the answers out of 65.*

Q: *What about the rest?*

G2: *They don't usually cope.*

Earlier in the interview (Q3a), G1 pointed out that testing in English after explaining in the vernacular resulted in frustration *'because your (pupils) get zeros and ones and so on'*.

Three out of the four pairs of teachers felt that they would not change their teaching methods (Q10b) even under ideal conditions. G1 and G2 on the other hand, felt that they could do things very differently if they had the necessary apparatus. They also felt that if the language and textbook difficulties could be solved, they would like their pupils to be able to use textbooks.

The textbook and the teacher

Questions 11 and 12 focus on whether the teachers have any difficulties with the textbooks. Seven out of the eight teachers confidently claimed that the language in the textbooks did not present them with any difficulties at all:

G 1: *...is just simple for the teacher to use for his own preparation.*

Only one teacher, C1 expressed difficulty with the vocabulary. The same teacher had earlier (Q3) acknowledged that she had difficulty with some sections of the syllabus because *'you didn't come across that thing, so you are taking just what is written on the book'*. One teacher, PE2, pointed out that although the language was not difficult, it was difficult to get information from the textbooks. On the other hand, all of the teachers stated at some stage during the interview that the textbook language was definitely too difficult for the pupils. For example:

TP: *These (textbooks) are made for the teacher not the child. The teacher must compile notes for the children.*

G1: *...but the purpose of the books is not for the teacher, it is for the children, so it doesn't serve its own purpose.*

Five out of eight teachers claimed that maps and diagrams in the texts (Q12a & b) were not difficult for them, while three (PE1, C1 and C2) found them difficult. PE1 did not know how to teach maps, while C1 and C2 were confused by the details on maps. They agreed, for example, that the only understanding they had of the difference between a plateau and an escarpment was, because *'it is written'*. Since the interviewees' claimed that the pupils in their classes could not and do not read the geography textbooks intended for them, it would appear that they are entirely dependent on their teachers for what they learn. The focus of the research, therefore, was shifted from the pupil to the teacher. The data from Structured Interview 1, Part 2, which assesses the teacher's interaction with the textbooks intended for their pupils, is analyzed in the following section.

4.3 STRUCTURED INTERVIEW 1, PART 2 - APRIL/MAY 1989

READABILITY AND COMPREHENSIBILITY OF GEOGRAPHY TEXTBOOKS FOR STD 3 TEACHERS (APPENDIX 2)

A note on the organization of the data to be discussed

It was pointed out in the analysis of the questions in Part 2 of the Structured Interview (Chapter 3), that the interview questions are grouped into three

categories. In this section, these categories are further subdivided according to the discourse properties on which they focus:

- Pre-reading questions: questions focusing on assumptions about background knowledge.
- Text-interaction questions: questions focusing on obscure reference; subject-specific terms used before their meanings are properly established; complex syntactic structures; confusing cohesion devices; unfamiliar expressions; propositional deficiency; thematic incoherence.
- Post-reading questions: thematic incoherence.

Each of the three passages is now discussed in terms of what the interview questions reveal about their discourse properties, and the quality of the teachers' interaction with them.

PASSAGE 1 – MINING IN SOUTH AFRICA (PAGES 43-44)

PRE-READING QUESTIONS

Background knowledge

Generally, the teachers' background knowledge about mining was vague and sometimes confused. The following selected examples illustrate the point:

Q1: Do you know what minerals are? Tell me what you know about minerals.

G2: They are precious stones dug underground and they are used for making certain valuable... money...

G1: ...and other piping.

C2: Anything that can come from under the ground.

C1: Yes.

T1: Yes, minerals are things that are under the ground or on the earth.

T2: Agreed.

PE2: Is it not production from the soil?

Q2: Do you know what gold is? Tell me what you know about gold.

Most interviewees had a fairly good idea of what gold was, although none of them had seen 'the real gold', apart from in watches and jewellery. PE2 thinks that 'paper money is made from gold' and that C1 and T1 think gold 'is an expensive stone'.

Q5: Have you ever seen a mine?

Only G2 has seen a mine 'from far away' and was able to identify the mine dumps in the picture on page 43. This picture was unfamiliar for the rest of the teachers.

Q6: Do you know where gold is mined in South Africa? Can you give me any details on where it is mined in South Africa?

It is interesting to note that although all the interviewees were aware of the area in which gold was found, only one was able to name more than one possible mining town; this, after an average of nine years teaching geography at Std 3 and 4 levels.

TEXT-INTERACTION QUESTIONS

(asked after reading the passage thoroughly and then referring to the text at will).

Subject-specific terms applied before their meanings are established

Q1: Look at page 43. (Point out the word 'minerals'). Do you know what minerals are now? Can you give me examples of minerals in this passage?

Clearly the distinction between 'minerals' obtained from mining, and 'raw materials', had not been established in the readers' minds by reading the passage. Their answers seem to confuse the two in the same way that the passage does; there is no perceived difference between them:

G2: Diamonds, coal, copper, iron-ore, wood.

C1: Raw materials...

C2: Yes.

C1: ...like wood, you can make something from it.

T2: Coal, iron, gold, wood...

T1: Yes.

PE1&2: Water, coal, diamonds, gold.

Q3: Look at page 44. (Point at the word 'arc' in the text). Do you know what this word means? Read the sentence and tell me what you think it means. Can you show me what an arc looks like?

Five of the eight interviewees knew what an arc was and could show a 'C' or a 'U-shape' in the air. One of these five was however not convinced:

PE2: Is it not a U-shape? It is confusing.

For the other three interviewees, who appeared not to have any background knowledge to draw on, the passage clearly did not establish its meaning:

C1: Type of a mountain where there are many rocks, a mountainous place.

T1: I don't know the meaning of this arc.

PE1: Eh... I don't know whether is the arc that is in the bible. The bible says that Noah build an ark. But as it is written here, I can't get its meaning.

Q5: Read the first paragraph on page 44. When was gold first discovered in Johannesburg? (Would you say 50, 100, 150, or 200 years ago?)

Of the eight interviewees, only one guessed correctly that it 'might be 100 years'. The rest were unsure or thought it must have been 200 years ago or more.

Obscure reference

Questions 4, 7, 8 and 11 all refer to maps and diagrams that are intended to support the passage. The following responses reveal the effect of obscure reference on the interviewees' comprehension.

Q4: This passage says that Figure 53 shows you where the gold is mined. Where is Figure 53?

All interviewees were able to locate the figure on page 43, but not without some delay. The Transkei teachers, in particular, paged around uncertainly before finding the reference.

Q: Can you show me the place on the map where gold is mined?

Only one teacher pointed directly to the arc on the map. All the others seemed to be misled by the obscure references in the text, to the 'Orange Free State' and 'Heidelberg', which actually led the readers directly to the coal mining area on the map:

G1: *The darkish one (pointing to coal area).*

G2: *Yes.*

Q: *Name some of the towns there*

G2: *Heidelberg, Vanderbijlpark, Dundee, Belfast...*

G1: *Carolina, Belfast...*

C1: *Heidelberg.*

C2: *Vanderbijlpark... (both pointing to the coal and gold areas) Heidelberg, Vanderbijlpark, Johannesburg and Welkom.*

T1: *Orange Free State and Transvaal and in South Africa. Different places in South Africa (pointing vaguely at the whole map).*

PE2: *Here at Welkom, at Heidelberg and others... Johannesburg and the Transvaal.*

PE1: *What about Rustenberg?*

Q: *How did you find them? (What helped you to find them?)*

At this point it became obvious that the interviewees had not actually used the key to interpret the map at all. Only after asking this question did they realize that there was a key. For example:

G2: *It (the passage) said that it (the arc) started from the OFS to the Heidelberg (referring to the paragraph on page 44).*

G1: *(Looking at the key on the map for the first time) ...doesn't this one (the one they had identified as the gold area) show coal?*

Q: *You feel it shows coal?*

G1: *The darkish one shows coal.*

Q: *So what clues are you using now?*

G1: *The key.*

G2: *Oh, the key ne? Oh,... (looking at the place G1 was pointing to) the gold mining is the greenish part. I see now, I see now.*

Q: *So how did you get that?*

G1: *I see the key.*

G2: *The key, the key – now I said the arc is curved just like a moon is curved.*

G1: *So in other words, the gold is Welkom, Vanderbijlpark, Johannesburg.*

G2: *Yes.*

Although the other interviewees claimed to have used the key to help them work out their answers, this was only mentioned after some delay. This suggests that the question made them conscious of what they 'should have done'. Notice though, that the key was of little help anyway. Even G1 and G2, who used the key, were misled by the poor labelling of Vanderbijlpark to include it in the gold area.

Notice also that although five of the eight teachers knew what the word 'arc' meant in the passage, only one identified it on the map. This particular obscure reference (also a concept that is not established) affected the teachers' ability to locate the referent. Had it not been for the probing interview questions, it is unlikely that even the teachers who did eventually identify the reference, would have done so on their own.

Q7: *Look at the picture on page 43. What is this a picture of?*

All interviewees identified the diagram correctly. Their difficulties began however, when they were asked to interpret the diagram and identify parts of it. In particular, the discussion of the 'gold reef' in the passage depends on supporting details in the diagram. The obscure reference to it does not, however, give the readers the assistance they need, as illustrated by the following examples:

Q: *What do you think this green part is? (point to the main gold reef).*

G1: *I think it is where the minerals are found.*

G2: *I'm sure it's the entrance of the... its where the people enter.*

G1: *It's where the minerals is so people have to come here and dig.*

C1: *It is gold.*

C2: *They show us how gold is in the mine. The indication of the gold (pointing, incorrectly, to the key for the map on page 43) show the colour – it is green colour.*

Q: *So that means that the key on page 43 shows that gold is a green colour. Does that mean that the green part on page 43 is gold?*

C1&2: *Yes.*

T2: *Gold-bearing reef? I don't know.*

Q: *You say its a gold-bearing reef, but you don't know?*

T2: *...I think so... but I'm not sure.*

Q: *What do you think it is T1?*

T1: *It is the path to the shaft or the mine.*

PE2: *Gold bearing reef.*

PE1: *eh... (long delay)... eh... shafts, gold-bearing reefs and blind shafts.*

Q: *All three?*

PE1: *Yes.*

Q8: *How did you find out what the things in the picture were?*

The answers to this question reveal both the confusing effect of the obscure reference, and the teachers' unfamiliarity with the key as a convention. G1 identified the gold reef by using the passage, while all the others claimed to have used the key. After using the key, T2 was still not sure of her answer. Notice, in particular, that C1 and C2 used the key for Figure 53 to interpret Figure 54.

Q11: *What does Figure 55 show us?*

The divergent answers to this question provide further evidence of the negative effect of obscure reference and uninterpretable diagrams on comprehension:

G2: Compare the value of gold and diamonds.

G1: Ja, it shows us how much diamonds and other goods there are in SA.

T2: The role of gold.

T1: The graph show how SA gets gold...

T2: Yes, I agree, but eh, it also shows us the gold is more valuable than diamonds... I think so.

PE2: The importance of gold and diamonds.

PE1: The value of gold and the value of diamonds.

Cohesion devices

Q9 Look at page 44. (Point to 'these problems' in the last line of paragraph 9) What do you think these problems are? (You can read the page if you want to and then tell me).

The anaphoric reference 'these problems', presented every interviewee with difficulties. None of them could clearly identify the two or more problems apparently referred to. This is not surprising since the reference is obscure even to a competent L1 reader. This is, in part, because of the absence of prominence that should be given to the discussion of the problems. Also, the inexplicable paragraph break between paragraphs 8 and 9 disrupts the development of the topic line. The following answers illustrate the teacher's problems in identifying the referents:

G2: These problems are to get this... (no answer)

G1: ... to the reef because its sloping, and it needs some specialist to get there.

C: It was the way how the mines ... (no answer)

C1: ...its difficult to go down there – so those difficulties where people are overcrowded by rock and they can't go out.

T1: Problem number one is the reef.

Q: And the other?

T1: ... well I'm still looking... So this reef makes a problem in mining. Since this reef is a rock that is found in the mine – so now, these men find it difficult to dig up this rock. So it takes time to come straight to the gold because there is this reef over. I think that is the problem. Because it takes time for them to get real gold because there is this reef on top so they must first remove the rock, and then get to the gold underneath.

Q: Do you agree T2?

T2: Yes.

Q: Are there any other problems?

T1: And... eh..., so the engineers are working hard and getting a tough job in removing that reef...

(Note the above explanation also reveals the effect of using the term 'reef' in the passage without establishing its meaning.)

PE1: The reef.

Q: Anything about the reef?

PE1: No.

PE2: Sloping of the reef.

PE1: Except... eh... take the shortage of engineers in SA. So engineers are needed, that's why there are so many people dying in the mines. Because of the shortage of engineers.

Thematic incoherence

Q10a: Read the last paragraph on page 44. Can you think of a title or a heading for this paragraph?

The variety of headings suggested as answers reveal that no single topic receives adequate prominence or support in this paragraph. The main idea is not made clear to the reader:

G2: Industrial development.

G1: The importance of gold.

C1: Earning money in South Africa.

C2: SA is the best in gold and diamonds.

T1: SA manufactures gold, or SA manufacturing.

T2: SA is important because of gold.

PE1: Export of SA.

PE2: Imports and exports of SA.

POST-READING QUESTIONS

Thematic incoherence

Of the five post-reading questions, questions 1, 2 and 4, are the most revealing in terms of the effects of thematic incoherence on comprehension.

Q1: What are the two most important things the passage tells us?

The following answers reveal how little prominence is given in the text to any two or three main ideas:

G1: The value of gold to SA.

G2: How Johannesburg grew up because of the presence of gold there.

G1: Eh... its in exchange with other amenities like cars, which we don't have – so we are able to buy things we don't have.

C1: How the town was built by having gold there...

C2: It tells us Johannesburg is most important because of gold... Johannesburg feeds us, it is our mother.

T1: Tells us about gold mining.

T2: ...people get these things from minerals – things like earrings, everything...

PE1: The importance of gold.

PE2: The importance of exports.

Q2: What does it (the passage) tell us about minerals?

The following responses reveal that there has been very little logical development of ideas in the passage. The answers also confirm the confusion between the terms 'minerals' and 'raw materials'.

G1: It is dug underground... they are dug raw, as raw materials.

G2: Minerals value in SA.

C1: Raw materials such as...

C2: ...wood, even water...

C1: ...and out of that material you can get something. Its raw when it has not been used, but after it has been used it is useful – e.g.: desks, paper...

T1: Minerals are so important to us, because we are getting money and things that are done from the minerals.

T2: Because it tells us that desks are made of wood and screws and other things we get from minerals.

PE2: Minerals are raw materials.

Q4: What did the passage tell about mines in South Africa?

The following apparently 'random collection of ideas' illustrates the effects of thematic incoherence on recall:

G1: Mines in SA have a problem of sloping.

G2: The different mines like coal, gold, diamond, copper, iron-ore mines... so SA has the deepest gold mines...

G1: And the places where the mines are found.

C1: SA is the biggest in gold mining...

C2: ...so less in diamonds...

C1: ...it also comes out of an open veld and people builded buildings and people get work and it show gold comes from an arc.

T1: ...the importance of mines in SA, and it also tells about the biggest mines, gold mines.... Gold mines are so important to SA, and there are also some diamond mines and all that. So... and that SA earns much money because of gold.

T2: Yes, and that SA became popular because of this gold.

PASSAGE 2 – WHAT SOUTH AFRICA LOOKS LIKE FROM SPACE (PAGES 45-46).

PRE-READING QUESTIONS

Background knowledge

The pre-reading questions set out to establish how much background knowledge teachers had about six key terms used in the passage. The answers show that most teachers had reasonable background knowledge about 'slopes', 'plateau' and 'mountain range'. There was however, evidence of uncertainty and confusion in the minds of at least two teachers (T1 and T2) about the meanings of 'plateau' and 'mountain range'. Also, 'relief', 'satellite' and 'spaceship' proved to be almost completely unknown, or at least vaguely comprehended by all the teachers.

Q2: Do you know what a plateau is?

T1: A plateau is an escarpment or a hillock.

Q4: What is a mountain range? Can you tell me or show me what it looks like?

T1: I cannot explain what a mountain range is.

T2: Not sure.

Q5: What is the relief of a country?

PE2: The rivers, mountains, rainfall of a country.

T1: The kind of rain in the country.

T2: I don't know the word relief.

Q1: Do you know what a satellite or a spaceship is?

G1: I know a little... it's a moving body in the air in space.

G2: It's a moving something in space.

C1&2, PE1&2: I'm not sure of it.

T2: No, I don't know.

T1: I've got an idea of a statellite (teacher's pronunciation), but I don't know the other name. I'm sure it's something to do with stars or the TV or the films. Maybe in the film you see something which was done long ago in overseas. You see it happening here by statellite presently in the TV's.

Q: Okay, so a spaceship... is it a different thing or the same thing, or something else?

T1: It is a different thing. Since it is a ship, I don't think it has something to do with a statellite.

Q: What would you say it has to do with?

T1: Well, with ship in the sea.

TEXT-INTERACTION QUESTIONS

Subject-specific terms applied before their meanings are established

Questions 1 and 2 together attempt to establish the effect of the use of the term 'space' without establishing its meaning in the mind of the reader. Question 2 probes the reader's background knowledge in order to determine whether reading the passage changes existing knowledge in any way.

Q 1: Look at page 45. (Point to the word 'space' in the heading) What does this word mean in this sentence?

G1: Means up in the space.

G2: Space means up (pointing to the sky).

Q: Can you describe in a little more detail what you mean by 'up'?

G1: Above the surface of the earth.

G2: Up in the sky.

C1: I understand there is an ocean this part, and ocean this part, and SA is in between, and other countries are a little bit far...

C2: SA is mountainous, there are rivers, also land, mountains there... rivers, also space for country.

T1: The space between the sky and the earth, the part between the sky and the earth.

PE1&2: High above

Q2a: Read the title and the first paragraph on page 45. Where does space begin and where does it end?

G1: I think it is supernatural, we can't answer. Its questions we always ask ourselves.

G2: No.

C1: *Between the mountains and the rivers and the escarpment.*

C2: *So, between the sea and the river, there is a space between them. Even between the mountains and the river there is a space, but the more space, it is between the sea and the mountains.*

T1: *Begins up and down to the earth...*

T2: *Yes, ends up on the sky.*

PE1: *Starts on the ground and goes up as far as you can go.*

PE2: *Not sure.*

The only meaning of the word, 'space', C1 and C2 were able to apply, is inappropriate. Understanding the view from above, which is critical for this passage, is not clear to them. For the rest of the teachers, the concept of outer space is vague and certainly needs to be more clearly established.

Q4a: *Is a relief a map?*

Four teachers were sure that a relief and a map are the same, while four felt that they are different, but couldn't explain how:

G1: *A relief is not a map but we are trying to show the relief by means of a map.*

PE2: *They are not the same thing. There are relief maps... physical maps. There are many types of maps.*

Q4b: *What does a relief tell you that a map does not tell you?*

The following answers reveal the teachers' confusion about the distinction between a map and a relief:

G1: *It's reality. The map shows you a small size. The really relief is somewhat big and somewhat got life.*

G2: *I don't understand... to me it seems as if the map shows us the parts (where) we are, those places we are concerning about. The relief shows us the country as a whole.*

C2: *The relief tells us about the mountains and the rivers, it does not tell us about the land.*

C1: *A map shows you where the relief is and how it is built.*

PE1&2: No reply.

Question 4c did not present the teachers with any difficulties. Although the terms, 'plateau', 'escarpment', and 'plateau slopes' are not established in the passage, the teachers appear to have worked them out for themselves.

Question 6 presented only T1 with difficulties:

T1: *I can't understand it. I'm not sure.*

(T1 was also unable to identify the base of the saucer correctly). For the other teachers, however, identifying the base of the saucer and comparing it to the relief of SA presented no difficulties. It is interesting to note one teacher's comment on the inappropriacy of the textbook illustration:

G1: *The book can confuse the child because the escarpment on the west is lower and the saucer doesn't show this. Also the saucer is round but the relief of SA is not round so the kids will be confused. It is not a good example*

Q8: *Read paragraph C, page 46. If I stand at the bottom of Mont-Aux-Sources and I want to climb to the top of the mountain, will I have to climb 3480 metres to get to the top?*

The responses to this question reveal the effect of applying the term 'height above sea level', before establishing it clearly in the mind of the reader. Four teachers said 'yes', one thought so, and one was not sure. C1 and C2 thought it would be more than 3480m to the top.

C1&2: *I don't think so because the land and the sea measurements is not the same. So I'm sure it will be more than that.*

Obscure reference

Q7 *Look at Figure 26. What is it a picture of?*

The obscure reference to this uninterpretable diagram, and to the line of mountains within it, misled the teachers. For example:

G1: *A cross-section of eastern part of SA.*

G2: *It is a relief of SA.*

T2: *It is a picture of the saucer turned like this (right side up).*

T2: *I disagree, it is like this (upside down).*

Q: *What else is it a picture of?*

T1: *It shows the oceans...*

T2: *...mmm the mountains and the towns.*

PE2: *The relief of SA looks like an upturned saucer.*

Q: *Can you show me the line of mountains in this picture?*

All agreed (incorrectly) that the line of mountains stretched from the Kamiesberg in the west to the Drakensberg in the east; from coast to coast, over the plateau (which the diagram leads one to believe is the case).

Q10: *Look at Figure 27 and read paragraphs d and f on pages 46. Now cover Figure 27 and read paragraphs d and f and point out on the model (supplied):*

- The plateau slopes (where they start and end)
- The coastal plain (where it starts and ends)
- The escarpment (where it starts and ends)
- The plateau (where it starts and ends)

as instructed by the text.

Q: *The plateau slopes*

Only one pair of teachers did not have problems identifying the plateau slopes. The others were confused by the obscure explanations in the text and the poorly labelled diagram:

C1: *The Transkei and Tugela valley, here (pointing at the right places). They start in the Transkei and end in the Tugela valley.*

C2: *I'm sure its really what she says, as the plateau slopes is between the sea and the land. The example is the Transkei – so the plateau slopes are this part – Eastern slopes of the Drakensberg, between the Transkei and Tugela valley.*

C1: *I'm not sure if there are plateau slopes anywhere else.*

C2: *Its the only part that shows us the plateau slopes - though other parts may have plateau slopes, they are not the same as these on the eastern slopes.*

C1: *I'm not sure if there are any on the west side, I'm sure there must be but it (the book) doesn't show us where.*

T1&2: (Pointed to the mountains on the plateau - incorrectly)

PE1: (Pointed along the east and south sides of mountains and (incorrectly) to the mountains on the plateau)

PE2: (Pointed along the tops of the Langeberg and Outeniqua mountains - incorrectly)

Q: Coastal plain

All teachers correctly identified the low-lying flat parts near the sea, but were not sure of where the coastal plain ends and the plateau slopes begin:

G1: *Coastal plain is from the sea, just right up but just before you get to the escarpment. There is no boundary - say half way up to the escarpment - all the way round (Natal to Namibia)... it is a low-lying area after the mountains.*

G2: *It is a low-lying area from the mountains to the sea.... Yes from here (coast) up to here (midway up the side of the Drakensberg).*

G1: *Yes, the coastal plain is part of the plateau slopes.*

G2: *mmmm (unsure)*

G1: *Some parts are coastal plain - but it is still sloping down from the escarpment...*

Q: Escarpment

Only two teachers C1 and C2, were not sure of the escarpment. The only explanation they could give was:

C1&2: *We are used to the book words. There is no other explanation - the mountains that form the edge of the plateau.*

Q: Plateau

G1 and G2 were sure of the east-west spread of the plateau, but not of its north-south area. They were also confused by the Magaliesberg and Witwatersrand mountains on the plateau. It is interesting to note that T1 and T2, although they could point out and describe the escarpment clearly, they could not distinguish between it and the plateau:

T1: *The plateau is also the escarpment.*

T2: *Yes.*

Q: You say, the plateau is the escarpment?

T1&2: *Yes.*

Propositional deficiency

Q8b: Read the last sentence of the second paragraph. The Nuweveld, Stormberg, Sneeuwberg and the Drakensberg are only a few what?

The teachers were unable to supply the missing information properly. Seven out of the eight thought they were 'mountains', while they are actually 'mountain ranges'. G2 appeared to be completely confused:

G2: *They were talking about the height - a few... now we don't know... a few metres up or a few mountains? It is rather confusing.*

Cohesion devices

Questions 3, 5 and 9 focus on aspects of reference within the passage. The referents in questions 3 and 5 are apparently transparent as they did not present teachers with any difficulties. Question 9 did cause confusion because its referents are obscure, and have not been properly established.

Q9: Read paragraph e) on page 46. Are the Magaliesberg, Waterberg, Soutpansberg and the Witwatersrand part of the plateau?

Five teachers incorrectly said 'no', while three said 'yes'. G1 explains the confusion:

G1: *Because we don't know from where the plateau stretches... so we take it that the whole area of the Transvaal with the escarpment is the plateau, with the exception of some hills and mountains.*

POST-READING QUESTIONS

Thematic incoherence

Only question 3 presented the readers with difficulties. Only G1 and PE1 could recall what the passage told about the Witwatersrand. The others could not. This is mainly because it is not a major theme anyway, and was probably not a good topic to focus attention on in the question.

PASSAGE 3 - THE CLIMATE OF THE RSA (PAGES 47-48).

PRE-READING QUESTIONS

Background knowledge

Of the four terms, 'climate', 'drought', 'climatic zone' and 'rain-bearing wind' in questions 1-4, the last two seemed to be unknown to most of the interviewees.

Q3: What is a climatic zone?

G1 and 2 seemed to understand, while the rest were uncertain:

C2: *Climate of that part... (no answer)*

C1: *...that particular part.*

T2: *No, I don't know.*

T1: *It is the climate of that particular area - I think so.*

PE1&2: *Not sure.*

Q4: What is a rain-bearing wind? Tell what you know about rain-bearing winds in South Africa.

G1 and G2 and PE1 and PE2 seemed to have a fairly good understanding of rain-bearing winds, however, the same could not be said for the others:

C1: *Near the coast... it is to do with the temperature and the weather.*

C2: *Along the coast it is always drizzling because of the weather.*

C1: *If it is windy, you expect that there will be rain.*

C2: *It must drizzle if there is wind because of the moist air.*

T1: *No idea.*

T2: *I've got the idea, but it is faint. It is rain with much more wind.*

Only G1 and G2 were able to discuss rain-bearing winds in SA, while the rest did not have any knowledge of this concept.

TEXT-INTERACTION QUESTIONS

Subject-specific terms applied before their meanings are established.

Questions 1 to 3, 5 and 6 assess whether reading the passage affects the reader's understanding of key terms. In particular, they measure the impact of terms that are used without establishing their meaning properly.

Of the five questions, only question 6 did not present teachers with any difficulties. The teachers were all able to identify, on the provided model, the town which got the most rain, and give the correct reason. Questions 1 to 3 and 5, however, were more demanding and revealed that for the majority of the teachers, the terms applied in the passage were still not clearly understood after reading. The following are examples that reveal misunderstandings or uncertainties after reading the passage:

Q1: Look at page 47. (Point at 'spells' of cool, rainy weather) in the first paragraph. Do you know what this word means? Say in your own words what you think it means.

G1: ...composition or segmented.

G2: The climate there is always... er rainy in winter.

C2: How is the climate, whether it is hot or cold.

C1: How or which areas it is hot or cold.

T1: Cold... cold rainy weather.

T2: Winter.

PE1&2: In winter is usually cool and its always raining.

Q2: Can you say what rain-bearing winds are now?

Four teachers could, two were vague and two were uncertain:

C2: Before it rains there is wind. That means rain comes from moist air.

C1: Especially near the ocean, the rising of the air causes the rain-bearing winds.

PE2: It is still vague.

Q: The passage hasn't helped you understand that?

PE2: No.

PE1: Still unclear.

Q3: What is the difference between a thunderstorm and a rainstorm?

C2: In a thunderstorm there is a lot of wind, there are thunders... small rain. In a rainstorm there is wind, but strong rain that overpowers this (small) rain er...

C1: Small stones... small white stones as if they are ice-block... and strong rain. So in storm (rainstorm) everything can be damaged as compared to a thunderstorm.

PE1: A thunderstorm occurs when the day was very, very hot... and it is accompanied by the lightnings and GRR... A rainstorm I can say... eh... is just eh... eh... soft rain.

PE2: Yes, I agree.

Q5: What is the difference between a desert and a drought?

C1: They seem to be similar.

C2: Deserts are just dry, hot place... There are mountain places around this desert so though there is less rain it is not too dry...

C1: ...the influence of the moist areas around it...

C2: ...because there are mountains around this desert, so obviously where there is a mountain, there is a rain.

C1: I feel confused about it. The questions (drought and desert) look alike.

T2: I think the drought is the place where there is no rain and also the desert, there is no rain there, but I can't differentiate.

PE1: On a drought there is totally no rain, but in a desert there is rain sometimes.

Obscure reference

Questions 7 to 10 focus on the effects of obscure references on the comprehensibility of information on maps and diagrams. In this passage, the teachers did not have any difficulties interpreting the maps and diagrams. It is possible that they were more familiar with this section of the syllabus. It is also a possibility, however, that the questions about maps and illustrations for the previous two passages may have prepared them for this kind of question.

It is interesting to note, however, that the only difficulties teachers did have, were directly related to the fact that the term 'zone' had not been established in the passage. In question 8a, PE1 felt that the bar-graphs (diagrams) showed rainfall zones, as did the thick black lines on the graphs. Clearly for PE1, neither 'zones', nor 'graphs' are known. Four teachers were not sure of the answer to question 9b because they did not know what 'zone' meant:

Q9b: Which rainfall zone is Durban in? How did you work out your answer?

C1&2: Is zone the place or the area? I'm not sure.

T1: Durban gets mainly rain in summer, so the zone is the...

PE1: It shows that Durban gets more rain. I don't know whether I'm asking or answering the question.

Thematic incoherence and propositional deficiency

The confused answers to question 4 reveal the cumulative impact of using subject-specific terms, the meanings of which have not been established; propositional deficiency, and thematic incoherence on the teachers' comprehension:

Q4: Why is there a desert along the west coast of southern Africa?

C1: It is a desert it is dry. So as you go along the coast it becomes warm, not drier like inland, since there is too much rain falls there along the coast than the middle part. Maybe the mountains can cause the rain, but the desert its open veld.

C2: Its too hot and there is no rain.

Q: So the reason why there is a desert along the west coast is for the reasons you told me?

C1: We are not sure, we can't say the right answer. There's no desert as such since along the west coast, there's rain all the time it ought to rain all the time.

T1: Yes, along the coast of SA it is dry, so that is why we are having deserts.

T2: Yes.

POST-READING QUESTIONS

Thematic incoherence and propositional deficiency

Interviewees responses to question 1 reveal that because the passage is thematically incoherent, it is difficult to identify the two most significant topics in the passage. Some teachers even suggest topics that are not mentioned in the passage:

Q1: *What are the two most important things this passage tells us?*

C1: *The climate is the temperature and the rainfall.*

C2: *Yes*

PE1: *Currents... the drought.*

PE2: *The bearing winds... the drought*

The answers to questions 2 and 3 reveal that thematic incoherence does not facilitate the reader's attempts to link information from different parts of the text. This is particularly the case when obscure references make it difficult to locate referents, and when subject-specific terms (which are sometimes the referents) have not been established:

Q2: *Is this possible in areas where there are thunderstorms? (Explain your answer). There are two mealie farms next to each other. On one farm the mealies are green and growing well. On the other farm, next door, the mealies are dry and some are dead*

In attempting to answer this question, C1 and C2 in particular, seem to be unaware of the thematic context of the passage:

C1: *Yes, its similar to that – its raining in this part but not that part.*

C2: *It also depends on the type of soil, clay soil, sandy soil – it maybe doesn't keep the water.*

C1: *It can be warm and dry.*

C2: *It depends to the build.*

Q: *Let's say all things are the same – is it still possible?*

C2: *It depends to those people who plough, how they care for the plants...*

C1: *Yes, it is possible.*

Q: *Why is it possible?*

C2: *The direction of the thunderstorm and the winds are blowing. So if it comes this direction (east) the plants can stand – from that side (west) they will fall...*

TI&2: *No, it is not possible.*

PE2: *No reply.*

Q3: *What do you think is the main difference between: a map showing rainfall zones and a map showing average annual rainfall?*

The responses to this question reveal that the differences between the two terms 'rainfall zones' and 'average annual rainfall' are not clearly established. Together with the thematic incoherence of the passage, the result is confusion.

G1: *It tells about the amount of rain per month.*

G2: *The amount of rain falling in that particular area.*

G1: *So that yields that type of climate.*

C2: *It tells us how much rain each zone gets and when it get rain.*

C1: *Areas like Durban get more rain and some areas get 250mm.*

TI: *Average will be the possible rainfall in that time, and rainfall zone is known or constant.*

PE1: *I should think on this map (average annual rainfall) there is plenty of rain. On this (zones)... I think the rain is scarce. As it has got the rain-bearing winds, there are certain places that do not get rain.*

Notice that although the teachers appeared to be able to interpret Maps I and 2 (questions 9 and 10), the above answers suggest that their understanding of these maps is superficial. This lends weight to the possibility that the map questions in the first two passages prepared the teachers for this kind of question in the third and last passage.

4.4 STRUCTURED INTERVIEW 2 – AUGUST/SEPTEMBER 1989

READABILITY AND COMPREHENSIBILITY OF THE REWRITTEN PASSAGES FOR STD 3 TEACHERS (APPENDIX 3)

The textbook passages were rewritten for this interview (see pages 62-91), with the express purpose of making them as readable and comprehensible as possible for the intended readers. In order to note any significant differences between the textbook passages and the rewritten passages, it was essential to interview the same teachers.

ANALYSIS OF THE DATA – REWRITTEN PASSAGES

As a preliminary step to determine how much the teachers' background knowledge could be expected to have changed since the textbook interview, seven months earlier, the following pre-interview question was asked:

Q: *When I interviewed you earlier this year, there were some things you were not sure about. Have you been able to find out about some of those things this year?*

Four teachers claimed that they had tried and four had not. However, none of the four who had tried were able to say what they had discovered. It is hoped that by analyzing the responses to the pre-reading questions for each of the three passages, it will be possible to determine whether the teachers' background knowledge had changed significantly enough to influence the data.

PASSAGE 1 – MINING IN SOUTH AFRICA (PAGES 62-69)

PRE-READING QUESTIONS

Background knowledge

The interviewees' responses revealed no significant change in background knowledge for questions 2, 3 and 4. There were however indications that some teachers had gained new knowledge for questions 1, 5 and 6. Those responses that reveal changes are cited below:

Q1: *Do you know what minerals are? Tell me what you know about minerals*

Textbook interview:

PE1&2: *Is it not production of soil?*

Rewritten passage:

PE1: *Yes, they are raw materials from deep down the ground, for example: gold, diamond, copper, etc.*

Q5: *Have you ever seen a mine?*

PE1, who had not seen a mine at the last interview, had seen a coal mine on television since then, and was familiar with:

...shafts and the people who were working there. The other one's driving a small train, taking the coal outside.

Q6: *Do you know where gold is mined in SA? Can you give me any details?*

At the previous interview only one teacher had been able to name a gold mining town. This time several teachers tried, but were nevertheless still inaccurate or incorrect:

G1: *Johannesburg... Heidelberg, Vanderbijlpark - I'm not sure.*

C1: *Johannesburg and places around it.*

T1: *Kimberly, Phalaborwa.*

It would seem, therefore, that although some teachers' background knowledge had changed slightly, it was not significant enough to give them a knowledge advantage when reading this rewritten passage. In some cases, the new knowledge was incorrect anyway, which if anything, would put the rewritten passage to the test.

TEXT-INTERACTION QUESTIONS

Subject-specific terms

Questions 2 and 3a determine whether reading the passage has clearly established the meanings of the terms 'minerals' and 'arc'. Answers to question 2 show that the readers are aware of the fact that only some raw materials are minerals, and that these are mined. It is significant that the teachers do not confuse minerals with raw materials (such as water and wood) as they did in the previous interview.

After the rewritten passage:

G1: *Minerals are raw materials that come from under the ground.*

T2: *Minerals are raw materials that are found from the mines.*

Compare minerals listed after the textbook passage: T2: *Coal, iron, gold, wood;* with those listed after rewritten passage: T2: *...gold, iron, coal and diamonds.*

Answers to question 3a, show that after the rewritten passage every teacher had a clear idea about what an arc was:

G1&PE2: *Curve shape... C-shaped.*

G2: *...like the back of a bean.*

C2: *Shaped like a horseshoe.*

T1: *Like a boat shape.*

PE1: *Like an upturned saucer.*

Reference

To test whether the teachers could apply their new understanding of the word 'arc', they were asked to identify the arc on the map and to name three gold mining towns (questions 3b and c). Unlike the textbook interview, when no teacher could identify the arc on the map, every teacher now identified the arc and three mining towns in it correctly. This is attributable to the integration of the map and the key into the text, and to clear references to obvious referents on the map. The same applies to question 9 which requires the reader to complete a task using the same map. All teachers were able to complete the task correctly.

Question 6 assesses the clarity of the illustration of the inside of a mine and how clear the references to its components are. In the textbook passage, the teachers had difficulty using the key to Figure 54. Consequently, they could not identify the main gold reef, and confused items in that diagram. In the rewritten passage, however, every teacher was able to identify all items correctly, with little hesitation. All eight teachers said that they had used the numbers in the key to help them.

It would seem that the integration of illustration and key into the text, facilitates clear reference. Also note that the illustration and labels in the rewritten passage are clear and simple and show only the details referred to in the text and the key.

Question 8 again illustrates the importance of clear reference to good, simple illustrations, which support the text by illustrating only what is discussed. When compared to the variety of interpretations of Figure 55 in the textbook passage, the new illustrations seem to support the rewritten passage and reinforce meaning. Compare the following responses.

After the textbook passage. Figure 55 shows:

G2: *Value of gold.*

G1: *Value of gold.*

C1&2: *How much gold we have.*

T2: *The role of gold.*

T1: *How SA gets gold.*

After the rewritten passages. The pictures show:

G1: *The value of selling gold, other goods and diamonds.*

G2: *How gold earns money.*

C2: *More money comes from selling gold... much money from selling goods, also less money for selling diamonds.*

T2: *Money from selling gold... money from selling goods... money which comes from selling diamonds.*

PE1&2: *We get that money... from selling gold and diamonds.*

Propositional (informational) deficiency versus explicitness

Question 7 focuses on the effect of propositional explicitness in the paragraph - *Gold brings much money to South Africa*. The correct answers from every teacher strongly suggest that the propositionally explicit paragraph facilitated comprehension.

Cohesion devices

Question 5c provides some interesting information:

Q5c: (Point to 'when this happens' in the seventh line of the paragraph – paragraph 2 page 64). What does 'this' refer to?

The referent of the anaphoric reference 'this', was correctly identified by five of the eight teachers. The other three had difficulties as they identified incorrect referents:

G2: *When the great rocks fall on them.*

T2: *If there is any irregularity or when the great rocks fall on them.*

T1: *Danger.*

This particular reference was intended to be clearer than a similar reference in the textbook passage (question 9), with which all of the teachers had difficulty. That five teachers identified the referent correctly, is partly because it was relatively close to the reference (the previous sentence), and it was within the same paragraph (unlike one of the referents in the textbook passage).

However, the fact that three teachers did not locate the referent, could have been because this is in a particularly long paragraph. This suggests that paragraph length might be another factor affecting the readability of texts intended for the ESL reader.

Thematic coherence

Q5a: Read the last paragraph on page 64 – (The long paragraph referred to above) Can you think of a title or a heading for this paragraph? Five teachers were able to give appropriate titles:

C1&2,&G1: *How gold is dug/mined.*

PE1&T1: *The gold mines in SA/Gold mine.*

G2 and T2 gave fairly unsuitable titles. This shows that they had not been able to identify the main idea of the paragraph; and PE2 identified one of the sub-topics of the paragraph as the main idea:

G2: *The invention of gold.*

T2: *The development of gold mines in SA.*

PE2: *The duty of the engineers.*

PE2 probably had difficulty identifying a title because the paragraph was too long. It may have been better had the topic of 'engineers' been dealt with in a separate paragraph. Nevertheless, for five out of eight to have given appropriate titles is a marked improvement over the variety of inappropriate titles given for a comparable paragraph in the textbook. This is attributable, in the rewritten passage, to the prominence given to the main idea by the logical development of the topic line.

Question 5c is a comprehension question that depends on thematic coherence for its answers. Since all teachers answered the question correctly, it may be concluded that this section of the paragraph is thematically coherent. This seems to confirm that thematic coherence facilitates reading comprehension.

POST-READING QUESTIONS

Thematic coherence

Questions 1 to 5 all focus on the effects of thematic coherence on comprehension. The answers to question 1 reveal a significantly higher degree of similarity in the main topics identified for the rewritten passage, than for the textbook passage. The two most important facts the rewritten passage tells us:

G2: *The value of minerals and...*

...the difficulty of getting them out of the ground.

G1: *Where minerals are found.*

How they are found.

C1: *How gold is mined.*

How we get money.

C2: *Where we get this gold.*

How gold is mined.

T2: *Raw materials and minerals (mines give us minerals).*

Different kinds of minerals.

T1: *Mining and minerals.*

Mining engineers.

PE1&2: *Mining in the RSA.*

The importance of exports and imports.

It is interesting to note that only one teacher did not accurately recall what the passage told about minerals. T1, it seems, was still confused about the difference between raw materials and minerals; in spite of her earlier clear explanation of the difference. It is significant to note, however, that her confused ideas can be traced directly back to the textbook passage (see below). This suggests that reading the rewritten passage only once, was not sufficient to correct the misleading information she has probably been relying on in the textbook for years:

T1: Yes, minerals are so important even in our classrooms we are using desks which are from wood which is from the soil and in the soil there are minerals. And we need iron which also comes from copper right down in the soil.

As was the case for the textbook passage, question 3 for the rewritten passage did not present any difficulties. Although the teachers did not recall everything about mines in SA for question 4, what they did recall was correct. These accurate answers provide further evidence to suggest that the thematic coherence of the passage did facilitate reading and comprehension.

PASSAGE 2 – THE LAND OF SOUTH AFRICA (PAGES 70-77)

PRE-READING QUESTIONS

Background knowledge

In this interview, as in the textbook interview, the terms 'slope' and 'mountain range' did not present problems. 'Plateau', a concept the teachers seemed to have a fairly clear knowledge of in the textbook interview, seemed less clear to at least three teachers before reading the rewritten passages:

T1: *The edge of the mountain or the escarpment of the mountain. The ending of the mountain.*

PE1&2: *A flat piece of land just above sea water level.*

The word 'relief' which was not clear to at least three of the teachers in the textbook interview, was still unclear for C1 and C2,

C1&2: *A type of weather.*

T1, however, had learned something:

T1: *Last time I correlated the relief with the climate – the 'relief rain'. But when I went back I saw from the textbook that the relief is the same word as the build.*

T1's misunderstanding of 'relief' in the textbook interview provides an interesting example of how the ESL reader's application of what is probably the only 'known meaning' of a word can affect meaning in a new context. This example highlights the importance of establishing the meaning of register terms before applying them; and where possible, to provide semantic reinforcement. For this reason, it seems, the word 'spacerocket' in the rewritten passage is more appropriate than 'spaceship'. (Notice the appropriacy in this context of 'rocket' versus 'ship', which caused confusion in the textbook interview.)

That five of the eight teachers were still unsure of the meaning of 'space' in this context, suggests that it is a concept that needs to be more clearly established. See, for example, the following confused responses to question 1b of the text-interaction section on the rewritten passage:

C1&2: *Is it not the space between mountains?*

T1: *It is something like a parachute.*

PE1&2: *Don't know.*

TEXT-INTERACTION QUESTIONS

Subject-specific terms

As the readability of the textbook passage was clearly reduced by the number of unknown register terms, care was taken to establish the meanings of each of these terms in the rewritten passage before applying them. For this reason, many of the questions on this rewritten passage (1, 5, 7, 8, 9, 10 and 11), discussed below, focus on register terms. This was done in order to assess the effect of establishing their meanings before applying them.

In an attempt to produce a 'predictive' heading that would activate appropriate background knowledge for the passage, the word 'space' was replaced by the expression 'from high up in the sky'. Question 1 assesses the effectiveness of this alteration. The following responses show a very clear improvement in this crucial area. This suggests that the teachers were more appropriately prepared for the discussion of relief than they were by the textbook passage:

G1: *When you are high up and you look down.*

C1: *One who goes up in the sky and looks and see what is on the ground.*

T1: *What does he see from in the sky.*

Questions 2b and c determine whether the passage has in any way improved the readers understanding of the word 'space' in this context. The following

responses show a clear improvement for C1 and C2 who were confused in the textbook interview. Compare:

After textbook passage

C1&2: *...between the sea and the river, there is a space between them. Even between the mountains and the river there is a space, but the more space, it is between the sea and the mountains.*

After rewritten passage

C1&2: *Below the earth – above the sky.*

Apart from these two teachers, the understanding of space and where it is, was not significantly different for the rest of the teachers who had showed reasonable understanding in the textbook interview.

Question 5a attempts to determine whether the rewritten passage helped the teachers to understand the distinction between a relief and a map more clearly than the textbook did. Three teachers felt that there was a difference between these concepts while the rest were sure that there was not. The attempts of those who did see a difference, to explain the differences, were no clearer than they were in the textbook interview. This suggests that either that the attempts to differentiate between them in the rewritten passage were not adequate, or that these concepts and the differences between them are more complex than they seem, and need much more careful explanation.

Question 5b determines whether or not there has been any change in the teachers' understanding of what happens to rain falling on the four main relief features of SA. There was no change. All the teachers explained the processes correctly in both interviews.

Question 7 determines whether or not there has been a change in the understanding of 'height above sea-level' (question 8a of the textbook interview). In the textbook interview none of the teachers showed an understanding of this concept. After reading the rewritten passage, four teachers had a much clearer understanding, and were able to answer correctly. They realized that the foot of a mountain was not at sea-level. However, three teachers' explanations revealed that there was still underlying confusion:

T1: *Because Mon-aux-Sources is near to the sea and it is the lowest land near the sea. So you cannot climb 3480m.*

T2: *Because you are at the lowest...*

Q: *Where is the bottom of the mountain?*

T2: *...deep down in the soil... When you say sea-level, do you mean deep down the sea?*

PE2: *No. Because the land below Mont-aux-Sources is the sea... more because the sea is deep.*

These responses indicate that even with the attempts to explain complex concepts in more accessible terms in the rewritten passage, a lot of background knowledge is assumed by the inclusion of such terms.

Questions 8 to 11 all assess the teachers understanding of the register terms 'mountain range', 'escarpment', 'plateau', 'coastal plain' and 'plateau slopes'. As in the textbook interview, the teachers did not have any difficulty in explaining these terms. It was noticeable, however, that their explanations

were clearer and more precise in this interview than in the textbook interview. Compare for example G1's explanation of the escarpment:

After textbook interview

G1: *Is from just near the Limpopo river right round to the west to SWA somewhere.*

After rewritten passage

G1: *The line along the top of the highest mountains.*

Obscure reference

Questions 3, 4 and 12 focus on the impact of clear references to clearly illustrated and labelled referents on maps and diagrams.

Q3: *Look at the picture on page 72. What is it a picture of? Can you show me the line of mountains in the picture?*

The fact that every teacher identified both the picture as the relief of SA, and the line of mountains correctly, is in stark contrast to the difficulties they had answering questions about the textbook illustration.

Question 4 is intended to illustrate the impact of a clear, simple map accompanied by an equally simple key. It is significant, when compared with the confused responses to Figure 25 in the textbook, that all eight teachers identified the 'line of mountains' correctly, and that only two did not identify the 'low flat land' of the coastal plain correctly.

Question 12 on the rewritten passage (question 10 on the textbook passage) assesses the impact of already clearly established register terms on the teachers' ability to identify the features of the relief of SA on a three-dimensional model. In contrast to the numerous difficulties most teachers had identifying these features after reading the textbook passage, the teachers were able to identify the features with ease after reading the rewritten passage. Compare for example:

After textbook passage

Six teachers were unsure about exactly where the plateau slopes were; none of the teachers was sure of the boundary between the coastal plain and the plateau slopes; two were not sure about the escarpment, and four were uncertain about the plateau.

After rewritten passage

Only one teacher was uncertain about the plateau slopes:

T1: *I'm not quite sure. I know them theoretically, but I'm confused on the model.*

Cohesion devices

Questions 2 and 6 on the rewritten passage (questions 3 and 5 on the textbook passage), focus on cohesion devices that did not seem to present the teachers with difficulties in either passage. However, question 9c (9 on textbook passage) does provide evidence to show how clear reference facilitates reading comprehension. Compare the following examples:

Q9/9c: *Are the Magaliesberg, Waterberg, Soutpansberg and the Witwatersrand part of the plateau?*

After textbook passage

Five teachers answered incorrectly. Their confusion was explained by G1:

G1: *I don't know from where to where the plateau stretches.*

After rewritten passage

Only one teacher did not understand the extent of the plateau and that the Magaliesberg, etc. were part of it.

POST-READING QUESTIONS

Thematic coherence

As an alternative to the three questions focusing on thematic coherence at the end of the textbook passage, it was decided to give the teachers a task that tested both the thematic coherence of the passage, and how well the meanings of four key register terms had been established. All eight teachers completed the task correctly, with only one confusing the plateau and the escarpment. This suggests that the passage is thematically coherent and that the meanings of the concepts are clearly established.

PASSAGE 3 – THE WEATHER IN SOUTH AFRICA (PAGES 78-91)

PRE-READING QUESTIONS

Background knowledge

As it was clearly established in the textbook interview that 'climatic zone' was not understood, and that the syllabus did not require an understanding of the term, it was decided that the exclusion of this term from the passage would not deprive the learner of any significant information at this stage.

Questions 1 to 3 on the rewritten passage are intended to determine how much the teachers' background knowledge had changed since the textbook interview. As in the textbook interview, 'climate' and 'drought' were fairly well understood before reading the rewritten passage. This revealed at least some background knowledge. There seemed to be no significant changes in this regard. The readers' knowledge had changed about 'rain-bearing winds'. All the teachers were able to describe them, but only G1 and G2 (as in the textbook interview) were able to apply the term to South Africa's climatic conditions. This suggests that reading the textbook passage for Interview 1 was the only new information the teachers had gained in terms of background knowledge.

TEXT-INTERACTION QUESTIONS

Subject-specific terms

Questions 1, 2, 4, 5 and 7 of this section assess the effects on comprehensibility of establishing the meanings of terms clearly before applying them. In the textbook interview teachers did not have any difficulty explaining 'drought' and 'climate'. It was not surprising, therefore, to find that they did not have any difficulty with these terms in questions 1 and 5 of the rewritten passage. However, the improvement in the teachers' answers to questions 2, 4 and 7 after reading the rewritten passage is marked. All eight teachers had very clear ideas about rain-bearing winds (question 2). Compare for example:

After textbook passage

PE2: *It is still vague.*

PE1: *Still unclear.*

C2: *Before it rains there is wind that means rain comes from moist air.*

After rewritten passage

PE1: *Winds that bring rain from the sea...*

PE2: *...from the sea to the land.*

C2: *The wind which comes from the sea, because they will bring rain.*

After reading the rewritten passage, the teachers again showed a clearer understanding of the differences between thunderstorm and a rainstorm:

After textbook passage

PE1: *A thunderstorm occurs when the day was very, very hot... and it is accompanied by lightning and GRR... A rainstorm... eh... is just... eh... soft rain.*

PE2: *Yes, I agree.*

After rewritten passage

PE1: *In a rainstorm the whole area is getting rain, but in a thunderstorm certain places getting rain and other places do not.*

PE2: *In a thunderstorm there is that thunder and that flashing of lightning. It is not in a rainstorm.*

Question 7's answers show that teachers understood the difference between a desert and a drought better than they did after reading the textbook passage. Compare for example:

After textbook passage

C1: *They seem to be similar... I feel confused about it. The questions (drought and desert) look alike.*

C2: *Deserts are just dry, hot place... There are mountain places around this desert. So though there is less rain, it is not too dry... because there are mountains around this desert. So obviously where there is a mountain, there is rain.*

After rewritten passage

C1: *A desert is a place where there is no rain. The plants there is too little – didn't get enough rain. The drought is where there is dry and no rainfall for that moment – its not like this (a desert).*

C2: *In a desert the weather... the climate is the same all year round. A drought is a special dryness for that particular time.*

In each of the above cases it would seem that improved comprehension is a result of two main factors. The first is that meanings of terms are properly established. The second relates to the thematic coherence of the paragraphs in which each topic line is clearly and logically developed, leaving the reader with a clear idea of what the paragraphs are about.

Thematic coherence and propositional explicitness

Questions 3a and b focus attention on the effects of thematically coherent and propositionally explicit paragraphs. The answers to these questions are

contrasted with the answers to question 4 of the text-interaction section in the textbook interview. Although the questions in the two interviews are not exactly the same, the confused attempts to answer the textbook interview question apparently reveal the effect of the thematically incoherent passage. On the other hand, after reading the rewritten passage, all eight teachers show a clearer understanding of the process resulting in a rainy, wet climate in Cape Town and a dry climate in the Karoo. Compare for example the following responses:

After textbook passage

Q4: *Why is there a desert along the west coast of South Africa?*

T1: *...along the coast of SA it is dry, so that is why we are having deserts.*

T2: *Yes.*

C1: *It is a desert it is dry. So as you go along the coast it becomes warm, not drier like inland. Since there's too much rain falls there along the coast than the middle part. Maybe the mountains can cause the rain, but the desert is open veld... We are not sure, we can't say the right answer. There's no desert as such since along the west coast, there's rain all the time, it ought to rain all the time.*

Notice that although C1 comes close to some understanding, she appears to be confused, because she thinks that rain on the east coast means that there is also rain 'all the time' on the west coast.

After rewritten passage

Q4a: *What makes the weather rainy and wet in Cape Town?*

T1: *The first point. There are rain-bearing winds in Cape Town, and the second things is that there are high mountains near Cape Town.*

Q4b: *Why is the land often dry in the Little Karoo?*

T1: *In the Little Karoo, first it is in the inland. It is not near the sea so there is a desert. There is no rain in the Little Karoo because it is right in the inland, so it is dry...*

T2: *... the mountains stop the big clouds from getting to the Little Karoo.*

POST-READING QUESTIONS

Thematic coherence

Both questions 1 and 2 focus on thematic coherence. They are intended, when compared to the responses for the same questions in the textbook interview, to show that improved thematic coherence does facilitate comprehension. Both questions require readers to extract ideas from the text and show their understanding by explaining them in new situations, outside the text.

For question 1, teachers' responses after the textbook passage, revealed that they had not fully understood the discussion on thunderstorms. The rewritten passage, on the other hand, succeeded in making its point. Compare, for example, the following answers to question 1:

After textbook passage

C2: *...depends on the type of soil, clay soil ... it depends to the build... it depends to those people who plough... The direction of the thunderstorm and winds are blowing, so if it comes this direction, the plants can stand – from that side they will fall...*

After rewritten passage

C2: *Yes, it is possible... can be a thunderstorm here and no thunderstorm here.*

Because the responses to question 2 in the textbook interview revealed that the difference between 'rainfall zones' and 'average annual rainfall' was not understood, and the distinction was not required by the syllabus, these terms were omitted from the rewritten passage. Instead, the text and map headings clearly explained, in simpler terms, what each map showed. This appeared to assist the teachers, as all eight had clear ideas about the differences between these concepts and there were no signs of confusion.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 DISCUSSION OF THE FINDINGS OF THE DATA ANALYSIS IN CHAPTER 4

THE INITIAL SURVEY, APRIL/MAY 1987: TEACHING AND LEARNING CONTENT SUBJECTS IN STD 3:

The initial survey confirmed:

- The absence of continuity in the transition from mother-tongue to English-medium instruction
- The pupils' low level of language competence
- The mismatch between content subject textbooks and their Std 3 users
- A heavy reliance on rote learning.

The survey provides significant evidence to suggest that a further source of difficulty is that teachers also experience reading and comprehension problems with the textbooks. Most significant for this study, however, is the finding that pupils are unable to read the textbooks intended for them. The main reasons for this are:

- The language of the textbooks is too difficult
- Textbook tasks and exercises are beyond the pupils' ability because they are expressed in incomprehensible language and are conceptually too difficult.

STRUCTURED INTERVIEW 1, PART 1 – APRIL/MAY 1989: TEACHING AND LEARNING GEOGRAPHY IN STD 3

The findings from this interview, show that there was little or no change in the teaching and learning situation over the two-year period between interviews. This suggests that the description of the situation in the initial survey is accurate and reliable. The interview confirms that the three main sources of difficulty in teaching and learning geography are:

- Pupils' linguistic incompetence (particularly reading)
- Incomprehensible textbooks
- Inappropriate teaching and learning methods (specifically rote learning).

Since pupils in the interviewees' classes cannot and do not read the geography textbooks intended for them, they are entirely dependant on their teachers for what they learn. If the teacher, relying heavily on the textbook for lesson content, determines both the quality and the content of the lessons; then the nature of the teacher's interaction with the textbook is crucial. To show that teachers have problems reading and comprehending textbooks intended for their pupils, would provide evidence that such textbooks are wholly unsuitable for pupils in their first year of EMI. The focus of the research, therefore, was shifted *from the pupil to the teacher*.

The first part of this interview did not seem to confirm that the teachers had significant difficulties reading and comprehending the textbooks. Only one teacher regarded the textbook as difficult. This perception was, however, disproved in the second part of the interview which focused on the teachers' actual comprehension.

STRUCTURED INTERVIEW 1, PART 2, APRIL/MAY 1989 – THE READABILITY AND COMPREHENSIBILITY OF GEOGRAPHY TEXTBOOKS FOR STD 3 TEACHERS

It was shown in each of the textbook interviews, that as a result of the failure of the passages as well-constructed expository discourse, the teachers did have a number of comprehension problems. It is important to note that there were no significant differences between the difficulties experienced by the rural and the urban teachers.

Teachers experiences the following reading and comprehension difficulties:

- A lack of background knowledge necessary to interact meaningfully with the texts
- They misinterpreted, misunderstood or did not know the meanings of terms whose meanings were not established in the texts
- They misunderstood whole sections of the texts because the meanings of subject-specific terms had not been established clearly
- An inability to work out the meanings of unknown vocabulary because of the absence of semantic reinforcement
- In some cases they failed to respond to exemplification and, therefore, were unable to generalize from obscure examples
- They were often unable to locate or identify important referents on supporting maps and diagrams because references to them were obscure. This was complicated in the texts by confusing labels on equally confusing illustrations
- They did not use 'keys' to maps and diagrams until prompted – probably because the concept was not fully understood, and was not established in the texts
- A difficulty in interpreting and extracting information from the often uninterpretable two and three-dimensional maps and diagrams
- They were sometimes unable to locate referents within the passages because of obscure cohesive links
- They were often unable to supply information omitted from propositionally deficient passages
- They found it difficult to identify major topics and main ideas because of thematic incoherence within and across paragraphs.

These difficulties are especially significant because texts such as those analyzed in this investigation are actually intended for pupils in their first year of EMI. They are not designed especially for their teachers.

STRUCTURED INTERVIEW 2, AUGUST/SEPTEMBER 1989: THE READABILITY AND COMPREHENSIBILITY OF THE REWRITTEN PASSAGES FOR STD 3 TEACHERS

It was shown in each of the interviews, that the rewritten passages facilitated the Std 3 teachers' reading and comprehension in the following ways:

- Because a background of accessible experience was provided in the passages, teachers generally had available the background knowledge necessary to interact meaning fully with the texts.
- Because the meanings of subject-specific vocabulary were established before their application, teachers did not have difficulty understanding them.

- Because subject-specific terms had been clearly established, teachers did not misunderstand whole sections of the texts.
- Because semantic reinforcement was provided, teachers were able to work out the meanings of unknown terms.
- Because attempts were made to make references in the passages as clear as possible, teachers were able to locate and identify almost every referent on supporting maps and diagrams. Also, illustrations and labels were made as simple and clear as possible.
- Teachers were able to use 'keys' to maps and diagrams successfully. This is probably because of their integration into the texts, making references more direct. Also, it was not assumed that the readers were familiar with this convention, and semantic and discourse support was provided where necessary.
- Teachers were able to interpret and extract information from all maps and diagrams. This was apparently because of the inclusion of only those details referred to in the text and the key, thus avoiding unnecessary details. In addition, illustrations were simpler.
- Because cohesive links were made as obvious as possible, teachers were generally more able to locate referents within the passages.
- Because care was taken to state the obvious, teachers did not have to supply missing information in and between paragraphs.
- Because attempts were made to produce thematically coherent texts, teachers were successful in identifying major topics and ideas.

It was, however, also shown that teachers did experience some difficulties with the rewritten passages. The first two listed below appear to be associated with the teachers' reading competence and conceptual awareness respectively, while the third was a design fault in the rewriting of the particular passage.

AN EXTENDED SECOND PARAGRAPH ON THE THIRD PAGE OF PASSAGE 1:

In spite of the obvious cohesive links and thematic coherence, some teachers found it difficult to identify a referent and the main idea in a paragraph that appears to be too long

A FEW REGISTER TERMS IN PASSAGE 2:

Teachers' difficulties with the following terms revealed that the passage failed to establish their meanings: 'space', 'relief', 'height above sea-level'.

THE LOCATION OF THE KEY TO A MAP IN PASSAGE 3:

That fact that the key to the Map on page 9 is located on page 10 caused some confusion. Until the teachers had worked out where to find the correct key, they either tried to use the key for the previous map, or guessed the answers to the question.

The cumulative effect of the above was, however, far outweighed by the overall improvement in the readability and comprehensibility of the rewritten passages over the textbook passages.

5.2 THE LIMITATIONS OF THIS INVESTIGATION

The findings of this investigation of the impact of textbooks in education in Transkei, Ciskei and Eastern Cape, do not necessarily imply that this situation

applies in black primary schools throughout South Africa. It is important to note, however, that there are at least two reasons to believe that a clear pattern of teaching and learning difficulties associated with content subject textbooks is emerging.

The first is that there is strong evidence to suggest that in Bophuthatswana and the Transvaal at least, the situation in higher primary schools is not unlike that described in this study. See Burroughs (1987); Macdonald (1986, 1987b, 1990); Van Rooyen (1990). Ellis (1984: notes) also found that pupils' general English competence was better in one of the Transkei schools involved in this study (Langaletu HPS), than in the Soweto primary schools he visited.

The second is that the work of Lanham (1986, 1987c); Burroughs (1987); Macdonald (1987b, 1990); Meyer (1989); and Van Rooyen (1990), provides evidence to suggest that a number of other higher primary content subject textbooks are also likely to be largely incomprehensible to their intended readers.

Furthermore, the possible challenge that could be raised in defense of the syllabus and the textbook – that standards are raised by setting the syllabus, and consequently textbooks, at higher levels than presently realizable – cannot be accepted as a feasible stratagem. First, these texts have been in use for at least a decade. Second, pupils cannot catch up in a given subject if they lack the medium (English), through which it is learnt.

5.3 CONCLUSIONS

This inquiry has identified problems arising from what is essentially an inability to comprehend geography textbooks on the part of not only pupils, but also teachers. The findings provide substantial evidence to show that two textbooks, approved and used widely for teaching geography in the first year of EMI, are incomprehensible to Std 3 pupils and only partially understood by their teachers. Consequently, they are used only by the teachers, whose reliance on them appears to be total. The content of geography lessons is therefore based on portions extracted from the text, partially grasped and often misunderstood; provided in largely unintegrated lists of facts extracted by the teachers; and taught mainly in the mother-tongue.

The main weaknesses of the teachers were:

- Poor levels of reading competence – revealed in their difficulties in processing partially incomprehensible textbook passages
- An inability to interpret maps and diagrams as they appear in the textbooks
- Limited knowledge of geography as a subject, revealed both in poor background knowledge, and in regarding the textbook as reflecting the syllabus
- Not recognizing the extent to which they have a language problem. This was revealed in their perception that the textbooks did not present them with any difficulties
- Methodological unsoundness revealed in: teaching unintegrated facts by rote; no learning by discovery; and repeated testing that reinforces memorization and regurgitation.

As far as the children are concerned, their inability to acquire any real understanding of geography is mainly:

- Their command of English is far below the threshold level assumed by the textbook writers and syllabus makers;
- Their cognitive preparation is inadequate.
- The method of their instruction presents only one unsuitable learning style – rote memorization and regurgitation.

The textbooks are incomprehensible mainly because they fail to account for the intended readers' linguistic and conceptual threshold levels, and because they fail extensively as well-constructed expository discourse. Specifically, they are incomprehensible as a result of the cumulative impact of:

- False assumptions about what is accessible background knowledge
- Thematic incoherence
- Propositional deficiency
- Absence of logical relations between propositions
- Obscure reference
- The meanings of unknown words and subject-specific terms not being established
- The incomprehensibility of supporting maps and diagrams.

THE RESULTS OF THIS INQUIRY CARRY AN IMPLICIT INDICTMENT OF THE FOLLOWING:

- Curriculum and syllabus designers who are out of touch with the child's reality, and ignorant of the need for continuity between the junior primary and higher primary phases; and to prepare the child linguistically and cognitively for this transition.
- Textbook writers who are either unaware or incapable of, creating readable texts for the ESL primary school child and who produce texts that give little or no evidence of recognizing the crucial nature of the language problem facing both pupils and teachers.
- Publishers who produce and market largely incomprehensible textbooks throughout southern Africa. Publishers who show little or no concern for the usability of their product; and every evidence of haste in production. For example, poor quality illustrations that are not properly integrated into the text; non-revealing headings and disorganized format; and content lacking in coherence.
- Departmental textbook committees that receive publishers' submissions, scrutinize and approve or reject them. Those committees are composed of subject specialists (for example, at the DET), who have no experience of the child or the classroom, are guilty of not acquainting themselves with the situation so as to ensure that reader and text are compatible. Committees composed of inspectors, subject advisors, and those with a knowledge of the classroom, are guilty of ignoring the realities of the primary school situation by approving inappropriate textbooks.
- Training Colleges, where trainees appear to gain little knowledge of:
 - content subjects;
 - educationally sound methods of teaching and learning; and
 - appropriate reading and writing skills.

5.4 RECOMMENDATIONS

Arising out of this investigation are the following recommendations:

- The anticipation of higher primary language and cognitive needs in the lower primary phase. English-across-the-curriculum with prescribed targets (crucial as preparation for EMI) is needed in the junior primary syllabus.
- As far as is possible a base of essential content subject concepts in the mother-tongue should be established. This should take place both in the junior primary phase and in parallel with EMI. Thus facilitating a principled transfer from the mother-tongue to EMI.
- Education authorities, publishers and textbook writers, should be informed, in precise terms, as to why and how textbooks fail.
- Textbook writers and publishers should be educated in strategies of constructing comprehensible text for ESL readers.
- Higher primary training college lecturers should be educated in methods of imparting:
 - English across-the-curriculum methods;
 - knowledge of content subjects;
 - reading, writing and visual literacy skills appropriate for content subjects;
 - learner-centred teaching methods.

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STRUCTURED INTERVIEW 1, PART 1:

Geography teaching and learning in Std 3 – May 1989

(Interview questions repeated from informal (semi-structured) interview, April – May 1987).

General questions preceding textbook interview

- 1 How do you feel your pupils are coping with geography?
(Do they find it easy or difficult?)
- 2a Can you say what they find difficult/easy?
- b Can your pupils read the geography textbook on their own?
- c Can they make notes from the textbook on their own?
- d Can they do the tasks in the textbook?
- 3a Which parts of the syllabus would you say the pupils find most difficult?
- b Which parts of the syllabus would you say the pupils find most easy?
- 4 How do pupils cope with the English used in the textbook (vocabulary, etc)?
- 5 Do they understand the maps and graphs in the textbook?
(Can they answer questions about maps and graphs?)
- 6 Do you find it easy to teach geography?
- 7 Can you say why?
What do you find difficult/easy about teaching geography?
- 8 How do you cope with the problems you experience?
(How do the difficulties influence the methods you use to teach geography?)
- 9 Do you find that you are able to teach pupils in English most of the time?
- 10a Can you describe, briefly, the steps that you normally follow in geography lessons? (What happens in your geography lessons normally: the methods you use; how much of the time you have to help pupils by explaining, etc; how much time they work on their own, and so on.)
- b How does this compare with the way you would like to teach your lessons?
- 11 What are your feelings about the prescribed textbooks? Do you ever have any difficulties understanding the language, vocabulary, or any of the content in the textbooks?
- 12a Do you have any difficulty understanding the maps, graphs illustrations, etc in the textbooks?
- b Can you say what you find difficult about them?
- 13 Would you like to comment on the problems of teaching geography in Standard Three?

STRUCTURED INTERVIEW 1, PART 2: FINAL VERSION

The readability and comprehensibility of geography textbooks for Std 3 teachers.

Questions on Passage 1

Questions to be answered before reading the passage:

Pre-reading questionsEstablishing background knowledge

- 1 Do you know what minerals are?
Tell me what you know about minerals.
- 2 Do you know what gold is?
Tell me what you know about gold.
- 3 Where does gold come from?
- 4 What is a mine?
Tell me what you know about a mine or mines.
- 5 Have you ever seen a mine?
What part of a mine have you seen? (Did you see?)
Look at the picture on page 66.
Does this picture show the part of a mine that you have seen?
Can you show me the part in this picture?
What is it called?
- 6 Do you know where gold is mined in South Africa?
Can you give me any details on where it is mined in South Africa?

Text-interaction questionsQuestions to be asked after a thorough reading of the passage

- 1 Look at page 65. (Point out the word 'minerals')
Do you know what minerals are now?
Can you give me examples of minerals in this passage?
- 2 Read the second paragraph on page 65.
Who needs raw materials like wood water coal and iron?
- 3 Look at page 66. (Point to the word 'arc' in text.)
Do you know what this word means?
Read the sentence and tell me what you think it means.
Can you show me what an arc looks like?

- 4 This passage says that Figure 53 shows you where the gold is mined.
Where is Figure 53?
Can you show me the place on the map where gold is mined?
How did you find it? (What helped you to find it?)
- 5 Read the first paragraph on page 67.
When was gold first discovered? (Would you say 50, 100, 150, or 200 years ago?)
- 6 Read the first paragraph on page 67. (After reading, point to the expression – ‘the town had grown out of the veld’)
Do you know what this expression means?
Can you explain what you think happens when a town grows out of the veld?
- 7 Look at the picture on page 66. What is this a picture of?
What do you think this green part is? (Point to main gold reef.)
What do you think this other green part is? (Point to secondary gold reef.)
What do you think this is? (Point to the headgear.)
What do you think these white parts are? (Point to passages/tunnels.)
- 8 What did you do to find out what the things in the picture were?
- 9 Look at page 67. (Point to ‘these problems’ in the last line of paragraph three.)
What do you think these problems are? (You can read the page if you want to and then tell me.)
- 10a Read the last paragraph on page 67.
Can you think of a title or a heading for this paragraph?
- b Read the last paragraph on page 67.
What does ‘money coming in’ in the last sentence mean?
Where is it coming from?
- 11 What does figure 55 show us?
How does it show us this?

Post-reading questions

Readers now close their books and answer these questions

- 1 What are the two most important things the passage tells us?
- 2 What does it tell us about minerals?
- 3 Did the passage tell us what is made with gold?
- 4 What did the passage tell about mines in South Africa?
- 5 What are the most serious problems that South African mining engineers have to solve?

Questions on Passage 2

Pre-reading questions

Questions to be asked before reading the passage

(Background knowledge and vocabulary)

- 1 Do you know what a **satellite** or a **spaceship** is?
What can you tell me about a satellite or a spaceship?
- 2 Do you know what a **plateau** is? What can you tell me about a plateau?
- 3 Do you know what a **slope** is?
What can you tell me about a slope?
- 4 What is a **mountain range**?
Can you tell me or show me what it looks like?
- 5 What is the **relief** of a country?

Text-interaction questions

Questions to be asked after reading the text

- 1 Look at page 24. (Point to the word ‘space’ in the heading.)
What does this word mean in this sentence?
- 2 Read the title and the first paragraph on page 24.
 - a Where does space begin and where does it end?
 - b Are there people in space?
 - c Have there ever been people in space?
 - d How did they get there?
 - e Who were they?
- 3 (Point to the word ‘relief’ in the fourth line of the first paragraph) What does this word tell us about in this paragraph?
- 4a Is a relief, a map?
- b What does a relief tell you that a map does not tell you?
(If answer is:
Where mountains are, then: But an ordinary map tells you where mountains are
(Show a map with name, not gradation (page 33)). So, what is the difference?)
- c What happens to rain when it falls on:
 - the plateau
 - the escarpment
 - the plateau slopes
- 5 Read the last sentence on page 24. What are the following points we are supposed to note?
Where will we find them?

- 6 Read paragraph a) on page 25. It tells of the similarity between the relief of South Africa and a saucer. (Give interviewees a saucer) Can you place this saucer on the table to illustrate the similarity between it and the relief of South Africa? Where is the base of the saucer?
- 7 Look at Figure 26. What is it a picture of?
Can you show me the line of mountains in this picture?
- 8a Read paragraph c, page 26.
If I stand at the bottom of Mont-aux-Sources and I want to climb to the top of the mountain, will I have to climb 3480 metres to get to the top?
- b Read the last sentence of the second paragraph.
The Nuweveld, Stormberg, Sneeuwberg and the Drakensberg are only a few what?
- c Read the passage about the escarpment on page 26. What does this mean? (Point to 'many mountain ranges go to make up the escarpment')
- 9 Read paragraph e) on page 27.
Are the Magaliesberg, Waterberg, Soutpansberg and the Witwatersrand part of the plateau?
- 10 Look at Figure 27 and read paragraphs d) and f) on pages 26 and 27.
Now cover Figure 27 and read paragraph d) and f) and point out (on model):
- the plateau slopes (where they start and where they end)
 - the coastal plain (where it begins and ends)
 - the escarpment (where it begins and ends)
 - the plateau (where it begins and where it ends) as instructed by the text.

Post-reading questions

Readers now close their books and answer these questions

- 1 What are the most important things that the passage tells about the relief of South Africa?
- 2 What does the passage tell about what South Africa looks like from space?
- 3 What does the passage tell about the Witwatersrand?

Questions on Passage 3.

Pre-reading questions

Questions to be answered before reading the passage (Background knowledge)

- 1 What is a climate?
- 2 What is a drought?
- 3 What is a climatic zone?
- 4 What is a rain-bearing wind?
Tell what you know about rain-bearing winds in South Africa?

Text-interaction questions

Questions to be asked after reading the passage

- 1 Look at page 28. (Point at 'spells' (of cool, rainy weather) in first paragraph). Do you know what this word means? Say in your own words what you think it means.
- 2 Can you say what rain-bearing winds are now?
- 3 What is the difference between a thunderstorm and a rainstorm?
- 4 Why is there a desert along the west coast of southern Africa?
- 5 What is the difference between a desert and a drought?
- 6 Look at the model of the relief of South Africa (provided).
(Point to positions of De Aar and East London)
Which town gets the most rain?
Can you say why?
- 7 Look at map 1 on page 29. What does it show us? What does this dark part here show? (Point to South Western Cape)
What is this dark part here? (Point to Natal area)
What is this light part here? (Point to Central Cape area)
What do these show? (Point to rain-bearing (winter) arrows)
- 8a Look at the pictures at the bottom of page 29.
What are they?
What do they show?
What are the thick black lines?
- b Tell about what the picture on the left shows.
When does Cape Town get most of its rain?
In which month does Mossel Bay get the least rain?
How much rain falls in that month?
- 9a Look at the pictures at the top of page 30.
When is the rainy season in each picture? (Summer or winter?)

- b Which rainfall zone is Durban in?
How did you work out your answer?

10a Look at the map on page 31.
What does it show?

- b Name one area which has more than 1000 millimetres of rain per year.
c How much rain falls in this area per year? (Point to Bophuthatswana region)
d How much rain falls in East London per year?

Post-reading questions

Readers now close their books and answer the questions

- 1 What are the two most important things this passage tells us?
- 2 Is this possible in areas where there are thunderstorms?
(Explain your answer)
There are two mealie farms next to each other. On one farm the mealies are green and growing well. On the other farm next door, the mealies are dry and some are dead.
- 3 What do you think is the main difference between:
 - a map showing rainfall zones?
 - a map showing average annual rainfall?

STRUCTURED INTERVIEW 2

The readability and comprehensibility of the rewritten passages for Std 3 teachers.

Pre-interview question

When I interviewed you earlier this year, there were some things you were not sure about. Have you been able to find out about some of those things this year?

Questions on Passage 1. Mining in South Africa

Pre-reading questions

Questions to be answered before reading the passage:

Establishing background knowledge

- 1 Do you know what minerals are?
Tell me what you know about minerals.
- 2 Do you know what gold is?
Tell me what you know about gold?
- 3 Where does gold come from?
- 4 What is a mine?
Tell me what you know about a mine or mines.
- 5 Have you ever seen a mine?
What part of a mine have you seen? (Did you see)
Look at the picture on page 4.
Does this picture show the part of a mine that you have seen?
Can you show me the part in this picture?
What is it called?
- 6 Do you know where gold is mined in South Africa?
Can you give me any details on where it is mined in South Africa?

Text interaction questions:

Questions to be asked after reading the passage.

- 1 Read the first paragraph on page 1.
Who needs raw materials like wood, water and iron?

- 2 Read the second paragraph on page 1. (Point out the word 'minerals' in the fourth line)
Do you know what minerals are now?
Can you give me examples of minerals in this passage?
- 3a Look at page 3. (Point to the word 'arc' in the second line)
Do you know what this word means? Read the sentence and tell me what you think it means.
Can you show me what an arc looks like?
- b Look at the map on page 2.
Can you show me the place on the map where gold is mined?
What helped you to find it?
- c Name three towns or cities on the map where gold is mined.
- 4 Read the first paragraph on page 3. (Point to the expression 'the towns grew up very quickly')
Do you know what this expression means?
Can you explain what you think happens when a town grows up very quickly?
- 5a Read the last paragraph on page 3.
Can you think of a title or a heading for this paragraph?
- b What do mining engineers do to protect miners and to stop accidents?
- c (Point to 'when this happens' in the eighth line of the paragraph)
What does 'this' refer to?
- 6a Look at the picture on page 4.
What is this a picture of?
What do you think this black part is? (Point to the gold reef)
What do you think this is? (Point to the headgear)
What do you think these white parts are? (Point to the tunnels)
What do you think this is? (Point to the mine dump)
- b What did you do to find out what the things in the picture are?
- 7 Read the heading on page 6.
How does gold 'bring much money to South Africa'?
- 8 What do the pictures on page 6 show?
How do they show this?
- 9 Look at question 2 (Things to do) on page 7.
Now use the map on page 2 to answer this question.

Post-reading questions:

Readers now close their books and answer these questions

- 1 What are the two most important things the passage tells us?
- 2 What does it tell us about minerals?
- 3 Did the passage tell us what is made with gold?
- 4 What did the passage tell about mines in South Africa?
- 5 Why is it dangerous to work in a mine?

Passage 2. The Land of South Africa

Pre-reading questions:

Questions to be asked before reading the passage
(Background knowledge and vocabulary)

- 1 Do you know what a spacerocket is?
What can you tell me about a spacerocket?
- 2 Do you know what a plateau is?
What can you tell me about a plateau.
- 3 Do you know what a slope is?
What can you tell me about a slope?
- 4 What is a mountain range?
Can you tell me or show me what it looks like?
- 5 What is the relief of a country?

Text-interaction questions:

Questions to be asked after reading the passage.

- 1a Look at page 2. (Point to the words 'from high up in the sky' in the heading)
What do these words mean in this sentence?
- b (Point to the word 'space' in the first line of the first paragraph)
What does this word mean in the sentence?
- c Where does space begin and where does it end?
Are there people in space?
Have there ever been people in space?
How did they get there?
Who were they?

- 2 (Point to the word 'relief' in the last sentence of the second paragraph on page 2)
What does this word tell about in this paragraph?
- 3 Look at the picture on page 2.
What is it a picture of?
Can you show me the line of mountains in the picture?
- 4 Look at the map on page 3.
- a Can you show me the line of mountains on the map?
- b Can you show me where the land is low and mostly flat?
- 5a Is a relief, a map?
- b What does a relief tell you that a map does not tell you?
(If the answer is: Where mountains are, then: But an ordinary map tells you where mountains are – show the map on page 3)
So what is the difference?
- c What happens to rain when it falls on:
- the plateau
- the escarpment
- the plateau slopes
- 6 Read the first paragraph on page 5. (Point to 'In the south these are the main mountain ranges:')
What are 'these mountain ranges'?
- 7 Read the last paragraph on page 5.
If I stand at the bottom of Mont-aux-Sources and I want to climb to the top of the mountain, will I have to climb 3 480 metres to get to the top?
- 8 Read the passage about 'The very high mountains' on page 5.
- a What is a range of mountains?
Can you give me an example?
- b What is the escarpment?
- 9 Read the paragraph about 'The high, flat land' on page 6.
- a What is the plateau?
- b Where is it?
- c Are the Magaliesberg, Waterberg, Soutpansberg and the Witwatersrand part of the plateau?
- 10 Read the passage about 'The low land near the sea' on page 6.
- a What is the difference between the coast and the coastal plain?
- b Where is the coastal plain?
- 11 Read page 7.
What are the plateau slopes?

- 12 Read pages 7 and 8 and look at the pictures on pages 7 and 8. Now close your books and point out on the model (model of relief of South Africa provided):
- the plateau slopes (where they start and where they end)
 - the coastal plain (where it begins and ends)
 - the escarpment (where it begins and ends)
 - the plateau (where it begins and ends)

Post-reading questions:

- 13 Read the task on page 8 and fill in the missing words.

Passage 3. The Weather in South Africa

Pre-reading questions:

Questions to be answered before reading the passage
(Background knowledge)

- 1 What is a climate?
- 2 What is a drought?
- 3 What is a rain-bearing wind?
Tell what you know about rain-bearing winds in South Africa?

Text-interaction questions:

Questions to be asked after reading the passage

- 1 Read sections 1 and 2, on pages 1 and 2.
What is a climate?
- 2 Read section 3, on pages 2 and 3.
 - a Can you say what rain-bearing winds are now?
 - b Look at the map on page 3.
What do the arrows show?
- 3 Read sections 4 and 5, on pages 4 and 5.
 - a What makes the weather rainy and wet in Cape Town?
 - b Why is the land often dry in the Little Karoo?

Read section 6 on page 6.

What is the difference between a rainstorm and a thunderstorm?

- 5 What is a drought?
- 6 Read page 7.
Look at the model of the relief of South Africa (provided). (Point to the positions of De Aar and Cape Town)
Which town gets the most rain?
Can you say why?
(Repeat for Port Nolloth and East London)

- 7 What is the difference between a desert and a drought?
- 8 Look at the map on page 8.
- What does it show?
 - Name one area which gets more than 1000 millimetres of rain in a year.
 - (Point to the western Bophuthatswana region)
How much rain falls in this area in a year?
 - How much rain falls in Cape Town in a year?
- 9 Look at the map on page 9.
What does it show?
What does this dark part here show? (Point to South Western Cape)
What does this dark part here show? (Point to Natal area)
What does this light part here show? (Point to Central Cape area)
- 10a Look at the picture in the middle of page 11.
What is it?
What does it show?
What are the thick black lines? (What do they show?)
- When does Cape Town get most of its rain?
- 11 Look at the picture on page 12.
In which month does Pretoria get most of its rain?
How much rain falls in that month?
- 12a Look at the pictures on pages 11 and 12 again.
When is the rainy season in each of these places? (Summer or Winter?)
How do you know?
- Look at the graph at the top of page 13.
When is the rainy season in Mossel Bay?
- 13 Turn to page 14 and do task 2.

Post-reading questions:

Readers now close their books and answer these questions

- Is this possible in areas where there are thunderstorms?
(Explain your answer)
There are two mealie farms next to each other. On one farm the mealies are green and grow well. On the other farm next door, the mealies are dry and some are dead.
- What do you think is the main difference between:
 - the map on page 8, and
 - the map on page 9?



REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF EDUCATION AND TRAINING

SYLLABUS

FOR

ENVIRONMENT STUDY

STANDARD 2

1986

STANDARD 2

ENVIRONMENT STUDY

A. AIMS

1. The pupil should realise that he is a member of a particular community and that he is bound by various ties to particular groups of people in that community, as they are represented, for example, in his home, his school, his church, his residential area and his tribe. These groups serve him directly or indirectly and he in turn owes them loyalty and co-operation. At a later stage larger loyalties can be developed.

It is educationally sound that the pupil in the primary school should develop a knowledge and understanding of his environment on the basis of actual experience. At this stage the pupil's experience of life is determined largely by social and economic influences to which he is subjected within the community in which he lives and moves. The experience which he has within his community should serve as a basis for an understanding of any other experiences which he may have and which are not connected directly with the life of his community.
2. The pupil should accept, in an intelligent manner, the fact that the welfare and progress of his community depends on the contribution made towards it by each of its members. He should, therefore, know how his own people and others earn a living; he should realise the value of the work which they do for the community and he should be convinced that he must work, if he wishes to lead a useful and contented life. He should realise that the welfare of the individual depends on the welfare of the community.
3. The knowledge which he gains should encourage him to take into consideration constantly the interests of other people. He must realise that his behaviour towards them will determine whether society will accept him as a dependable and useful person or not. He should be convinced that he cannot live and act as a detached individual in society, but that he is dependent on other people, and they in turn are dependent on him. The maintenance of good relations will depend on his attitude, and the good habits of conduct that he has developed in association with people of his own group, as well as with the people of other sections of the population.

Furthermore, he must realise that laws are necessary to the people of any community for harmonious living together. Consequently teaching should lead the child to do naturally, and therefore willingly, what society has prescribed as correct, good and commendable.

4. In the various study themes the following points should be borne in mind:
 - (a) The pupils must be made aware of the majesty, beauty and order in God's creation, and their sense of wonder must be stimulated.
 - (b) They must be led to a thankful and personal appreciation and acceptance of the gifts of God and the responsibilities of man towards these gifts.
 - (c) Similarly, the pupils must be made aware of the wonderful things created by man, and a sense of responsibility with regard to the preservation and further advancement of these must be developed.
 - (d) The pupils must be helped through their critical observations and thought to classify their world, to express themselves in language and to think purposefully.
 - (e) They must develop such skills as speech, reading, writing and drawing so that they are able through these to come close to reality and acquire and exercise an intelligent control over their world.
 - (f) Respect and tolerance for others must be aroused. Pupils must be taught to respect their own property and that of others, and to extend that respect to animals and plants.
 - (g) The pupils must be led to a high ethical standard by practising co-operation, courtesy, personal neatness, helpfulness, consideration, faithfulness, steadfastness and responsibility.
 - (h) Good working and study habits must be acquired and cultivated.

B. INTRODUCTION

1. Scope of the subject

In Standards 1 and 2 Environment Study incorporates in one subject the content of an initial, elementary study of the subjects Geography, History and Nature Study. Because it is informal and is firmly based on the principles of proceeding from the known to the unknown, it forms the best introduction to the formal study of these subjects.

For this reason no attempt is made in this syllabus to differentiate the subject-matter according to these formal subjects and to classify it as such, but the teacher should bear in mind that one of the chief aims is to lay the foundation for the more formal study of these subjects in later standards. For instance changes in the weather are observed, recorded, discussed and later classified carefully. This gradually leads to an understanding of the abstract idea of weather and eventually to that of climate.

The stages of observing, systematising or classifying should be quietly but consistently followed by the teacher, who must bear in mind constantly that she is gradually leading her pupils to develop their powers of thinking, reasoning and expression as well as of observation and appreciation.

Later this natural mental tendency to classify and systematise will induce pupils to become aware of, and to appreciate cause and effect, and it will train them to reason.

The scope and content of Environment Study is determined by the point of view that it is the young pupil who must learn to know and understand his environment in its widest sense. The scope of his study is therefore his social, economic, natural and physical environment, since these aspects make up the "world" in which he lives and moves.

2. General method

- (a) Because the teacher should make use of the current interests of the pupils and the special resources of the locality, it will necessarily follow that the type of work done will vary from school to school.
- (b) While the general scope of the work and the kinds of activities which should be common to all schools have been laid down, teachers are expected to pay more attention to those topics which are closely connected with the pupils' particular environment.
- (c) The subject should be marked by activity on the part of the pupils. Whenever possible they should be encouraged to find out things for themselves, to go and see how things are done or made, and where things are found, and to make collections of samples and illustrations for class museums and personal albums.
- (d) Much of the work suggested can be done during lessons in other subjects, e.g. during lessons in oral work in the languages, handwork, Health Education, gardening, etc. The possibility of such correlation should be kept in mind constantly by the teacher in the lower primary school. Attention is drawn particularly to the safety rules that appear in the Health Education syllabus.

- (e) Normally the pupil has a keen desire to know how and why things happen. The wise teacher will encourage her pupils to ask questions and will use many of these questions to indicate interesting activities. Some of these questions will suggest simple experiments and demonstrations which can be conducted in the classroom or on the school grounds.
- (f) Teachers in single-teacher schools and those responsible for grouped classes should note the slight modifications of the syllabus which are contained in footnotes at the end of the Standard 2 syllabus.

3. Time and period allotment

Four periods of 30 minutes each per week are allocated to Environment Study in Standard 2.

C. CONTENT

1. The environment of the pupil

This study should not go beyond that of the district and should be adapted to the pupils' environment. The term "district" should not necessarily be interpreted merely as the magisterial area but as the environment of a town, which is served by the town and which serve the town.

(a) Employment : Types of work in the environment

The different types of work done by the people in the area surrounding the school, the places where they work, and the contributions they make to the happiness and progress of the community.

Select any SIX of the following:

- (i) The chief and his councillors.
- (ii) The farmer.
- (iii) The minister of religion.
- (iv) The shopkeeper.
- (v) The builder.
- (vi) The teacher.

- (vii) Officers of the South African Development Trust.
 - (ix) The doctor.
 - (x) The nurse.
 - (xi) The housewife.
 - (xii) The railway worker.
 - (xiii) The post-office worker.
 - (xiv) The factory worker.
 - (xv) The mine worker.
 - (xvi) The traffic officer.
- (b) Transport and communications
- (i) How the pupil, whether urban or rural, can move about easily in his area; urban transport services.
 - (ii) Road safety: the pupil should distinguish between left and right; know the safest way to school and back; walk on the pavement or on the right side of the road (but giving way to traffic) if there is no pavement and understand the reason; dangers of playing in the street; danger points in roads in daily use; pedestrian crossings; traffic lights; traffic officers, scholar patrols and policemen, and how to ask for their help where necessary; the danger of railway and main road crossings; the necessary hand signals; rules governing the correct use of a bicycle or tricycle; dangers of livestock on the road. (Deal with aspects applicable to the pupil's environment).
 - (iii) How the pupil can travel in the district; railways and road motor services; other means of travel.
 - (iv) How goods are sent to and from our town. A visit to a station or bus halt and observation of the various activities there, the loading and unloading of goods and luggage, buying tickets, arriving and departing.

- (v) Safety rules: Dangers of walking on railway lines; hanging out of carriage windows and over balconies; leaning against carriage or balcony doors; carelessness on the station platform and in the train.

(c) Introduction to maps

Simple model of imaginary school or home. (Use boxes or clay models for buildings, string for fence, etc.); map drawn on blackboard placed on the ground beside the model; smaller maps of the same model drawn on slates or in books. Plan or map of classroom. Map of the school and its immediate surroundings, showing roads or streets and neighbouring buildings. Simple map-drawing practice by pupils. Map, later, of the district. Use atlas colours for rivers, dams, hills, etc.

(d) Climate

Normal local weather conditions, rainy periods, the seasons (scientific explanation not required), direction (north, south, east, west), observation of clouds, mist, rain, frost, dew and winds. Length of day and night. Observation of the movement of the sun and changes in the length of shadows.

(e) Links with the places

Stories about two outstanding local Black personalities of the past; national holidays and celebrations, customs, legends and folklore, e.g. "The Lightning Bird", interesting place names (their origin in history and their meaning).

(f) Links with other places

- (i) Where our roads and railways lead to.

- (ii) Where the rivers in our district begin and end.

- (iii) Neighbouring towns and our links with them. For rural pupils special attention must be given to the place which is their nearest business centre.

(g) Flora and Fauna (plant and animal life) of our district

General observational work, collections, etc., should be continued. The scope of the interests and activities should now cover a wider field.



REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF EDUCATION AND TRAINING

SYLLABUS

FOR

GEOGRAPHY

STANDARD 3

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- (i) Animals (other than domestic) found in the district, e.g. hares, meercats, monkeys, baboons, rock rabbits, jackals; where and how they live; why some are our enemies and some our friends; why some are protected by law; wild animals which have been exterminated in our district.
- (ii) Birds in our district: where and how they live; those which are only visitors to our district; where they go when they leave us; why some birds are our enemies and some our friends; birds protected by law.
- (iii) Kindness to animals: the work of the Society for the Prevention of Cruelty to Animals (S.P.C.A.). The laws prohibiting the collectin of birds' eggs and the catching of birds.
- (iv) Seeds (mealies, beans, peas) and bulbs should be planted to enable pupils to observe what happens during the process of germination and during the subsequent growth of the plant. (A detailed study of germination is not required).
- (v) Plants which are typical of the veld of our district: the names and recognition of a few of the best known plants such as aloes, euphorbia, thorn trees, khaki-bos, burrweed, thistle, grasses, etc.
- (vi) Safety rules: poisonous wild fruits and plants.
- (h) The district as part of the province
- Very brief treatment of the position of the district in relation to the province.
- Recognition of signs on a simple map of our province: towns, rivers, railways, mountains and boundaries.
- Point out such important mountains, towns and rivers as the pupils may have heard of.
- The study of the province will be undertaken in Standard 3.

D. EVALUATION

Maximum marks 50.

Minimum pass mark 25.

INTRODUCTION

SYLLABUSES FOR STANDARDS 3 AND 4

These syllabuses take effect as from the beginning of 1982.

1. The structure for both classes is as follows:

<u>Subjects</u>	<u>Standards 3 and 4</u>
Assembly	10 min. per day
Religious Education	5 periods per week
Music	2 periods per week
Physical Training	2 periods per week
Vernacular	7 periods per week
First Official Language	7 periods per week
Second Official Language	7 periods per week
Mathematics	7 periods per week
Health Education	2 periods per week
Geography	2 periods per week
History	2 periods per week
General Science	3 periods per week
First Optional Subject	2 periods per week
Second Optional Subject	2 periods per week
TOTAL PERIODS PER WEEK	50 periods per week

Assembly may at times be conducted for all classes of the school simultaneously, or for each class separately as decided by the principal.

Book Education/Library should receive attention after school hours or during the study periods.

Optional Subjects

Standard 3 Two of the following:

- Arts and Crafts
- Gardening
- Needlework

Standard 4 Two of the following:

- Arts and Crafts
- Needlework
- Gardening
- Woodwork (only if facilities are available)

2. The Examination

<u>Subject</u>	<u>Marks</u>	<u>Time</u>
<u>(a) Vernacular</u>		
First paper	60	45 min.
Second paper	60	150 45 min.
Oral	30	
<u>(b) First Official Language</u>		
First paper	60	45 min.
Second paper	60	150 45 min.
Oral	30	
<u>(c) Second Official Language</u>		
First paper	60	45 min.
Second paper	60	150 45 min.
Oral	30	
<u>(d) Mathematics</u>		
First paper	50	30 min.
Second paper	100	150 60 min.
(e) Geography	50	30 min.
(f) History	50	30 min.
(g) General Science	100	45 min.
(h) Religious Education	100	45 min.
(i) Health Education	100	45 min.
(j) Arts and Crafts		Year mark out of 100
(k) Gardening/Needlework		Year mark out of 100
TOTAL	<u>1 200</u>	marks

3. Examination marks for both Standards

<u>SUBJECT</u>	<u>TOTAL MARK</u>	<u>PASS MARK</u>
Religious Education	100	40
Music	Not an examination subject	
Physical Training	Not an examination subject	
Black Language	150	60
First Official Language	150	60
Second Official Language	150	60
Mathematics	150	60
Health Education	100	40
Geography	50	20
History	50	20
General Science	100	40
Arts and Crafts	100 marks may be a Year Mark	40
Needle work	100 marks may be a Year Mark	40
Gardening	100 marks may be a Year Mark	40
Woodwork	100 marks may be a Year Mark	40
TOTAL	<u>1 200</u>	<u>480</u>

4. Minimum requirements for a pass

A candidate -

- (a) must obtain a minimum of 480 out of the total of 1 200;
- (b) must pass the Black Language and English or Afrikaans with a minimum of 40%;
- (c) may not have less than 40% in more than two subjects.

SYLLABUS

FOR

GEOGRAPHY

STANDARD 3

(FROM 1982)

A. AIMS

1. To lead the pupil to a closer acquaintance with:
 - (a) his own country and its people
 - (b) other lands and peoples of the world, and
 - (c) the natural phenomena of the earth in so far as he is able to understand them.
2. To enable the pupil to acquire some facility in the use of geographical aids such as posters, pictures, graphs, maps, the atlas and the globe.
3. To develop in the pupil the power to reason and make simple deductions based on geographical knowledge previously acquired.
4. To help the pupil to become aware of the definite relationship which exists between man and his environment and to understand that man's activities and ways of living are really his efforts to adjust himself to his surroundings and to use to advantage the resources available to him.
5. To develop in the pupil a concept of common humanity by:
 - (a) leading him to take an interest in national problems of his own country
 - (b) encouraging a sympathetic attitude towards other races and their problems and
 - (c) creating a clearer understanding of the interdependence of the peoples of the world.
6. To stimulate an active interest in daily occurrences as depicted in newspapers, magazines, radio reports and television broadcasts.

7. To cultivate in the pupil a sense of appreciation of, and reverence for, the beauty and wonders of nature, consequently making his visits to other parts of his own country and to other countries richer and more purposeful experiences. The need for conserving the natural environment and guarding against pollution should be continually emphasised.

B. INTRODUCTION

1. Geography is the study of the relationship between man and his environment; and it is absolutely essential to have a knowledge of the subject if man desires to adapt to the changing world he lives in and to have an intelligent grasp of daily occurrences.
2. MAN with his God given ability should always be the focal point of study and the relationship between man and his environment should continually be emphasised.
3. The teacher should continually question himself why he is teaching the pupils a specific section of the syllabus. Above all, the pupils should enjoy Geography.
4. It is essential for the teacher in each standard to study the syllabus for the previous and the following standards in order to avoid overlapping and to determine the depth of the instruction.
5. The subject matter may be dealt with either systematically or thematically.
6. Short assignments and written tasks which encourage the pupils to do reference work should regularly be done in connection with any aspect of the syllabus and planned excursions to promote observation are essential.

C. CONTENT

1. Newspaper Geography

This should be started at the beginning of the year. Interesting news items should be cut from newspapers and pinned onto a board. The items should be of geographical interest and if possible related to the syllabus and should be easily understood by the Standard 3 pupil.

A map of Southern Africa outline should be pinned onto the board and the cuttings pinned around the map. A length of coloured cotton or wool should be pinned from the cutting to the place on the world map to which the cutting refers.

Pupils should be encouraged to provide newspaper cuttings. Cuttings should be replaced as often as possible. Ensure that all pupils read the cuttings by occasionally setting simple test questions on them, or by discussing them briefly in class from time to time.

Tape recordings of newsbroadcasts or actual newsbroadcasts can be played to the class for discussion. In many cases magazine articles may also be used in place of newspaper articles.

2. Mapwork and Practical work

(a) Direction

- (i) 8 Main directions: North, South, East, West, North-east, North-west, South-east, South-west. (2)
- (ii) directions with the school as the central point, of hills, buildings and roads. (2)

(b) Weather observations. (2 periods - 1 for drawing of chart, 1 for discussion). (2)

- (i) The class constructs with the help of the teacher, a chart on which observations on the weather must be recorded;
- (ii) observations are made for two months of the year, namely February and August. These have been chosen as being as close to mid-summer and mid-winter as is possible;
- (iii) observations are recorded at the start of each Geography period during February and August;
- (iv) the following observations are to be made:
 - (1) Temperature - hot, cold or mild (stress day temperatures).
 - (2) Wind - summarise the various wind directions and represent them in a wind-rose.
 - (3) Cloud cover - many clouds, few clouds, no clouds.
 - (4) Rainfall - Heavy rain, light rain, no rain.

- Lightning and thunder, no lightning and thunder.

(5) Frost, dew and mist - Record when it occurs.

N.B. Any discussion on the observations must be limited to description only. Pupils should be encouraged to describe what they have observed with regard to the weather. No attempt should be made to explain any of the observations.

(c) Day and Night - Simple experiment showing day and night using a torch and a circular object e.g. tennis ball, orange, globe. (1)

(d) Map reading. (2)

3. Republic of South Africa

(a) Position

Use a map of the Republic of South Africa to teach the following:

(i) Position in relation to the equator and the poles. (1)

(ii) Position in the continent of Africa. (1)

(iii) Position in relation to the most important continents and oceans of the world. (1)

(iv) The size of the Republic of South Africa in relation to other known countries (use the globe). (1)

(b) Build

(i) Use simple diagrams and or models to teach the following concepts: coastline, plateau, escarpment, plain. (2)

(ii) Use a map of the Republic of South Africa to show the following:

(1) The coastline and coastal plain. (1)

(2) The Little Karoo and the Great Karoo. (1)

(3) The Plateau. (1)

(4) Mountain Ranges. (1)

(5) The eastern low-lying part. (1)

(6) Most important rivers. (1)

(c) Climate

(i) The main rainfall regions all year round, summer and winter rainfall regions; regions of high rainfall and regions of low rainfall. (2)

(ii) Temperature - two simple maps showing summer and winter temperatures. (1)

(d) Natural vegetation

(i) Study only the situation of the main vegetation regions giving an example of each vegetation type e.g. Savanna - grass. (2)

(e) Water resources and the preservation thereof

(i) Main rivers and dams. (2)

(ii) Preservation of water resources through:

(1) Non-pollution. (1)

(2) Careful use of water. (1)

(f) Human activities and products (emphasise distribution, types and uses).

(i) Stock farming - choose one of the following: beef, dairy, mutton, wool, karakul, angora goats and pigs. (3)

(ii) Arable farming: choose one of the following: wheat, maize, sugar cane, vegetables (one type), fruit (one type), coffee and tea. (3)

(iii) Forestry. (2)

(iv) Mining: choose one of the following: gold, diamonds, coal, copper and iron ore. (3)

(v) Fishing. (2)

(vi) Manufacturing industries

(1) Show on a map the five most important areas of concentration of manufacturing industries; (1)

(2) study one of the following industries in one of the above areas: motor, textiles, paper and printing, leather and cement. (3)

(g) Transport

Methods of transport and the most important traffic routes. (3)

(h) Population

(i) The different population groups; (1)

(ii) distribution of population outline and simple explanation. (2)

(i) The beauty and preservation of:

(i) Plant life; (1)

(ii) animal life. (1)

4. Independent states and self-governing territories

Use a map to teach the following about each independent state and self-governing territory: Name, Ethnic group, Position, Capital. (5)

TOTAL PERIODS = (60)

D. EVALUATION

One examination paper (thirty minutes)

In this examination short type questions must be set in all sections of the syllabus (listed below) in order to cover as much of the syllabus as possible.

1. Mapwork and Practical work (10 marks)

2. The Republic of South Africa: Questions must be set on each of the sub-sections in the syllabus. At least one map questions must be included. (40 marks)

TOTAL 50 marks