

**TEACHING IN ENGLISH AND ISIXHOSA: CODE-SWITCHING IN GRADE  
11 BIOLOGY CLASSES AT A SCHOOL IN KHAYELITSHA**

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A mini-thesis submitted in partial fulfilment of the requirements for the degree of Master's in Applied linguistics/ Language education in the Faculty of Education at the University of the Western Cape, South Africa.



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Signed

## **Keywords**

**Explore**

**Role**

**Code-switching**

**Grade 11 Learners**

**Understanding Concepts**

**Classroom interaction**

**Mother tongue**

**Medium of instruction**

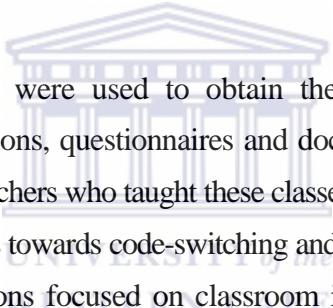
**Assessment activities**

**Biology**



## **ABSTRACT**

This study explores the use of code-switching in Biology classes at high school level, how it is used in the teaching and learning situation and its effect on the learners' performance in the subject. Grade 11 was chosen for the investigation as it precedes the last year at high school. The medium of instruction in many schools in the area where the school is located is English, whereas the learner population is 99% isiXhosa-speaking. Therefore, the learners are taught in their second language, which most of them cannot fully comprehend, especially when it comes to expressing themselves. Most of the teachers as well are second language speakers of English, which implies that they encounter problems in conducting lessons in English only. That is why we find most of them using the code-switching strategy in teaching and also allowing the learners to use isiXhosa in the classroom.



Different research techniques were used to obtain the data for this study, namely interviews, classroom observations, questionnaires and document analysis. The interviews were conducted with the two teachers who taught these classes. The aim of the interviews was to gain insight into their attitudes towards code-switching and how they deal with the teaching situation. Classroom observations focused on classroom interaction using both languages during lessons. These were aimed at finding out how often code-switching takes place in the classroom. Learners responded to a questionnaire. Lastly, an analysis of the learners' scores in test, classwork and examinations including the question papers, was conducted.

The findings reveal that learners and teachers feel comfortable code-switching during lessons using all three major types of code-switching, although they also reveal that learners preferred to use their mother tongue most of the time. The study also shows that although code-switching is used for different functions in the classroom, the main function is to clarify the lesson so as to help learners understand the content of the lesson.

Another major finding is that, through code-switching the learners seem to understand their lessons, however, they encounter problems when it comes to examinations. Some problems are due to the fact that they might not understand the questions, which are in English only. Or there might be other problems such as learners coming to school on empty stomachs. This can indicate that code-switching is but one variable that can impact on learners' performance.



## **DECLARATION**

I, Bongiwe Nangu, declare that *TEACHING IN ENGLISH AND ISIXHOSA: CODE-SWITCHING IN GRADE 11 BIOLOGY CLASSES AT A SCHOOL IN KHAYELITSHA* is my own work, that it has not been submitted for any degree or examination in any university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Bongiwe Nangu

Date: November 2006

Signed:



## **ACKNOWLEDGEMENTS**

I would like to express my sincere gratitude to my supervisor, Professor Zubeida Desai, for her invaluable patience, her guidance throughout the study, and her assistance in securing finances for my study.

I am also indebted to the principal, staff and learners of the school where the study was conducted, without their assistance there would be no study.

My thanks also go to my family for their support and encouragement.



## **DEDICATION**

This mini-thesis is affectionately dedicated to my family and the Ngcuka family for showing interest and their support throughout my studies. To Aubrey and our son Ukhanyo, I dedicate this mini-thesis.



## CONTENTS

Keywords	ii
Abstract	iii
Declaration	v
Acknowledgements	vi
Dedication	vii

### Chapter 1: Introduction

1.1 Background	1
1.2 Personal background	3
1.3 Aims of the study	5
1.4 Research design	6
1.5 Ethical considerations	6
1.6 Chapter outline	7
1.7 Conclusion	7



### Chapter 2: Theoretical Framework

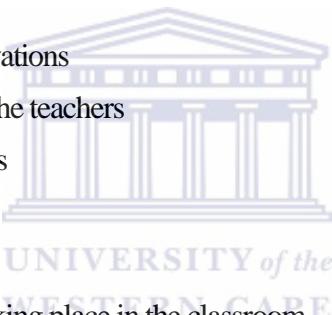
2.1 Introduction	8
2.2 Definitional issues	8
2.3 Bilingualism and Multilingualism	12
2.3.1 Bilingual education	14
2.3.2. Mother tongue instruction	17
2.4 Code-switching	20
2.4.1 Functions of code-switching	20
2.5 Conclusion	25

## **Chapter 3: Methodology**

3.1 Introduction	26
3.2. Research design	26
3.2.1 Sampling	27
3.3 Process of data collection	28
3.3.1 Classroom observations	28
3.3.2 Interviews	30
3.3.3 Questionnaires	32

## **Chapter 4: Presentation and analysis of data**

4.1 Introduction	33
4.2 Data presentation	33
4.2.1 Data from classroom observations	34
4.2.2 Data from interviews with the teachers	39
4.2.3 Data from the questionnaires	42
4.2.4 Data from Documents	44
4.3 Data analysis	44
4.3.1 Types of code-switching taking place in the classroom	45
4.3.2 Analysis of classroom observations with regard to the frequency of code-switching in the classroom	47
4.3.3 Analysis of the functions of code-switching in the classroom	47
4.3.4 Analysis of assessment activities in the classroom	50
4.3.5 Analysis of learners' questionnaires	50
4.3.6 Analysis of the benefits of code-switching	51
4.3.7 Document analysis	51
4.4 Conclusion	54



## **Chapter 5: Summary of findings, recommendations and conclusion**

5 Introduction	55
5.1 Summary of findings	55
5.2 Recommendations	58
5.3 Conclusion	60

<b>BIBLIOGRAPHY</b>	<b>61</b>
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<b>APPENDICES</b>	<b>68</b>
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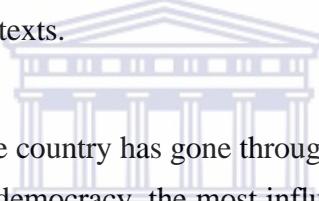
Appendix 1	69
Appendix 2	70
Appendix 3	71
Appendix 4	73
Appendix 5	84



# **CHAPTER 1: INTRODUCTION**

## **1.1 Background**

For many decades language in education in Africa has been a subject of research, with the focus being on language policies, language in education and language in society, (see for example, Tolleffson (1991), Prah (2003)). In the studies that were conducted there has been a call for countries to africanize their education so that it will be suitable for people from Africa. Some such studies are those of Rubagumya (1991) in Tanzania and Kamwangamalu (2001) in South Africa. As a result, some of the countries developed and others are developing, new language in education policies. In these policies, importance was given towards recognizing African languages in the educational contexts.



South Africa is no exception- the country has gone through dramatic changes in the last decade. Since it has gained democracy, the most influential transformation that took place was in the education system. According to Thami Mseleku, the former Director General of Education, the changes in South Africa in the 1990s saw the education system being transformed through systematic initiatives, research-base programmes and policy-driven transformation (Revised National Curriculum Statement:2003:1). This new education system aims towards a healthy environment, recognition of human rights, social justice and inclusivity, by producing citizens who will participate in all the spheres of the country's growth.

An aspect of this transformation in the education system is the language in education policy, which looks at how all the official languages can play a role in the education system. Another aspect is the implementation of outcomes-based education (OBE), which introduced new approaches to education, in these approaches, new methods and techniques of teaching and learning were recognized, which are guided by the philosophy that there should be a contract between the teacher and the learner and that teaching and learning is both a process and a product.

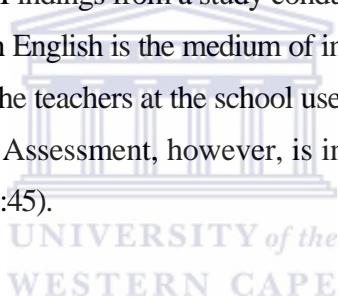
As with all things new, people at first were sceptical of these changes. The implementation of OBE at the General Education and Training (GET) level (this includes grades R to 9) has been confusing for the teachers, as they have to learn new things and new ways of teaching the learners. One aspect of OBE, which has had important implications for teachers, was that learners have to become active participants in the learning process. This can be possible if the role of the teacher changes in the classroom. Teacher talk should be limited and the learner is no longer a passive participant who is spoon-fed the information.

The new methods and techniques put the learner at the centre of attention in their education. Teaching therefore has to emphasise the active involvement of the learner, meaning that the activities should be learner-centred. Learner centredness is an issue, which has interested educationists, especially those who focus on second language learning. This approach is the opposite of teacher-centredness where the teacher dominates classroom activities, (most of us are familiar with this approach as we have gone through it). It is said that learner-centredness came about because of dissatisfaction with traditional methods (Nunan, 1988, Celce-Murcia, 1997).

The reasons for the dissatisfaction with the old methods were that these methods, especially in language learning, looked at the target language as precisely that - a target and not as part of a learning process. Communication in the target language was realized through repeating structures, which the learners could not use in real life situations. That is why it was decided that the focus should shift to the learner itself. Learners' needs in language learning had to be analysed in order to provide for systematic language learning. For instance, where and for what purpose would the learners use the language while they are at school and when they leave school. Teaching is said to be learner-centred if it takes the communicative and functional needs of the learner into account.

Witthaus (1991: 61) states that teaching should be viewed as learner-centred if both the teacher and the learners share responsibility for the learning process. The learner-centred approach then encourages communication and participation in the classroom, and one of the most important resources that can make this possible is language.

As with the new Constitution of 1996, the Language in Education Policy of July 1997 promotes multilingualism. Learners are expected to learn an additional language while maintaining their home language. By using their home language in learning, the learners can acquire the skills, which can then be transferred to their second language. However, the intentions in the policy are not realized in actual learning situations. Desai (1998, 2003) notes that although the policy itself can be seen as enabling, what actually happens in the classrooms is the opposite. Findings from a study conducted at one of the schools in Cape Town show that although English is the medium of instruction from Grade 4 in all the content subjects, most of the teachers at the school use the mother tongue of the learners to conduct the lessons. Assessment, however, is in English only, except in languages as subjects (Desai, 2003:45).



## **1.2 Personal Background**

Since the early years of my schooling, classroom instruction was dominantly in the mother tongue, although the language of instruction was officially English. This was due to the fact that the school was in a rural area in a former homeland, which was known as Ciskei. Homelands in South Africa were bounded according to languages, people who spoke a certain language lived in a certain homeland. For instance, the Xhosa-speaking people dominated the Transkei and Ciskei. Whilst in Boputhatswana, there were the Setswana people, in KwaVenda the home language was TshiVenda, in KwaNdebele the language was isiNdebele and in KaNgwane it was siSwati. In these homelands you would find that most of the instruction at schools was conducted in the home language, as every one, including the teachers, spoke the language.

The school that I went to was once a missionary school so it was a fairly well equipped school in terms of furniture, buildings, books and stationery which were sponsored by the government, compared other schools.

My situation changed in Grade 6 when I went to a school in an urban area, which was situated in the capital of the homeland, Bisho. At this school, learners were not allowed to speak their home language during school hours, unless it was an isiXhosa lesson. This was emphasized especially to those who were in Grade 7 as they were regarded as seniors at the school. However, in the 1990s when things started to change in the country, the homelands were incorporated into the Republic of South Africa. When I started high school, the teachers were still using the mother tongue for instruction, although we did have teachers who were not first language speakers of the language of the learners. Some of the teachers came from Johannesburg and some even from Ghana. With these teachers, instruction would be mostly in English, but, as the teachers were immersed in isiXhosa, they would try to use the language of the learners to make sure that the learners understood the lessons. In this way teachers were compelled to learn the mother tongue of the learners. It was easy for them because in the rural areas you found only monolingual classes, where everyone spoke the same language.

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I started teaching in January 2003 at a school where the medium of instruction is English. This medium is supposed to be used in all subjects with the exception of the lessons in isiXhosa and Afrikaans. Most of the learners and educators at the school are Xhosa speaking, as are most of the people living in the area. There is a staff establishment of 42 educators, 83% of whom are Xhosa-speaking and 17% are Afrikaans-speaking. The learner population is 1500, 1 % of whom are Sesotho speakers who have a mother tongue fluency in the first language of the 99% of the remaining learner, that is, to some degree, the learners and educators are bilingual since they understand both the mother tongue and English. But it is difficult to say to what degree they understand English. What is apparent is that code-switching takes place during lessons. There are teachers who criticize each other about the use of isiXhosa during lessons in content subjects, because English is the medium of instruction. This is how my interest in code-switching started.

My concern was whether the teachers perceived switching to isiXhosa as disruptive or as being useful to the learners. As an English teacher, I feel that learners expect the teacher, to use both languages in language lessons. I decided to explore whether code-switching has an effect on the learners' understanding of the lessons and to what extent it affected their learning.

### **1.3 Aims of the study**

Aims of the study are two-fold. Firstly, it explores the role of code-switching in two biology classes in relation to the learners' understanding of particular concepts. Secondly, it investigates whether code-switching has an effect on the learners' overall performance in the subject in Grade 11. This is investigated through their performance in the classroom activities and mid-year examinations as well as the end of the year examinations.

The main research question, which directs this study is; To what extent does code-switching help learners in their understanding of Biology concepts and what effect does it have on their overall performance?

The subsidiary questions that the study will attempt to answer are:

- What type of code-switching takes place in the classroom?
- How often and when does the teacher code-switch?
- For what reasons does the teacher code-switch?
- Does assessment make any provision for code-switching during classroom activities?
- Does code-switching occur in learners' writing? If so, is it allowed?
- What do learners think about code-switching? Do they find it helpful?

## **I.4 Research design**

As this is a study of language use in the classroom within a specific speech community, the study confines itself to 'Entyantyambo High School'<sup>1</sup> and specifically to Grade II, students drawn from 2 of the Biology classes. The classes were chosen according to the teachers' availability during school hours. The research methodology consists of classroom observations, questionnaires, interviews and recorded lessons.

## **1.5 Ethical considerations**

I have taken into consideration the ethical aspects of conducting research. All necessary steps were taken to inform the parties concerned, also to get permission to undertake the research at the school. I notified the principal about my intentions in conducting the research and how it would affect the normal running of the classroom. Since I was dealing with teachers and learners, conducting the study might have interfered with the day-to-day experiences in the classroom, that is why I also sought their approval to sit in on their lessons and record what was going on. In doing so I explained the aims of the research and how the school could benefit from the findings.

I have considered the protection of the school and the parties concerned and have therefore used a pseudonym for the school. Although the learners have provided their names in the questionnaire, they are not mentioned in the study.

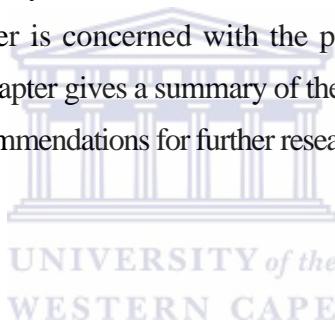
Lastly, the findings of the study were discussed with the principal, head of department (natural sciences) and the two teachers.

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<sup>1</sup> This is a pseudonym to protect the anonymity of the school.

## **1.6 Chapter outline**

The mini thesis consists of five chapters. The first chapter is an introduction, which provides the background to the study. The background includes a brief explanation on the language issue in South African classrooms and the changes that have taken place since 1990. The chapter also states the research problem and why it is of interest to me, my experiences concerning language and the medium of instruction. The chapter ends by outlining the aims of the study and its significance for language and education. The second chapter provides a theoretical framework for the study by reviewing the literature on the subject of code-switching. It also contextualizes the subject by giving a brief overview of the context in which code-switching usually occurs. The third chapter describes the methodology employed in the collection of data and the reasons for employing it. The fourth chapter is concerned with the presentation, analysis and discussion of the data. The last chapter gives a summary of the findings, the relevance of the study and finally it makes recommendations for further research.



## **1.7 Conclusion**

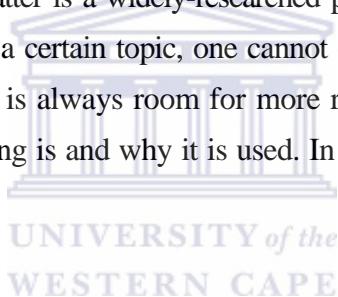
In this chapter I have introduced the study, its background, motivation for choosing this area of focus and what it aims to achieve. The chapter has also outlined the structure of the mini-thesis, which has 5 chapters. The next chapter (Chapter 2) explores the theoretical framework of the study.

## CHAPTER 2: THEORETICAL FRAMEWORK

### 2.1 Introduction

In the previous chapter I introduced the focus and purpose of the study as well as how the mini thesis is structured. This chapter will focus on the understanding of the term code-switching by reviewing the definitions given for this term. It also contextualises this phenomenon by discussing the contexts in which it usually arises. This contextualisation will help us understand how and why code-switching occurs. This context involves concepts such as: multilingualism, medium of instruction, language of learning and teaching and bilingualism.

Code-switching as the subject matter is a widely-researched phenomenon. However, as with any research conducted on a certain topic, one cannot ever say that people fully understand the subject, as there is always room for more research. There are many definitions of what code-switching is and why it is used. In the next section I look at some of these definitions.



### 2.2 Definitional issues

A code can refer to many things, some may think of a language, and some may think of dialects or varieties of the same language. There have been attempts at distinguishing a language from a dialect, but there is difficulty. The difficulty in distinguishing between a dialect and a language is that a language is referred to as a communicative resource but a dialect is also used for communication by certain speech communities, therefore they are both used for communication purposes. However, some tried to differentiate between a language and a dialect by giving them statuses.

A language refers to a variety that is socially accepted as having a high status and is used for most government communication. A dialect on the other hand has a lesser social value (Roy-Campbell: 2001). The dictionary of Linguistics and Phonetics

(1987:92) also refers to a dialect as a subdivision of a language, which gives a language higher status. Most African languages for a long time bore the status of being dialects or what some people referred to as vernaculars.

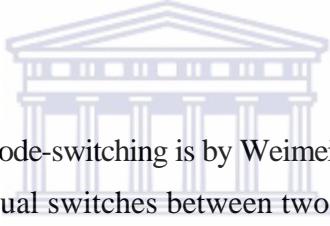
Roy-Campbell (2001:84), states that although the word vernacular means a "language of a particular locality ... it is often stigmatised to refer to linguistic forms that are considered less than a language". Most research done on code-switching focuses mainly on bilingual code switching. Code-switching can also occur within a particular language, where a language has several dialects or where there are different forms such as formal and informal forms of the same language.

In Britain there are a large number of people of Caribbean descent. The English dialect they use is known as Jamaican Creole. It is found that the speakers of this dialect find it difficult to code switch especially with standard English, as the dialect is not used at school. It is suggested that to curb this, the dialect should be learnt at school, as it is their mother tongue. Also looking at the situations of Black English and Standard English in the United States, DeBose, (1992) from research conducted in Oakland, California found that the subjects code-switch between Black English and Standard English from time to time (cited in Eastman 1992: 161). Ramat (1992) studied the alternation of standard Italian and Italian dialect in discourse. She found that the following types of switching take place; intrasentential code-switching, that is when a speaker switches codes within the same sentence and word-internal code-switching, that is when a speaker, in a sentence makes use of a word from a different code than the one he is using.

Code-switching, however, is common among bilingual and multilingual communities. In these communities, when codes are switched all the time, the speakers get used to the mixed code that they unconsciously use more often, which ends up being a register of that particular speech community. Swigart (1992: 83) makes an example of a situation in Dakar where Wolof and French are often switched. This confirms Pandit's (1986: 69) claim that the speakers use the switched code as an effective communicative resource in situations where they would not use either of the languages concerned (cited in Swigart, 1992). Elsewhere in this chapter I have given an example of the situation in Soweto, a

township in Johannesburg, which is a good example of how people from diverse language backgrounds communicate with each other using all the language resources they have at their disposal. Gysels (1992: 45) mentions a situation in Kenya where French and Kiswahili are often switched. This mixture of codes serves as a register.

The term code switching has been defined and explained in many different ways. For instance Myers-Scotton (1992: 177) states that since code switching is generally part of the performance effluent bilinguals "it is the use of two or more linguistic varieties in the same conversation, without prominent phonological assimilation of one variety to the other". However, when someone code-switches he does not need to be fluent in the other language, as the study by Slabbert and Finlayson (1984) indicates about township dwellers who code switch and who are not fluent in the various languages they simultaneously switch into.



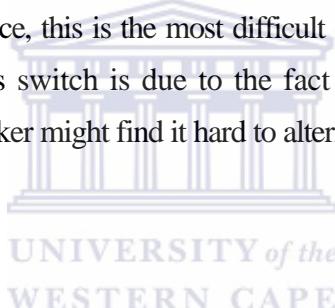
One of the earliest definitions of code-switching is by Weimeich (1953), who states that code-switching is when a bilingual switches between two languages. The bilingual may be fluent in both languages or non-fluent. In the case of a non-fluent bilingual there are 'differences between those who have control over their switching and those who have difficulties in switching the codes as required' (in Poplack 1980).

Duran (1994) describes code-switching as the use of two languages simultaneously or interchangeably. Duran continues to state that code switching implies that the speaker has some degree of competency in the two languages even if bilingual fluency is not yet stable. As Meisel puts it 'code switching is the bilingual's ability to select the language according to the interlocutor, the situational context' (cited in Hyltenstam and Obler 1989:13).

Skiba (1997) on the other hand regards code switching as language interference. He states that the interference may be viewed as transference of elements of one language to another at various levels including phonological, lexical and orthographical. This interference is mostly evident when a second language is

learned, where switching is used as an effective teaching strategy for continuous communication.

Some of the definitions given for this concept are; code-switching is changing languages within a single speech event (Brock-Utne and Holmarsdottir, 2003) or a switch in language that takes place between sentences (Holmarsdottir, 2005: 320). This shows that the switch can happen intersententially or intresententially, which others refer to as code-mixing (Myers-Scotton, 1989). Also the switch can be what Poplack (1980) calls emblematic or extra-sentential. The intersentential switch is when the speaker switches codes between sentences; this is regarded as the safest switch. Emblematic is when the speaker makes use of idiomatic expressions, tags or interjections from the other language in his speech. These two require a 'minimal competence' in the second language. While the intra-sentential is when the switch takes place within a single sentence, this is the most difficult of the three types of code-switching. The difficulty in this switch is due to the fact that some languages are different in word order and a speaker might find it hard to alternate to another language in the middle of the sentence.

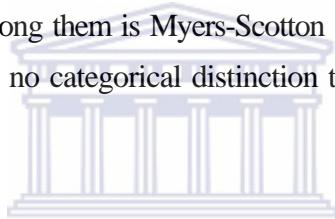


Intra-sentential code switching has been a subject of analysis within the study of code switching. It is the belief that it is difficult for anyone to switch languages within a single sentence without the sentence being exploited. According to Poplack (1980), who has a particular interest in this type of switching, it is 'grammatically constrained', requiring more competence. Therefore the speaker needs to have a near balanced bilingualism, that is, he must be fluent in both languages at his disposal. This is due to the fact that bilinguals know exactly where to switch and how, as well as where the switch will not be suitable.

Although the definitions of code-switching above seem to conform to a certain agreement of what code-switching is, this is not always the case. There are linguists and writers with somewhat different views of what code-switching is and what it is not. For example, there are those who differentiate between what constitutes a switch, a loan or a mix. Khati (1992) looks at this issue of differentiating between switching and borrowing through the study of language alternation between Sesotho and English. He

makes use of the work by Poplack (1987), where Poplack refers to instances where morphemes from two languages are used within the same lexical terms as 'nonce borrowing'. In the article Khati refers to this intra-lexical switching. The work of Khati (1992:184) shows that the mixture does not only use syntactic processes of the host language, but also its phonology and morphology. This, he states is more an instance of code-switching than borrowing.

Poplack (1980) states that there is an undeniable difference between code-switching and borrowing. The difference is that 'the loanwords further differ from codeswitching in that there is no involvement of morphology, syntax or phonology of the lexifier language' (1980:3). Although Poplack stands firmly on this belief, it might be difficult to distinguish between nonce borrowing and one word code-switching. There are a number of writers who say that trying to differentiate between borrowing and one word switching is a futile exercise. Among them is Myers-Scotton (1989 & 1992), and Gyles (1992:53) who state that there is no categorical distinction that can be made between borrowing and code-switching.



In this study, I adopt Milroy's (1995:7) definition that code - switching is the 'alternate use by bilinguals of two or more languages in the same conversation'. Also I would regard code - switching as a broad term for any kind of language alternation whether inter, extra or intrasentential, as it will make it easier to refer to all kinds of code-switching that take place in the classroom. The definitions above give us an understanding that in order for code-switching to take place there should be at least two languages or varieties of a language in use. In the next section I look at the contexts in which the languages or varieties can be found in society.

## 2.3 Bilingualism and Multilingualism

Many countries around the world are multilingual in the sense that many languages are spoken within their borders. Multilingualism generally refers to the use of different languages by a community in different circumstances, (Hudson, 1999:52). In these multilingual countries you will find that there are quite a number of languages and

dialects used for communication among the communities.

Many African countries such as Nigeria, South Africa, Tanzania, Kenya and others are multilingual, and have a number of languages and dialects that are used for communication. Some of the dialects are so similar that the people who speak different dialects can understand one another. Such dialects are said to fall under one language family. For instance, here in South Africa where there is a high degree of multilingualism, we have the example of the isiXhosa language, which has many dialects according to the regions they are spoken in, such as the eastern and the western part of the Eastern Cape. Nomlomo (2003:69) notes that these dialects are 'linguistically valid for the purpose of communication'.

Very few of these multilingual countries recognize all their languages as having official status or any recognizable status as tools of communication. South Africa is rare in this regard, for its recognition of 11 official. Some of the countries only promote one indigenous language and a European language as the official languages. Examples of such countries are; Angola, Kenya, and not far from the borders of South Africa is Botswana, (Kembo and Webb: 1999). There are many such countries in Africa. An example of such country is Nigeria with 400 languages.

Due to this, people in these countries are to some extent bilingual. For instance, in South Africa most people are bilingual because they have to use their mother tongue at home and English or Afrikaans at school. Skutnabb-Kangas (1988) states that for some people being bilingual or multilingual is not through choice, but because their mother tongue is not recognized, they are forced to learn other languages as well. Some become bilingual because of their interest in other languages that are spoken in the different regions of the country. However, the European language holds higher status than the mother tongue of these people. And it is mostly used in sectors such as education, business and the government.

When it comes to the choice of a national or official language, the governments of

these countries regard the indigenous languages as being unable to play a role in matters such as national integration, economy and governance. As far as national integration is concerned, they are said to be divisive and this results in the promotion of the ex-colonial languages. The reasons for this choice is that these languages are seen as 'socio- culturally neutral' as they are nobody's mother tongue (Kembo and Webb: 1999: 410). And English seems to be the major language that these countries choose.

The most popular reason that ruling powers put forward for choosing a European language as the official language, with regard to the economy and governance, especially in those countries that have English as the official language, is that the language is an international language through which they can communicate with other countries for trade purposes. They make sure that it is promoted at school level. That is why you will find in these African countries many schools have a second language as the language of instruction from the third year of schooling. Many think that it would be best for the child to learn in his mother tongue, but not neglecting the usefulness and the benefits of using English as well. That is why there has been a debate on establishing ways in which the two languages can work together in educational situations, developing programmes such as bilingual education and parallel education programmes.

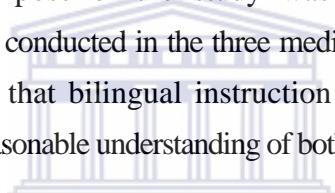
The following section briefly looks at some bilingual programmes that already exist and at how countries can develop these in cases where they do not exist.

### **2.3.1 Bilingual education**

The language of ex-colonizers posed many problems especially in the educational achievement of the learners. Some countries made provisions to counteract the disadvantages of being taught in a second language, these included bilingual education programmes. The bilingual programmes which we have come to know about are those in the United States of America and Canada, although countries around the world have established such programmes. According to the US office of education (1971), bilingual education is the use of both the child's mother tongue and a second language

simultaneously in the learning process. The bilingual programmes served two purposes in the US: first to establish the right to use and retain the vernacular in education. Secondly to provide a more human and pedagogically more realistic approach to the learning of English as a second language by ethnic minorities (Nguyen Dang Liem 1989: 79).

However, the US and Canada are not the only countries that have experimented with bilingual education. In Africa we have the example of countries where they have experimented on the effects of using bilingual education at schools. In Tanzania for example, Kadeghe (1998) looked at the teaching of Physics using the languages at the learners' disposal, that is English and Kiswahili. The subjects were divided into groups of three, one group taught in English, one in Kiswahili and the other in both English and Kiswahili (bilingual). The purpose of the study was to assess the learners' achievement in tests, which were conducted in the three mediums. From the findings of the study, the author suggests that bilingual instruction could be advantageous, especially if the learners have a reasonable understanding of both languages.



In the South African context, the use of two languages for instruction at the same school is not a new phenomenon. In the 1930's there were schools, which used what is called parallel medium of instruction where learners were divided into groups. One group would be taught in one language and another group in a different language. The languages mentioned here are English and Afrikaans. In these schools they encouraged communication and cultural exchange in both languages. However, it was not possible for indigenous languages to get this opportunity, because of the laws that prevented the use of indigenous languages as languages of learning. In the homelands the people preferred to teach in their home languages only as they were not fully competent in English.

In addition to the parallel medium system, South Africa has experienced dual medium of instruction in English and Afrikaans, where both languages were used "alternatively in teaching one subject through one medium and other subjects through the other" to English and Afrikaans speaking learners who were sitting in the same class (Malherbe 1946:114). The introduction of dual medium of instruction in English and Afrikaans

saw an increase in levels of bilingualism, especially where it was made compulsory (Heugh 2000:6). Malherbe's findings (1946) show that learners in dual medium schools achieved more both academically and socially, (cited in Heugh: 2000).

However, recently there have been some studies where researchers initiated projects at schools where they investigate the use of a bilingual medium approach. In these projects they found that dual medium (dual here should not be understood in the sense that the learners are divided into groups, but in the sense that both languages are used in the classroom for communication), works very well although it requires hard work and competence in both languages from the side of the teachers (Heugh et al: 1995: 17).

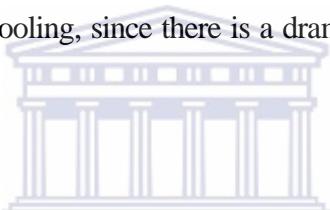
The bilingual education projects of the US and Canada (where you will find immersion classrooms) and the one study from Tanzania, had positive results in promoting both languages. However, not all countries have adopted such programmes. Mati (2003) makes the following recommendations for such countries to develop their own bilingual education systems. He states that English should be used in conjunction with the African languages as a language of instruction (2003: 6). In this way the language that the children bring from home is affirmed in the school environment and thus the pupils will not feel alienated. Mati also suggests that if bilingual education in South Africa is implemented, we should look at each region separately, for instance if it is a urban or a rural area, and the proportion in which the two languages can be used is mostly 50/50 (English and an African language).

We should not fall into the trap of following the US and Canadian programmes as they might be disadvantageous for our context, because in the Canadian context it is the minority language speakers who were immersed into the second language. We on the other hand have the majority of the learners speaking the language that is not the medium of instruction. In addition most of our teachers are not first language speakers of the medium of instruction. This means we will have to look at teacher training as well. What happens then with the language of instruction in countries which do not have bilingual education programmes? The language used for learning and teaching remains the second language of the child. Education through the medium of a former colonial

language in many African countries has resulted in poor achievement both academically and linguistically (Skutnabb-Kangas: 1988). As a result, for over a decade there has been a call for mother tongue instruction. In the next section I look at the benefits of using the mother tongue for instruction.

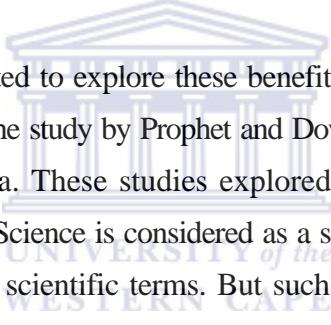
### **2.3.2 Mother tongue instruction**

Mother tongue instruction has won some proponents who argue for its case. Among them are Bambose (1991), Brock-Utne (2001), and Desai (2003). Many writers have cited the benefits of mother tongue instruction. Among the cases put forward for mother tongue instruction are: it has many advantages for the child's learning. For Bambose (1991), mother tongue instruction will bridge the gap between home and school when the child begins schooling, since there is a dramatic change in his life by being in a new environment.



When learning takes place in a language that he is familiar with and is able to use, it will help in narrowing the changes because the new people he meets will be speaking the same language as his. Macdonald (1991) states that language as a tool for learning and communication forms a bridge between home and the new environment of the school, therefore the development of African languages is necessary so that the children can function on their own in this new environment. In the end they will be prepared for learning. Macdonald (1991:31) adds that 'children's thinking skills develop most quickly and easily in the first language ... once they are well equipped mentally in their first language, children can transfer their skills and knowledge with reasonable ease'. It is said that it is easy for the child to learn a second language if he is more proficient in his own mother tongue because he is well developed in language learning and the language skills are transferred to the second language. Brock-Utne (2001: 12) confirms this by saying that high achievement in overall studies can be attained as the knowledge of how to learn can be transferred to other learning areas.

The advantages and the role of the mother tongue in education affirm how important it is to use African languages in African contexts as languages of learning and teaching (Skutnabb-Kangas, 1988). Furthermore, Prah (2002: 17) states that African languages as languages of instruction act as an instrument for the cultural and scientific empowerment of the people as they are the languages of the masses; people become more creative and innovative when they use their own languages. It also gives a chance to the language to grow as languages of culture, as the children will learn about the culture of the language. Eventually when an indigenous language is used as a medium of instruction, there will be an opportunity for its development as a language of science and technology. Bamgbose (1991) echoes the point that language and culture go hand in hand, for giving attention to our languages and developing and promoting their use will result in a healthy society. This can ideally happen in an educational setting.



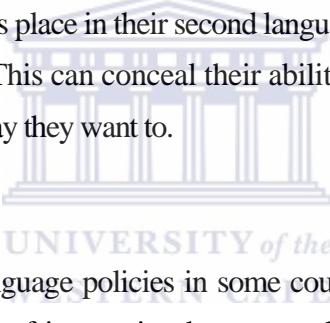
Many studies have been conducted to explore these benefits and advantages that are mentioned above. I can mention the study by Prophet and Dow (1994) in Botswana and Mwinsheike (2003) in Tanzania. These studies explored the teaching of science subjects in an African language. Science is considered as a subject, which can only be taught in English because of its scientific terms. But such studies have shown that learners taught in their mother tongue benefit more than those taught in the second language.

Although the benefits of mother tongue instruction are clear, not everyone is enthusiastic about the idea of introducing mother tongue instruction. You will find education officials, parents and even teachers who favour English as the medium of instruction. With parents, many reasons are put forward for their attitudes, such as the children will get a better education if they are taught in English they will be able to communicate with other people from different linguistic backgrounds. Of course it is not a bad thing to want your children to get a better education, but if we believe in our languages we can make sure that the children do get a better education using African languages. Cummins and Swain (1986:80) state that, in order for the learners to learn the second language and succeed academically, they require maximum exposure to the language. However it is clear that for second language learners the development of academic skills also depends on the learners' capability to understand the academic

input, which is related to the conceptual attributes developed in their first language.

Most of the parents' feelings about mother tongue instruction came from their experiences with apartheid. The introduction of Bantu Education, saw the mother tongue instruction being used as a tool to serve the Nationalist Party's political agenda, by which the African children were segregated along language lines.

In South Africa, although the language in education policy states that, if possible, the learners' home language should be used as language of teaching and learning and assessment, this is not normally the practice. My experience is that, although teaching and learning does take place in the learners' home language at some schools, and when they are responding to questions posed by the teacher they can use their mother tongue, written assessment, however, takes place in their second language, which is a language they have little command over. This can conceal their abilities and they would not be able to express their ideas in the way they want to.

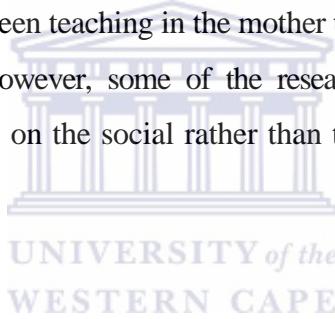


It has been difficult to amend language policies in some countries as people still think that African languages as media of instruction have no value. It is believed that the continued use of English as a medium of instruction will make things easier for the developing countries as there is ready print material, and that they will not spend money in reprinting the material in African languages. As I see it, the costs in the long run for using African languages will be an investment in education and enriching multilingualism.

In these situations, teachers are compelled to continue using the second language as the language of teaching and learning, which happens to be the second language for many of the learners as well. In these situations, the teachers encounter some problems in the classroom. In order to manage the problem, teachers have adopted some strategies in the classroom; one of these strategies is code-switching.

## **2.4 Code-switching**

There has been intensive research done on the concept of code switching for more than two decades, but the research conducted has not been conclusive. Most of the research done on the issue has been conducted in America and Britain. In Africa there has not been enough focus on the issue. However, I am not casting aside the works of Ndayipfukamiye (1993) who conducted a study on code switching in Burundi Primary schools. Jo Arthur (1993) focused on the classroom discourse between the teacher and pupils in standard six Botswana classrooms. Also we have the study by Prophet and Dow (1994) who assessed the development of scientific concepts using the mother tongue. Although this study does not focus on code switching, it is very useful as it makes the comparison between teaching in the mother tongue and the medium of instruction, which is English. However, some of the research conducted in Africa, including South Africa, focuses on the social rather than the educational aspects of code switching.



### **2.4.1 Functions of code-switching**

There are many reasons why people code-switch, both societal and educational. Martin - Jones, in Milroy (1995) discusses some of the research that has been conducted in bilingual classrooms. These studies focus on the functions of codeswitching, the attributes of both teacher and learner as, well as how they value each language, that is, what status they attribute to each language.

#### **2.4.1.1 Code-switching in the society**

Before looking at code switching in classroom situations, I would like to look at the functions and motivations for code-switching outside the classrooms, in the broader society because a child is moulded in the community before coming to the school environment. In a society where more than one language is in use, people have a choice of

what language to use in certain situations and why they would not use it in others, as well as a choice of what language they can use for certain utterances. For example, in isiXhosa, a speaker may decide in the middle of a conversation that a certain word or phrase in the language may not be suitable then he can switch to another language or dialect. This happens mostly when the speaker wants to sound polite and that particular phrase may not be proper for the conversation or the people he is conversing with. Myers-Scotton's (1993) findings from a study she conducted show that people code switch to redefine the relationship between the two speakers, and that participants consciously code switch because of social factors such as status and identity.

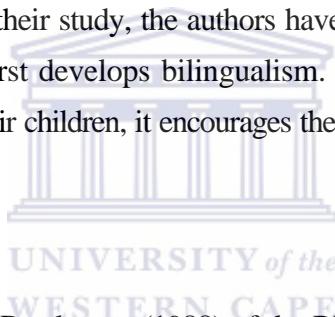
Similarly, Slabbert and Finlayson (1994) list a number of social motivations for code switching in a South African township. These are, the speakers code switch to accommodate the addressee, to establish common ground, to show willingness to learn and experiment with other languages and to employ measures to make yourself understood. Slabbert and Finslayson's study was conducted in Soweto, one of the townships with people of diverse backgrounds in South Africa. The study aimed at exploring how code switching is used within a South African urban context. They used interviews to collect data. What transpired from these interviews is that the speakers were aware of their code switching. When asked what language they speak, the reply came as; 'we usually speak a language that is Soweto style' which can be referred to as a language for communicating since Soweto is a habitat for multilingual communities.

#### **2.4.1.2 Code-switching in the classroom**

In educational contexts, code switching is regarded as a practice that could support classroom communication in general (Adler et al, 2002: 10-11). To support this, Adler et al refer to studies, which show that the use of learners' first language in teaching and learning mathematics provides support needed while the learners continue to develop proficiency in the language of teaching and learning. The teachers that Adler et al investigated comment on their use of code-switching in the classroom as a good strategy when it is used properly. For them, code-switching helps the learners to understand the concepts and communicate their understanding, but also fear that in the examinations the learners are expected to respond in English.

Functions of code switching in the classroom include; to explain, elaborate, emphasize, clarify and reformulate concepts, and to instruct the learners on tasks that need to be done (Adler et al, 2003, Huerta-Macias and Quentero, 1992). If code switching in the classroom performs all these functions, it becomes an effective teaching and communicative strategy, as well as one for developing bilingualism.

Classroom interaction between learners in small groups using both mother tongue and medium of instruction is important as learners learn from each other through the use of their first language. Effective communication in the classroom takes place when learners are able to use either language, therefore ensuring effective learning. If oral discourse in both languages is allowed, this can lead to effective writing (Huerta-Macias and Quintero: 1992). In their study, the authors have also included the family because it is where the child first develops bilingualism. If parents maintain their mother tongue and use it with their children, it encourages them to use it as much as the language of instruction.



A similar study to this is that of Butskamm (1988) of the RWTH Aachen Institute of Didactics, where he observed the use of code-switching in a History lesson at a bilingual German grammar school. In this study he discusses the importance of mother tongue in learning activities and other methods that can be used to teach a content subject. One of these methods he mentions is the concurrent method. The concurrent method is where the teacher says something in one language and translates it into another. This method has proved to be a failure. Reasons for the failure were that the learners will only pay attention to what is said in one language and ignore the translation. Although mother tongue is an essential learning aid, this method has failed due to the fact that the teacher will have to say every thing twice. That is why most teachers adopt code-switching as opposed to the concurrent method, as teaching strategy.

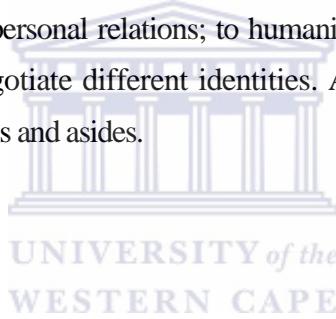
At the school where the study was conducted the two languages that are used for instruction re German and Arabic. The lesson that the author used in demonstrating the use of code-switching is a lesson where learners are actively involved in a class

discussion. Switching to their mother tongue functions as a learning aid to enhance communicative competence in the medium of instruction.

Ferguson (2002) found that the findings of most of the studies done on classroom code switching have numerous similarities when it comes to the functions of code switching. To make this understandable he grouped these according to 3 categories (2002: 4):

- Code-switching for curriculum access; here code switching is used to explain the meaning of texts for the learners so that they can understand the subject matter.
- Management of classroom discourse; here code switching is used for 'off lesson' discourse in order to motivate discipline and praise the learners.
- Code-switching for interpersonal relations; to humanize the effective climate of the classroom and to negotiate different identities. An example of such code switching is the use of jokes and asides.

As Adendorff (1993: 142) says,



Code-switching is a communicative resource, which enables the teachers and pupils to accomplish a considerable number and range of social and educational objectives.

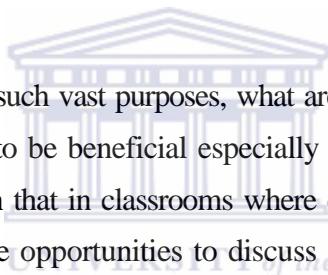
There are functions of code switching which are common in both the societal and educational contexts. These are:

- Directive, in the sense that the speaker is trying to include the hearer in the conversation by using his language. But this can also be exclusion for others;
- Referential that is when the speaker does not know a word in the language he is using and brings into the conversation a word from another, or the language is more suitable for the subject of the conversation and
- Metalinguistic, by impressing other participants with a show of linguistic skills (Appel and Muysken: 1987: 35).

For Baker (1993:77), the positive functions of code-switching are:

- To emphasize a point;
- To clarify;
- To signal identity and status of the speakers;
- To indicate acceptance by the group;
- To cross social or ethnic boundaries.

Negatively code-switching can be used to exclude someone from the conversation when one of the speakers does not understand the language that the other speakers have switched to.



Since code switching is used for such vast purposes, what are its benefits? In education code switching has been found to be beneficial especially in the bilingual education programmes. Studies have shown that in classrooms where code-switching is allowed, this provided children with more opportunities to discuss and reflect on the subject matter. The freedom of language use that code-switching allows enables them to become active participants and effective learners. Compared to those in the mainstream (classrooms that are taught in English only), those learners using code-switching achieve more.

Although the benefits of code switching are evident, there are negative attitudes towards this communicative tool. Most of the attitudes are based on intra-sentential code-switching. This type of switching is regarded as problematic because when two languages are used in a single sentence, various problems of incompatibility may arise. The most obvious of these problems is the difference in word order of most languages. It is said that if these languages are used at the same time it will result in an ungrammatical configuration for one of these languages, therefore violating it (Poplack, 1980).

It is not only people who deal with the scientific study of languages who have negative attitudes towards code switching. Teachers, parents and even learners have these attitudes, especially in schools where English is the medium of instruction and a second language for both teachers and pupils. For teachers, code switching is an 'indecent, forbidden form of behaviour' (Adendorff 1993: 142). As a result they deny even using this strategy in their classes. In this country a learner has a right to be taught in the language of his choice. In a school where a majority of learners speak a common language, in this case the governing body could use this to allow learners to learn in their mother tongue. Parents, however, have the perception that if their children are taught in English only they will get a better education. Most parents send their children to schools where they are taught in the second language and their mother tongue is taught as a second language. This results in subtractive bilingualism, as language goes together with culture; these children in some way are losing their culture.



With such attitudes it is not surprising that most education policies on the African continent do not endorse code switching in their language policies.

## 2.5 Conclusion

In this chapter I have introduced the concept of code-switching, where I have traced how this term has been defined by many scholars throughout the decades, and I adopted Milroy's (1995) definition of code-switching "alternate use of two or more languages in the same conversation", which I use throughout the study. In the definitions explored, the following terms came up: bilingualism, multilingualism, bilingual education and mother tongue instruction. The chapter briefly discussed term, and how these have been explored in many countries, especially in Africa.

The next chapter describes the methods that I employed in collecting the data for the study.

# **CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY**

## **3.1 Introduction**

As I have already mentioned, the aims of the study were to explore the role of code-switching and its effect on the learners' overall performance in learning concepts in their Biology lessons in Grade 11. The study falls within the descriptive primary research paradigm, which includes non-experimental, qualitative and interpretative methods. It is primary because it is derived from primary sources of information such as the teachers and learners. This kind of study can best be described as a case study where the researcher observes the characteristics of an individual unit (Cohen and Manion: 1985:). A case study is an intensive, holistic description and analysis of a single instance, phenomenon or social unit (Merriam, 1988:21). Deducing from other definitions of a case study, especially what constitutes a case, Merriam (1988) concludes that a case is a single entity, unit around which there are boundaries, such as a person or a community. In my study I have used the school as my case study.

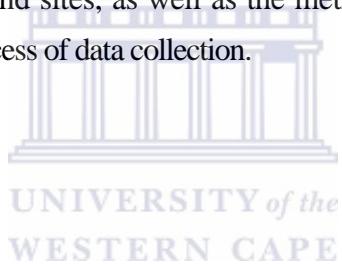
## **3.2 Research design**

According to Nunan (1992:77), a case study is different from other types of research because in a case study the researcher, unlike the experimenter does not manipulate the variables to determine their causal significance. As part of qualitative research, a case study takes account of events in the classroom, where real teaching and learning takes place (Seliger and Shahomy: 1989). Qualitative research is based on non-experimental techniques, Seliger and Shahomy note that non-experimental procedures are more open-ended and not dictated by pre-determined research designs. This gives the researcher an opportunity to get unrestricted responses from the subjects, because the classroom will not be a controlled environment. There are clear distinctions between qualitative and quantitative research according to Denzin and Lincoln (1994:13). The word quantitative has some implications for the type of research one embarks on. They state that 'qualitative implies an emphasis on the quality of entities and on the process and

meaning that are not experimentally examined or measured. The researcher stresses the socially constructed nature of reality, the intimate relationship between the researcher and what is studied. In contrast, quantitative research emphasizes the measurement and analysis of causal relationships between the variables, not the process'. Although the study is mainly qualitative in nature, some aspects of quantitative research have been used. These are the learners' scores in class work, class tests and examinations. I will be able to evaluate the learners' understanding of the concepts through their scores

Since the study investigates what actually takes place in the classroom, the most common technique in case study research classroom observation was employed. In the classroom observations the researcher was a non-participant, as the study is not an experimental study. Other techniques that were used in data collection are interviews and questionnaires. This chapter will focus on discussing briefly the research approach adopted, the research subjects and sites, as well as the methodology, which aims at assisting in understanding the process of data collection.

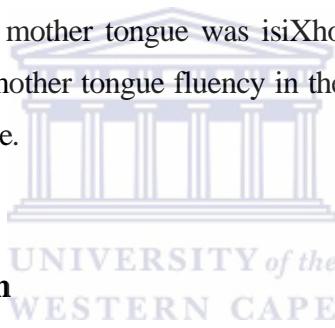
### **3.2.1 Sampling**



The sample for the study was a high school in Khayelitsha, a township near Cape Town. The school is no different from typical township schools, which are characterised by limited teaching and learning resources. The language spoken in the area is predominantly isiXhosa since most of the people come from the Eastern Cape. I chose this area as it is a semi-urban area, meaning that the learners are exposed to their second language (English) through the media such as television, radio and billboards. This therefore makes it safe to say that they are in some way bilingual, unlike those in rural and farm areas where these resources are scarce and they only encounter the second language at school. The reason I say that the learners in the township are in some way bilingual is that it is very difficult to measure bilingualism. We might not be able to safely say that bilinguals are those who have an equal competence in both the mother tongue and a second language. For there are those individuals who cannot speak the second language but are able to read and write and understand when spoken to in that language.

Another reason for choosing this school is that it was easy for me to collect data, as I was closer to the subjects because I teach at the school. I did not need to spend time traveling between the investigation site and my place of work. Cohen and Manion (1980: 76) refer to this kind of sampling as accidental sampling because it involves the nearest individuals to serve as respondents. And for me the school and the subjects are within easy reach. According to Denzin and Lincoln (1994), this type of sampling is purposive sampling, which they explain as when a qualitative researcher seeks out groups, settings and individuals where the processes being studied are most likely to occur.

The subjects consist of two Grade 11 biology classes of 54 and 60 learners each, two teachers, and the head of department and the principal were also briefly engaged. Most of the learners indicated that their mother tongue was isiXhosa and those who had a different mother tongue, had a mother tongue fluency in the language. Both teachers had isiXhosa as their mother tongue.



### **3.3 Process of data collection**

#### **3.3.1 Classroom observations**

Collecting data through observations is one way of getting an insight of what actually takes place in the classroom and how the teachers and learners use language (s) at their disposal to transmit knowledge. The direct observation helps in the understanding of the context. Although classroom observations are regarded as an easy task, the observer must know what to look for as not everything can be recorded. According to Best (1959), the observer must be able to distinguish between the significant aspects of the situation and factors that have little or no importance to the investigation.

Allwright (1988:254) identifies three types of observational data. These are:

- Systematic observation of learners in controlled non-classroom settings;

- Systematic classroom observation of naturally occurring language classroom events, with no attempt at control;
- Systematic observation of controlled classroom data.

In this study I chose the second type, where the researcher observes the events in the classroom without manipulating the subjects or the data. By choosing this type, it made it easy for the teachers and the learners to be more natural and feel comfortable during the lessons. During the observations, I observed class interaction and took some notes. Some of the lessons were tape recorded to ensure validity of the notes that were taken.

Choosing classroom observations has many advantages for the study: direct observation of the classroom interaction allows the observer to watch what people do and listen to what they say. This is in contrast to interviews and questionnaires where there might be a discrepancy between what people say they did because the researcher was not there to see if they actually did what they say they had done. In this study, since I had used these three methods, I thought it would be important to start with classroom observations before interviewing the teachers so as to see if their responses about their teaching correlated with what I saw in the classroom.

In these observations, I was a complete observer, as I did not take part in the classroom activities that the teacher and learners were engaged in during the lessons. Although the observations were non-participatory, it does not mean that the observations could not interfere with the usual classroom events, because the mere presence of the observer can make the subjects change their behaviour, resulting in inconclusive results. This is one of the disadvantages of classroom observations mentioned by Robson (1996:192). However, for me, since I was a teacher at the school the learners were familiar with me, and they felt comfortable to behave in the way they normally did. Also the tape recorder could sometimes be a hindrance as learners may turn their focus on it, but at most times this was not the case.

The tape recorder is a useful device in classroom observation for the following reasons: it provides ample material with great ease and records every conversation in the classroom, as it might be difficult for the researcher to recall all the conversations that took place in a particular lesson, as well as noting down everything. According to Silverman (2001:62) tape recorders are very important as they '(can be replayed to improve the transcript as well as to preserve the sequence ta'. However tape recorders also have some disadvantages. These are: the tape recorder does not record silent activities, as it is not visual. And some of the information recorded may not be relevant (Hopkins 1994: 120).

Another technique in classroom observation, which I adopted, was interaction analysis. This technique enables the researcher to observe how language is used in the classroom (Nunan 1992: 98). I found it befitting the study as it could be used to observe how language is used across all learning areas, not only focusing on language acquisition. Through the interaction analysis I was able to measure how much time each teacher and learners allocated to the use of each language in the classroom. Also what teaching materials were used, what teaching techniques were employed whether they allowed for learner interaction and how many opportunities the learners had to speak in the class. The devices used for this in the classroom are: observation schedule and check list (see Appendix 1 &2).

### **3.3.2 Interviews**

Interviews are also a tool I have used in the study in order to collect data. There are many advantages that are associated with the use of interviews in case study research, the important one being that during the interviews the researcher is able to find what the people being interviewed think and they can also express their feelings about a certain issue in the study. Most common with interviews is one-on-one interaction between the interviewer and the respondents.

The purpose of this is to find information about what the person thinks. Interviewing is necessary when we cannot observe behaviour, feelings or how people interpret the world around them (Merriam 1988:72). When it comes to this study, some may think that interviews were not necessary, as the study is not about the respondents' perceptions.

Although the purpose of the study was not to gain teachers' views and attitudes, with the interviews I hoped to find out whether the teachers felt that their codeswitching does help the learners in understanding the lessons and what effect they thought code-switching had on the lessons. In these interviews I have made use of semi-structured interviews, which is a mix of structured and unstructured questions. A number of questions were prepared in advance, however, allowing for flexibility (Nunan: 1992). I chose this type of interview so that I could be prepared, but on the other hand, I wanted to make my interviewee feel comfortable, more like we were having a conversation. The interviews were recorded and transcribed to ensure validity.

Below is a table of questions, which were used as a guide for the interviews.

**Table 1**

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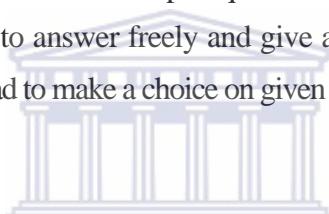
**Interview questions**

1. Does the school have a language policy? What is the policy of the school?
2. What are your views on the language policy?
3. Which language do you use when teaching
4. Which language do the learners use when interacting with you?
5. When you use the medium of instruction, do you find it easy or difficult and do the learners seem to understand you?
6. What do you do if you find learners have difficulties in understanding the lesson presented in the medium of instruction?
7. When do you use the mother tongue and how often?
8. Do you plan in advance to use the mother tongue or does it happen in class?
9. Are the learners allowed to use their mother tongue in assessment activities and examinations?

The interviews were conducted with the teachers, but for the learners, a set of questions in the form of a questionnaire were distributed.

### **3.3.3 Questionnaire**

I have used questionnaires with the learners because of their numbers, it would be impossible to interview each and everyone without consuming too much time. Questionnaires are highly efficient for data collection with a large number of respondents (Anderson 1998: 168). With the learners, the focus was on eliciting information about how they view the language use in their classroom and what their expectations are of the teacher and language of instruction. The questions in the questionnaire are both open and closed. The open questions used in the questionnaire made it possible for the learners to answer freely and give accurate responses. And in the closed questions the learners had to make a choice on given options.



Since the questions were administered to learners, I thought it a good idea to keep them short, because learners may find it time consuming to respond to a very long questionnaire. I tried to make the questionnaire clear and simple so that they did not find it difficult to respond to. To make sure that the questionnaires were returned, I included a section where the learners could write their names and grade although this information would not be used in the report.

The interviews, recorded classroom observations and the questionnaires were used for qualitative data analysis. I also used the learners' scores in class work, class tests and the mid-year examinations for quantitative data analysis.

In the next chapter I will present and analyse the data that I have collected through the methods and techniques discussed in this chapter.

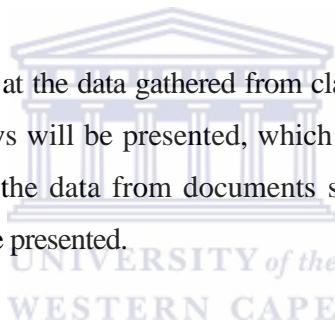
## **CHAPTER 4: DATA PRESENTATION AND DATA ANALYSIS**

### **4.1 Introduction**

This chapter is concerned firstly with presenting the data, which was collected using the different techniques that I discussed in the previous chapter, such as interviews, questionnaires and classroom observations. Secondly it is concerned with an analysis of the data in order to find answers to the research questions mentioned in Chapter 1.

### **4.2 Data Presentation**

In presenting the data I will look at the data gathered from classroom observations first, and then data from the interviews will be presented, which will be followed by data from the questionnaires. Lastly the data from documents such as tests, class work, examinations and mark lists will be presented.



The classes observed contained many students. In Class 1 there were 59 learners who were registered and three dropped out and were therefore deregistered. In Class 2 there were 57 learners and none dropped out of school. In one class the students sat in single chairs and tables, while in the other class they sat in double desks. In the lessons observed, the textbook was one of the resources used; however, there were few of these during the lessons. According to school practice, all the learners receive textbooks at the beginning of the year. Two learners share a book because of the shortage. For those who do not bring the book to class, when asked the reasons they say they fear that the book might be stolen and they have to carry the cost of recovering it at the end of the year. Therefore, during these lessons the learners depend only on the teacher for information.

In this study the teachers are referred to as T1 and T2 for Teacher 1 and Teacher 2. I observed 4 lessons with T1 and in most of these lessons the teacher dominated the classroom talk. The teacher would explain the lesson and then ask questions which the

learners answered. T2's lessons were more balanced, which means that both teacher and learners participated, learners asked questions, answered questions and explained things to others. The learners in her class were more interactive, they were the ones who would ask the most questions from the teacher and the other learners. However, with both teachers, code-switching did take place during their lessons. Below is a table, which indicates how often each language was used during one of the lessons.

**Table 2.**

**Duration of the lesson: 45 minutes.**

Class	Time each language used in the classroom				
	English		IsiXhosa		
	Teacher	Learner	Teacher	Learner	Total
T1	25 minutes	5 minutes	8 minutes	7 minutes	45
T2	20 minutes	12 minutes	12 minutes	10 minutes	44

#### **4.2.1 Data from classroom observations**

As indicated above, classroom observation was one of the methods used in data collection to answer research question 1, which is 'What type of code-switching takes place in the classroom'<sup>1</sup> and research question 2, which is 'How often and when does the teacher code-switch'. I had intended to observe as many lessons as possible, but due to delays and teachers having other commitments, such as the school choir, I focused on 7 lessons as it became clear that some of the lessons were a repetition and the procedure was similar.

## **Teacher 1 (T 1)**

I had the opportunity to observe both his classes but I had one class, which I focused on. The other class I used to compare the learners' interaction during lessons as one class is a science class and the other non-science class, where they focus on subjects such as History, Geography and Biology. The school has 3 streams which are, commercial, science and general stream. The general stream consists of Biology, Geography and History subjects. The lessons were 45 minutes long, but most of the time they started a few minutes late due to the assembly, especially if the period was after the assembly.

In the class which was the focus and where I observed 3 lessons, the learners were sitting in single desks. There was a lot of space in this class as the classroom is bigger there were about 12 learners who were absent according to the class list, although this cannot be accurate as the teacher informed that some learners registered at the beginning of the year and never came to school or dropped out of school during the course of the year. Since the classroom was a laboratory, the desks were not arranged in a manner that the learners sit in rows. I sat in an unoccupied desk facing both the teacher and the learners. The lesson started with greetings in English. Then the teacher introduced the day's lesson, which was a conclusion of the topic on bacteria, that they were dealing with. During this lesson teacher interaction was for most of the time in the language of instruction (English), with switches to mother tongue.

Since this was the last part of the chapter, the teacher reflected on the previous lessons, which were covered in the chapter and asked questions. When a learner was unable to answer a question he/she had to stand until another question was asked, then a second chance would be given so that the learner could sit. One learner who was standing for a long time asked if she could sit, as her leg was painful. The learner used her mother tongue to make the request. As this lesson served as a revision, to recap on the covered topics the teacher used mostly English, but sometimes he interpreted what he said in isiXhosa.

### **Example**

English: Nitrogen is useful, as it is needed by the soil.

Mother tongue interpretation: *Ndithi iNitrogen ibalulekile njengoko isetyenziswa ngumhlaba* (what I'm saying is that the nitrogen is .....)

As the lesson continues the teacher made sure that the learners understood and were following the lesson, he did this in the mother tongue most of the time. For example he would say '*Sikunye?*' (Are we together?). In addition there were instances where the teacher used both languages in one sentence.

### **Example:**

*Umbane xa kududuma* plays a vital role in the soil,  
(when there is a storm the lightning)

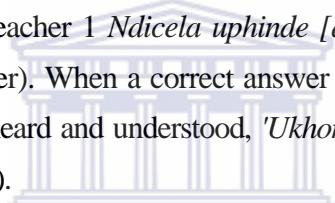
Learners were also allowed to ask questions before the lesson ended. No questions were asked by the learners, so the teacher gave them a task to do at home. During this lesson there were out of topic utterances such as jokes and when the teacher was reprimanding a learner, which took place in the mother tongue.

The focus of the next lesson that I observed from this class was on Viruses and Bacteria. In introducing this topic the teacher made references to the last chapter as they were linked. He explained the different types of fungi. This took place in the language of instruction. While he was explaining he asked some questions to get the learners' prior understanding of the topic. The answers for these questions were supplied both in mother tongue as well as in English. When a learner did not understand the question, she/he would request from the teacher '*Ndicela uphinde [question tishala]*' (can you repeat the question please, teacher). When a correct answer was supplied, the teacher would make sure that everyone heard and understood, '*Ukhona umntu ongavanga?*' (Is there anyone who did not get that?).

The last lesson from this class was observed in the 3rd term of school. When I got to the

class the teacher was not there so I waited. The learners in the classroom were chatting to each other. When he finally arrived the learners settled down and I noticed that again there were a number of learners who were absent. The lesson began after 13 minutes. The topic for this lesson was Genetic Mechanisms. The textbook was used as the only resource in the lesson. Few learners brought the textbook so many of them were sharing textbooks.

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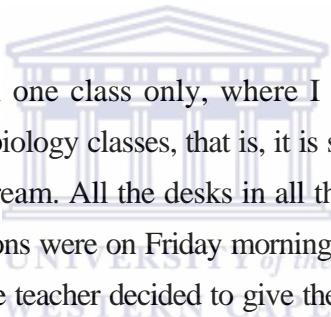
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In the class that was used for comparison, 2 lessons were observed. The class was also in the laboratory. It was big and the desks were not close together and there were sufficient for the learners. A few desks were not occupied, indicating that there were learners who were absent. Similarly I sat in a position where I would be able to face both the teacher and the learners. In one of the lessons, two activities took place. The first activity was to mark class work, which was written the previous day. In marking the task, questions were asked, from which the learners had to provide the correct

answers. As the activity was carried out, when a learner provided an answer the teacher elaborated more and reminded the learners that a test would be written soon therefore they had to pay attention and do the corrections for the questions they got wrong.

After the marking of the class work, the learners complained that they did not have notes for the chapter. This led to a second activity in the lesson. One learner copied notes onto the board while the rest were copying into their books from the board. While the notes were written, the teacher moved around the class explaining the notes and answering some questions that the learners had. This interaction took place mostly in English and sometimes with some switches to isiXhosa.

### **Teacher 2 (T2)**



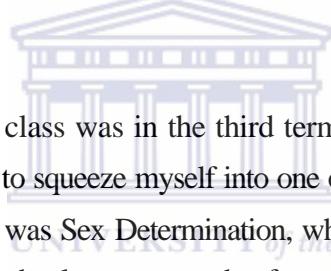
With this teacher, I focused on one class only, where I observed 3 classes. The classroom is similar to the other biology classes, that is, it is situated in a laboratory, as the learners are in the science stream. All the desks in all the lessons that I observed were occupied. The first two lessons were on Friday morning where periods are shorter than usual. On the first Friday, the teacher decided to give the learners class work from the topic they had completed. The teacher explained what the learners were expected to do. The class work was done in groups of 4. She handed out a worksheet with the tasks to each group. When she wanted to be sure that each learner in a group had a worksheet, she said '*wonke umntu ufumene iphepha?*' (Does everyone have a worksheet?) in isiXhosa. As the learners proceeded with the task they interacted among themselves in their mother tongue. I noticed that some of the contents of their conversation were not on the task at hand. At some point it got noisy and the teacher had to say '*thulani nenze umsebenzi \venu!*' (*Keep quiet and do your work*).

Then the teacher started to move around the desks and mark the learners' work individually. If a learner did not get the answer right, she would explain the question in isiXhosa and then the learners had to try again to give the correct answer in English.

On the second Friday, the teacher was introducing a new topic on Bryophytes with the focus on the Moss Plant. As this was an introductory lesson, the teacher did most of the talking and this was in English, with switches to the mother tongue. For instance when she familiarised the learners with the topic, she used their surroundings as an example.

**Example:** *ukuba u-muva around the school building, you will see a soft green plant ethi xa u-yipress (a) uboya bulale as i-cordroy (if you move around the school buildings you will see a soft green plant, which when you press it the fur will feel like corduroy.)*

In this example, both languages are used in one sentence. To end the lesson the teacher gave the learners homework. In this task they had to go and find a moss plant in the areas they live in so that they could bring it to the next lesson, which will focused on the life cycle of this plant. The instructions for this task were given in isiXhosa.



The last lesson observed in this class was in the third term. As usual there were no empty desks in this class so I had to squeeze myself into one of the desks with two other students. The topic for the lesson was Sex Determination, which falls under the chapter in Reproduction. The focus of the lesson was the formation of gametes. At the beginning of the lesson there was silence in the class while everyone was listening to the teacher. However, as the lesson progressed there was a lot of discussion as they started to interact by asking questions and participating. At times these questions were not really focused on the topic at hand but related in some way. For example, one learner asked how bisexuals are produced. This led to a discussion about gays and lesbians, which was a very interesting topic for them as they are teenagers, which made them eager to contribute to the discussion. Some of these discussions took a long time so that the teacher was not able to finish what she set out to do. At the end of the period she promised to continue with the lesson and handed out a worksheet for homework.

#### 4.2.2 Data from interviews with the teachers

The two teachers, in whose classes I did the classroom observations, were asked the same interview questions. The questions were semi-structured which allowed flexibility.

These questions addressed 3 research questions. Question 2, which is 'How often and when does the teacher code-switch?' Question 3, which is 'For what reasons does the teacher code-switch?' and Question 4, that is 'Does assessment makes any provision for code-switching during classroom activities?' The teachers' responses to the research questions will be presented under each question. A detailed transcription of one interview is presented as Appendix 3.

The first and second questions deal with the language policy of the school, particularly focusing on the medium of instruction. Both teachers answered that they were not aware of the school's language policy, as they had never seen it. However T1, said he thought there is a language policy because the school has one medium of instruction.

Question 3 focuses on the teachers' views about the use of English as a medium of instruction. The teachers felt positive about this medium, especially where their subject is concerned. T1 pointed out that he felt that it is important to use English in class since most of the subjects are in English, therefore they could get used to the language.

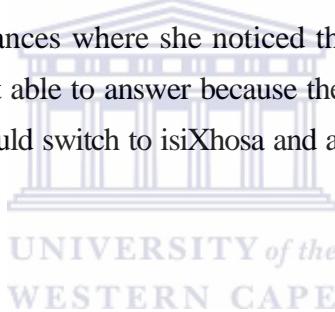
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From the fourth question, the focus is on the teachers' teaching and language use. Question 4 asks about the language the teachers use in their classrooms, especially when they are teaching. They both answered that they use the medium of instruction, but T2 pointed out that she sometimes uses isiXhosa during the lessons although most of her teacher talk is in English.

Question 5 aimed at finding out the language the learners use in the classroom when they interact with the teachers. T1 stated that they used English although they encountered difficulties in trying to express themselves in English. He also pointed out that, some of the difficulties are not caused by a lack of understanding in the language, but it was because of shyness and the fear of being mocked by others. In such cases he allowed them to use their mother tongue.

The sixth and seventh questions aimed to find out whether the teachers had any difficulties in using English as medium of instruction in the classroom as it was their second language and if learners seemed to understand them clearly when they used this medium. The teachers stated that they did not have any problems. T1 indicated that he did not have any difficulties in communicating in English with the learners. The learners on the other hand competed with each other to understand and use the language.

Question 8 focused on the strategies the teachers employed when they found that some learners had difficulties understanding the lesson, presented in English. T1 pointed out that he did not do anything in class but organised extra-time with the particular learner as he saw repeating all over as a waste of time for those who understood. T2 also mentioned that there were instances where she noticed that the learners were not following the lesson or were not able to answer because they did not understand the question she asked. Then she would switch to isiXhosa and allowed them to answer in isiXhosa.



Questions 9 and 10 asked for the reasons the teachers used the mother tongue in the classroom. The teachers confirmed that they do use the mother tongue, as T2 already pointed out in the previous question that she switches to isiXhosa so that learners could understand her and be able to interact with her. T2 also stated that she used isiXhosa for the learners' understanding.

Questions 11 and 12 refer to the frequency of switching and whether they planned to use the mother tongue before coming to class. Both teachers answered that they did plan to use isiXhosa for their teaching, but it happened in class and that it did not happen often.

The last question focuses on the learners' writing, asking whether learners were allowed to code-switch when they write. The teachers' responses to this question were that learners were not allowed to use their mother tongue in their writing, the medium of instruction only was allowed. T2 pointed out that even if a learner has the question

right, it would be marked wrong because of the switch, even if it is a one word insertion. To confirm this, I checked the learners' scripts.

During the course of the investigation I decided that it would be best to also find out the principal's views on the subject of code-switching at his school, although this was not part of the initial plan of the study. I gave a brief explanation of the purpose of the interview and that it would be treated with the utmost confidence. Although I was sceptical in conducting this interview since it was not part of the plan, I found that it is not unusual in investigations for the researcher to engage in techniques that were not part of the plan. Best (1959) explains 'through the interview technique the researcher ... can also explore significant areas not anticipated in the original plan of the investigation.

I have also analyzed test scripts and examination scripts for traces of code-switching.



#### **4.2.3 Data from students' questionnaires.**

In this section I present data which has been gathered from the questionnaires distributed to the learners in the two classes observed. 100 questionnaires were distributed to both classes, in total 84 were returned. The responses in the questionnaire provide answers to research questions 4 and 5 respectively. These responses are categorized into groups. The learners were expected to answer all questions, three of these questions require a yes or no answer and two required the learners to explain their choices for the yes/no questions.

The first question aims to know if learners noticed whether code-switching took place in their lessons. Almost all the learners answered that they did notice code-switching in their lessons, 83 learners, while only 1 did not answer this question.

The second question focused on their perceptions about code-switching, whether they found it helpful in understanding the lessons, 80 of the respondents stated that codeswitching did help them in understanding the lessons while only 4 thought that it was not helpful.

The third question aimed to find out why the learners thought that code-switching helped. A number of reasons were given by the 83 who felt that code-switching was helpful. Most stated that Biology used too difficult terms, so when the teacher switched to their mother tongue they understood and gained the knowledge they needed. Code-switching was effective only if the teacher explained or emphasized what was taught so that they could also participate in class. If they understood they could also explain to those who still did not understand that particular topic. Also it becomes easier for them to remember the concepts if they are explained in the mother tongue. The remaining one indicated that it is best for them to get used to the concepts in English in preparation for the examinations.

Question 4 aimed to know if learners' code-switch in their writing. 12 of the respondents stated that they do code-switch, and seventy-two said they did not. The last question asked the learners to elaborate why they gave the answers for the previous question. The twelve who stated that they did code-switch gave various reasons for code-switching. Two of these said that they code-switched to express themselves better so that the teacher could understand what they said or to explain their answers to particular examination questions. Another two code-switch when they did not know what word to use in English or when they could not express themselves in English, they would write in isiXhosa and either put it in brackets or underline for the attention of the teacher. Six learners stated that as teachers code-switched in class to explain things, they did not see the reason they could not do the same to put their views clearly. The last 2 respondents made a comparison with other subjects such as Afrikaans where they were allowed to switch to English; therefore they could do the same in Biology.

Of the seventy-two who answered that they do not code-switch in their writing, twenty-six pointed out that they do not do so because code-switching is not allowed, not right or 'unacceptable' when they write. Forty-four brought up various interesting reasons they do not code-switch, some indicated that the use of English in writing proves that they have understood what they have been taught in class. Others pointed that since the questions were in English, therefore it was imperative for them to answer in English as well. Another group stated that it might be confusing for the teacher to read

what they wrote if they code-switched. A further group indicated that it would be for them to write in one language in a sense that it would improve their English. For example, they could use dictionaries for vocabulary and spelling in classroom activities and home work. 2 learners said they tried by all means not to use complicated words as there would be no need for them to switch to another code as they noted that there were differences between written and spoken language.

#### **4.2.4 Data from documents**

The question papers were analysed in terms of the type of questions asked, what skills were required for answering these questions, and whether these reflected the aims of the syllabus, especially in terms of attaining concepts. The exam papers were also analysed to see whether they gave learners the opportunity to use language to communicate their understanding.



### **4.3 DATA ANALYSIS**

The previous section dealt with presenting the data gathered through classroom observations, interviews with teachers and questionnaires which were distributed to the learners. The study explores the use of code-switching in teaching and learning Biology, as well as the role it plays in learners' understanding of the subject. In investigating these, a number of questions needed to be answered.

This section analyses the data presented. In an attempt to answer the main research questions, the analysis will focus on the following:

- Types of code-switching taking place in the classroom
- How often did code-switching take place in the classroom
- Functions of code-switching in the classroom
- Assessment activities in the classroom
- Learners' writing
- Benefits of code-switching

### **4.3.1 Type of code-switching taking place in the classroom.**

In analyzing the data gathered from the classroom observations, I will be using the different types of code-switching that I discussed in the literature review:

- Inter-sentential code-switching
- Intra-sentential code-switching
- Extra-sentential code-switching

Inter-sentential code-switching is when a speaker switches codes between sentences. In the classroom observed, the teachers seemed not to use this type of switching although it is regarded as the safest and easiest. Instead what is closest to inter-sentential code-switching, which was used mostly by the teachers, is translation and repetition of what was said in the language that is more familiar. This type of switching is discouraged by writers, one of whom, Ferguson (2003) feels that translation can be less helpful in a classroom situation. However, teachers supported their use of translation by saying that it was the only way when learners do not understand what they say, therefore translating into the mother tongue was best. For instance, the teacher was explaining the uses of Nitrogen and said; 'nitrogen is very important as it's used by the soil'.

**Example 1** *Ndithi INitrogen ibalulekile njengoko isetyenziswa ngumhlaba.* The word ndithi (what I'm saying) shows that the sentence is a repetition of what was said.

In translation, when everything is repeated it takes more time to complete the lesson.

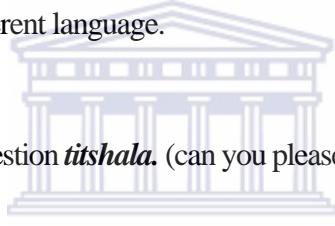
Another reason it is discouraged is that the learners might not listen to the second language, knowing that the teacher will repeat in the mother tongue (Brock-Utne et al, 2003).

The one type of switching that has occurred most of the time is intra-sentential code-switching. This is a type of switching when a speaker switches codes within a single sentence. Although this is perceived as a very difficult type of code-switching, the teachers seemed to have no problems switching within the sentence. It is a belief that switching between isiXhosa and English is impossible and cannot be grammatically

correct. This belief is fuelled by the assumption that English is superior to other languages and very different from isiXhosa. An example of how the teachers deal with intra-sentential code-switching, and in doing so make it seem easy to switch between the two languages, is, while explaining the use and importance of the Nitrogen, the teacher says:

**Example 2,** *Umbane xa kududuma* plays a vital role in the soil (when there is a storm, lightning plays a vital role in the soil.)

Here the sentence starts off in isiXhosa and the teacher switches to English in the middle of the sentence. Other instances of intra-sentential code-switching in the classroom come from the learners, where we find them inserting a word from another code in a sentence that is in a different language.



**Example 3.** *Ndicela uphinde* iquestion *titshala*. (can you please repeat the question, teacher.)

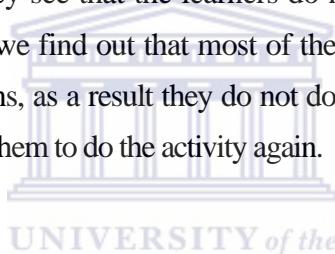
In this sentence an English word (question) is used instead of the isiXhosa word (umbuzo).

Extra-sentential code-switching on the other hand is when the speaker uses tags, idiomatic expressions and interjections from another language in his speech. Most of the extra-sentential code-switching that was used by the teachers were tags, such as in example 2 above, in the word i-question, two languages are used; the article -i is in isiXhosa and the word question in English. Also when the teacher wants to know if the class is listening, after saying something in English he would ask; *sikunye?*, (are we together), this can also be an example of inter-sentential code-switching as the teacher finishes a sentence before uttering the word. Sometimes they use the word *ne?* to ensure that they are listening and to elicit responses from them. This word originates from Afrikaans, but it is used more often by Xhosa speakers as their own.

#### **4.3.2 Analysis of the classroom observations with regard to the frequency of code switching in the classroom.**

The classroom observations provide answers to research question 2, that is, how often does code-switching take place in the classroom. Through the observation technique it became apparent that code-switching does occur for quite a number of times for various reasons, contrary to the responses given by the teachers in the interview, where they claim that code-switching does not occur very often. Although many of the times that code-switching did take place, it was not directly related to the topic at hand.

As noted above, there are various reasons why the teachers and learners code-switched. The most common is that the teachers' code-switch when clarifying difficult items for the learners, as well as when they see that the learners do not understand, especially instructions to a task. However, we find out that most of the learners do not ask when they do not understand instructions, as a result they do not do well in the activities, then the teacher has to explain and ask them to do the activity again.



For learners, they mostly use code-switching for active participation. However they mainly use isiXhosa when they are working within groups. It was unfortunate that I did not observe any practical lessons, where they have to use the language to report on the experiments they performed. It may be because the Grade 11 continuous assessment does not have a practical component, such as the Grade 12. Continuous Assessment is whereby the progress of the learner is monitored throughout the year.

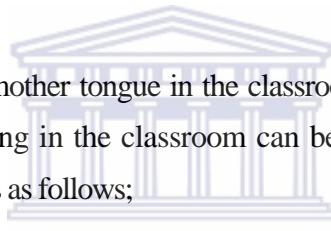
#### **4.3.3 Analysis of the functions of code-switching in the classroom.**

One more question which the classroom observations aimed to answer was research question 3. That is, why do teachers code-switch? Responses from the learners to question 5 in the questionnaire, also give answers to this question, since we have noted from the data presentation section that there are learners who indicated that they do code-switch in their writing although it is not allowed. As Table 1 indicated to us, learners are the ones who switch to the mother tongue mostly in the classroom. Learners

switch to isiXhosa during lessons so that they can interact with the teacher or the other learners. As we can see in the same table, the learners in Tl's class do not interact with the teacher and with one another except for answering questions. The reason for this is indicated in the interview with the teacher when asked which language learners use in the classroom when interacting with the teachers, Tl responds:

they use English most of the time, although in some cases some of the learners are shy to speak English because others will always have a remark...

This statement tells us that the learners are not comfortable in using English in the class as their proficiency in the language will be mocked by others, that is why few interact in the classroom as it seems that the teacher would prefer them to use English. Those that manage to speak, do so in isiXhosa or mix the languages.



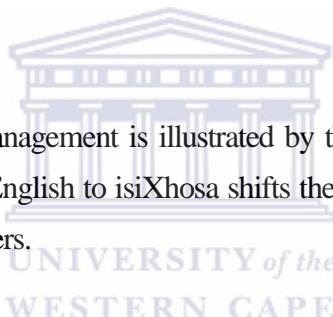
For teachers, switching into the mother tongue in the classrooms serves many functions. These functions of code-switching in the classroom can be grouped into categories, which Ferguson (2003) categorises as follows;

- Code-switching for curriculum access
- Code-switching for classroom management, and
- Code-switching for interpersonal relations

In the lessons observed there were many examples of code-switching for curriculum access. Unlike Physical Science and mathematics, Biology deals with large texts which can be difficult for a speaker with limited understanding of English. Therefore the teachers make use of code-switching to clarify and explain the texts, reformulate the content of the lesson so that the learners can understand (Ferguson, 2003: 4). This is displayed in the following examples: In one of the lessons T2, while teaching said something about a clot, the teacher explained what a clot was using the mother tongue. Although the learners did not indicate that they did not know what a clot was, she felt compelled to explain so that it would be easy for them to remember. Also Tl made use of both languages in a sentence so as to elaborate on what was said, as in example 1 above.

In the interview with the teachers, although T1 did not indicate why he switched to mother tongue during lessons, T2 noted that during lessons when she felt that the learners were not following the lesson she switched to isiXhosa. Also if questions were asked and learners seemed as if they were unable to answer because they did not understand the question itself. Then she would switch to isiXhosa. In other words code-switching in both instances was used so that learners could understand the lesson and be able to communicate this understanding by responding to the questions asked by the teacher.

The learners, in their response to the research question; why do they code-switch, stated that they do so to explain their ideas since the teacher might not understand their English.



Code-switching for classroom management is illustrated by the following examples. In these examples the switch from English to isiXhosa shifts the focus from the content of the lesson to disciplining the learners.

**Example 4** *Thulani nenze umsebenzi* (keep quiet and do your work) This was said by T2 as the learners were making a noise, while they were supposed to be busy with classwork. Sometimes when the learners are making a noise disrupting the teacher while teaching, he would say;

**Example 5** *Niyangxola* (you are making a noise)

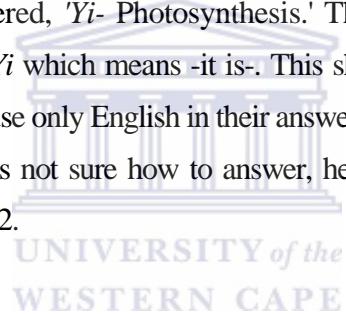
Although the teacher does not necessarily tell them to keep quiet they know that with this statement that are required to stop making a noise.

During the lessons observed, the teachers switch from English to isiXhosa when they joked with the learners, and praised them for work well done. These were examples of interpersonal relations in the classroom. Both in the teacher interview and pupil questionnaire, there was no indication that they use code-switching for interpersonal relations.

#### **4.3.4 Analysis of assessment activities in the classroom.**

From the classroom observation, code-switching during assessment activities in the classroom is displayed. Also the teacher responses in the interviews concerning their code-switching in the classroom provide an answer to research question 4. That is, whether assessment makes any provision for code-switching during classroom activities. In these activities, it became apparent that it is at the teacher's discretion to allow code-switching and they also code-switch. Although most of the questioning by the teachers is in English, most learners provide their answers in the mother tongue, except for those that only need a one word answer.

**Example 6** When Tl asked, 'What is the process called when sunlight and carbon dioxide mix?' the learner answered, 'Yi- Photosynthesis.' The learner in this answer made use of the isiXhosa word *Yi* which means -it is-. This shows that the teachers are not strict that the learners should use only English in their answers. Again when a learner is asked to answer a question and is not sure how to answer, he would ask the teacher to repeat the question, as in example 2.



Code-switching did not only take place during oral assessment. When the learners are given written work such as classwork, they would ask the teacher to explain the instructions as well as some of the questions, that is, when the teacher switched to isiXhosa during assessment activities. Thus they revealed in the interviews that they did code-switch when the learners did not understand what they were required to do in the classroom activities.

#### **4.3.5 Analysis of learners' questionnaires and their writing.**

The fifth research question is aimed at finding out if learners do code-switch when they write. The teachers' responses to the same question in the interviews reveal that the learners are not allowed to code-switch in their written work. Many of the learners answered that they did not code-switch when they write in their responses to question 4 in the questionnaire. However, there were a few who answered that they did code-

switch, but only in the classwork, homework activities and assignment but not in the tests and examinations.

Although some learners answered that they did code-switch, there is no evidence in the tests and examination scripts of code-switching. This might be because most of the questions in the tests required a one word answer or multiple choice questions. Even in those questions that required them to give definitions or short essay type questions, most of the learners wrote in English without switching to the mother tongue as they were aware they might lose marks. However, I have noticed that in some of the scripts there were learners who wrote incomplete sentences, this could be a result of many things. One, it could be because the learner was unable to express what he had in mind in English. Two, he might have forgotten in mid sentence what he wanted to write. Lastly, it could be that the time allocated to the paper was limited and the learners were rushing to finish all the questions.

#### **4.3.6 Analysis of the benefits of code-switching**

In the learners' questionnaire most learners felt that they benefit more when the teachers switched to isiXhosa in the classroom as they understood the content of the lesson more. The teachers themselves revealed that when teaching using English only they could see that some of the learners did not follow the lesson, although when asked they would reply that they do. They said they see it in their faces, which is when they decide to switch to the language they understand most, isiXhosa.

#### **4.3.7 Document analysis**

This section provides an analysis of the learners' tests and examination scripts for traces of code-switching and an analysis of the mark lists which also provide answers to the main research question. That is, to what extent does code-switching help learners in their understanding of the Biology concepts and the effect it has on their overall performance. I will make use of the test and examination mark list, although I believe that these cannot be sufficient to determine the overall performance of a learner.

Therefore I also used the list of all their Continuous Assessment (CASS), and the actual evidence for these marks.

In the analysis of the learner questionnaires as well as the teacher interviews, the answer to the question about code-switching occurring in learners' writing was answered. According to the teachers, learners were not allowed to code-switch or answer in any language except English. Learners themselves knew this as they had indicated in question 5 of the questionnaire. There were those who answered that they did code-switch for various reasons. However, the test scripts and assignments reveal that there was less code-switching in learners' writing. This could be the result of the type of questioning in these assessment activities, which is discussed below. Even in the assignment where learners are required to express themselves, they are able to do so, although sometimes they are not grammatically correct.

**Table 3. Analysis of Grade 11 Biology results**

**SG**

class	No.of learners	pass	fail	Total mark	Av. mark	Av. Pent	Symbol distribution									
							H	GG	G	FF	F	E	D	C	B	A
1IC	20	8	12	300	89	29.7	2	2	6	2	6	2				
1ID	47	25	22	300	101	33.7	3	6	7	6	13	9	3			

**HG**

class	No. of learners	pass	fail	Total mark	Av. mark	Av. Pent	Symbol distribution									
							H	GG	G	FF	F	E	D	C	B	A
1IC	36	35	1	400	189	47.3				1	10	10	1	5		
1ID	10	8	2	400	208	52			1		1	4	1		2	1

The above table reflects the overall results for the two classes that were observed in the year 2004. These results include both the CASS mark as well as the end of the year examinations. Here the CASS mark is converted to 75 marks whereas the exams carry

the most marks. The results show that most learners who have failed are in the Standard Grade stream. Only 33 learners passed out of 67. In the Higher Grade stream most learners passed, out of the 46, 33 passed, 11 were converted to standard grade to effect a pass and only 2 failed.

What these results reveal is that the learners doing HG performed reasonably well as there is also a learner who got an 80% pass. This is not only reflected in the end of the year results, the CASS marks as well show that these learners' performance was good throughout the year. For a breakdown of the results for each individual learner see Appendix 5.

The varied achievements can be determined by the type of questions in that particular assessment activity. Below I look at these different types of assessment questions. The types of exercises they do for class work differ: in some exercises they match terms with their definitions or they give a term for a biological process. In other exercises they complete mind maps or draw and complete a drawing. The projects and assignments are more investigative, where they are required to collect information on their own, organise in order to solve a biological problem. In these investigative tasks learners do well as they are given an opportunity to provide their own solutions, not what is required by the teacher or what the book tells them. And the time to complete these is more relaxed, so there is less anxiety than in the examinations.

Not much different from the examinations is the standardised test although it is shorter. Most of the questions in this test are multiple choice where they are given a list of choices to choose from and one word answer questions. The multiple choice questions in the tests carry a lot of marks. Unlike the examinations the tests have no essay type questions where learners are required to explain some biological processes.

The mid and end of the year examinations are almost the same. They carry with them many marks and are long. In total the learner is supposed to answer questions which carry 400 marks. In these examinations, they answer multiple choice questions, short essay questions, questions where they have to define concepts, drawings and labeling

as well as one word answer questions. The latter does not carry a lot of marks in the examinations, which is the main type of assessment in the classroom. This seems to be the reason why most learners pass these tests. The multiple choice type of questions are allocated a lot of marks, for instance in one exam which has 225 marks, 100 of these are allocated to the multiple choice. This is another reason there is no evidence of code-switching in learners' test scripts.

#### **4.4 Conclusion**

This chapter focused on presenting and analyzing the data which was collected. Certain findings were reached. Firstly, we found that code-switching does take place in the classroom and that the teachers were able to use the different types of code-switching for various reasons. The reasons behind using code-switching in the classroom, which were given by the teachers as answers to the interview which I had conducted with them, were that they do so in order to help learners understand the content of the lesson. Also, through classroom observations I noted that the teachers code-switch when they explain Biological concepts. It has also became apparent that code-switching in the classroom was not only used to explain subject content as teachers code-switched when they disciplined the learners.

In the next chapter I will give a summary of the findings from this study as well as recommendations for teaching and learning.

# **CHAPTER 5: SUMMARY OF FINDINGS, RECOMMENDATIONS AND CONCLUSION**

This study was aimed at exploring the use of code-switching in Grade 11 Biology classes. The interest in this study was based on establishing whether code-switching helps learners to understand the content of the lesson, since Biology carries a large proportion of language content which might be difficult for second language speakers. To answer this question, an investigation was carried out at a school where almost all the learners were second language speakers of the medium of instruction. At the two classes concerned, classroom observations were conducted, as well as interviews with teachers and a questionnaire was distributed to the learners.

The previous chapter dealt with the presentation and analysis of the data obtained from the research study. The analysis of the data revealed a few facts about the use of code-switching in the classroom. This chapter will summarise the findings obtained from the data collected, draw conclusions and propose recommendations which will make a contribution to the on going debate about the language of instruction

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## **5.1 Summary of findings**

In this section I discuss the findings from the investigation concerning the six research questions, which will give us an answer to the main research question.

### **5.1.1 On the types of code-switching taking place in the classroom**

The data reveal that the teachers feel comfortable using the different types of code-switching in the classroom. They were able to switch intra-sententially with no difficulties, although this type of switching has been regarded as the most difficult. This belief is fuelled by the fact that the two languages (isiXhosa and English) are linguistically different. However, the study has proved that intra-sentential code-switching between isiXhosa and English is possible and is not difficult as previously perceived.

Another type of switching which has been used most in the lessons observed is translation and repetition. These two, largely discouraged for use in the classroom, the study has shown that the teachers use effectively and they feel that they produce the best results.

Learners were comfortable in using their own mother tongue. In those cases where a learner; had to answer a question, he would sometimes use borrowing, that is although the whole sentence was in isiXhosa there would be an English word inserted somewhere in the sentence. Most of the time they are not doing this because there was no isiXhosa equivalent, but it showed that the learners had knowledge of English.

### **5.1.2** How often does code-switching take place in the classroom?

Since the teachers were code-switching as a tool to help learners understand the content of the lesson, in most of the lessons observed code-switching did take place. The data collected shows that the teachers tried to use English as much as possible, but it was difficult as they noticed that learners had difficulties in following the lesson, therefore code-switching took up most of the time in the classroom. For learners, who are using their mother tongue most in the classroom, code-switching was one way of enabling themselves to express themselves.

### **5.1.3 ... On the functions of code-switching in the classroom**

From the analysis of the data presented in- Chapter 4, the classroom observations revealed that code-switching is used in the classroom to perform certain functions. These functions were categorised according to Ferguson's (2003) definitions. These are:

- Code-switching for curriculum access
- Code-switching for classroom management
- Code-switching for interpersonal relations.

These functions contribute to the learners' acquiring of knowledge as well as development in the classroom. For curriculum access, the teacher uses code-switching

to explain and clarify, especially the concepts, since the language used in the textbook is complicated for second language learners. In addition, switching to the more familiar language puts the teacher at ease, as they are also second language speakers of English. When code-switching is used in the classroom, it does not only benefit the teacher in his teaching, but also the learners as they are the ones who will be confused if the teacher uses a language he cannot fully comprehend. The learners will also note that if they cannot express themselves in English it does not mean they have to keep quiet but they can become active participants in their own learning. The interaction between them and the teacher contributes to their understanding of the content of the lesson as they can ask and answer questions.

#### **5.1.4 On assessment activities and learners' writing.**

Although learners were not allowed to code-switch when they write, in the classroom the teachers did code-switch to explain the instructions of the activities. And learners were able to discuss in groups their answers. But they encountered problems when it came to examinations where they had to give their answers in English.



The study presents us with a number of educational implications. It reveals that code-switching remains an important tool in classroom interaction, in helping both the teachers and learners to communicate about the content of the subject. Apart from the use of codeswitching, the study also reveals that our schools need to be more equipped with learning resources which can assist in the learning process. Visual resources can have an impact as the teacher will be talking about something they can see, even if the teacher uses English as medium of instruction. Using experiments in the classrooms, it would be something they can do themselves and interpret the way they see things happen.

As stated in Chapter 2, there are people who are against the use of code-switching in the classroom as learning and teaching resource. The reason they give for their opinions has been borne out by the fact that when teachers are allowed to code-switch, they take this opportunity to teach in the mother tongue for an entire lesson as is noted by the principal in the interview (Annexure 5). Although mother tongue instruction has its own

benefits in the African educational context, the teachers who do this, forget to work with the learners in preparation for the examinations which are in English. That is why the teachers involved in my study felt that they had to teach in English, although their uneasiness with the language was visible.

## **5.2 Recommendations**

### **5.2.1 For the policy**

The findings of this study also reveal that there is a gap between what the language policy states about the medium of instruction and the practices in the classroom. Code-switching was found to be an effective resource when it comes to teaching second language learners, although it is sanctioned by the policy, only for verbal interactions, learners are expected to be assessed only in English. Therefore the feeling is that it should continue to be used in schools, until there is a change in the policy regarding the medium of instruction. Such changes are that the mother tongue of the learner can be used as medium of instruction above the level it is used at present. This is an issue, which has been the focus of debate for many years, looking at the work of, amongst others, Prah (2002), Desai (2003) and Bamgbose (1991). The conclusions always favour the use of African languages in the African context.

Although, it has been shown that there is a need for code-switching in the classrooms, the problem arises when learners have to write examinations, especially the external examinations (Matric). In the exams they are not allowed to code-switch, let alone to use their mother tongue to answer the questions. It has been suggested by the department of education to look at allowing the learners to answer the questions in their mother tongue and the question papers would also be printed in all official languages. That has not happened yet and the learners continue to be at a disadvantage. What can be done is to allow them to code-switch in the examinations, as they can display their understanding better.

### **5.2.2 For the schools**

The principals should allow and encourage the teachers to code-switch for the benefit of the learners, if the status quo remains in the examinations. Teachers must also not be ashamed of using code-switching, instead of teaching the whole lesson in a language they have limited command of. As they code-switch in the classroom and learners are not allowed to code-switch in the examinations, the teachers should work with them on how to deal with examination questions. This can be done as early as grade 1 I in preparation for the matric year, where they write external examinations which are marked by people who have no idea about the individual learners during the year.

At schools, performance of the learners in a particular grade is measured mostly by how they do in the end of the year examinations. This can be a hindrance for learners to proceed to the next level. The end of the year results (Appendix 6), reveal that although learners did well during the year, their performance declines at the end of the year. The reason for this is that, during the year, teachers are able to explain instructions and questions for them in the mother tongue, while in the end of the year examinations they are not there to do that. Therefore, learners are at a disadvantage by not understanding the questions and are unable to express themselves in English.

Language is not the only factor affecting the decline in performance at the end of the year. There are other factors as well, for instance, if a learner has been doing well during the year and something in the family happens that dramatically affects the learner, especially during the examinations. What happens to this learner is that he fails the exams, and has to repeat the grade. But if CASS takes precedence over the exams, the learner would be able to proceed to the next level. What I am saying is that schools must evaluate their assessment policies, especially for those grades that are written internally.

### **5.3 Conclusion**

In conclusion, while tertiary institutions in South Africa have not yet made any attempt at looking at using indigenous languages as media of instruction, it is best for schools that have a majority of learners who speak these languages to assist them in attaining proficiency in English that will see them proceed without difficulties in understanding their work at university.



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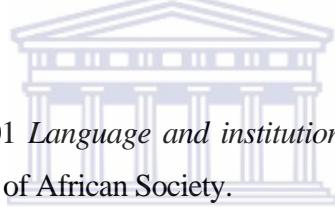
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# APPENDICES



## **APPENDIX 1:**

Observation schedule

Class.....

Teacher .....

Condition of the class:

No. of learners in class: No. of learners present: Materials (resources):



The lesson:

Start: Greetings — Introduction of lesson —

Classroom procedure:

End of lesson:

## **APPENDIX 2:**

### **Questionnaire**

NAME: .....

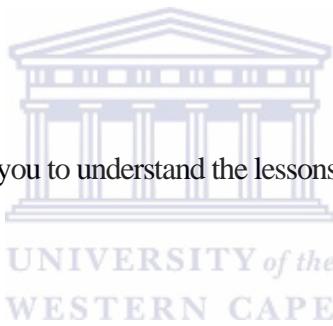
GRADE 11: .....

**Please tick the appropriate box and give a full answer only when asked.**

1. Does code-switching (the alternate use of two languages in one conversation) take place in your Biology lessons?

Yes.

No.



2. Do you think this is helpful for you to understand the lessons?

Yes.

No.

3. Explain your answer to no. 2 above.

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

4. Do you code-switch in your own writing?

Yes.

No.

5. If your answer to no. 4 is yes, why do you code-switch? If it is no, why not?

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

### **APPENDIX 3: TRANSCRIPT OF THE INTERVIEW WITH TEACHER 1**

Interviewer: Does the school have a language policy?

Interviewee: I'm not sure whether it does, but it is supposed to have a language policy because most of the subjects are done in English. Interviewer: So if you say most of the subjects are done in English, does that mean the medium of instruction is English?

Interviewee: Yes

Interviewer: What are your views on that?

Interviewee: I can say it is very important, more specially in those subjects that are taught in English. It is very important for the learners as it is easy for them to understand the meaning of some words because it forces them to use the dictionary.

Interviewer: In your own teaching, which language do you use?

Interviewee: I use English

Interviewer: Which language do the learners use when interacting with you?

Interviewee: They use English but most of the time if a learner does not know how to ask a question in English I allow them to use their mother tongue.

Interviewer: When you are using English in the classroom, do you find difficulties or it becomes easy for you?

Interviewee: It is not necessarily difficult, but I use isiXhosa for the sake of the learners.

Interviewer: When you use English in the classroom, do the learners seem to understand the content of the lesson?

Interviewee: Yes they do, but in some classes, you find learners who will ask you to interpret what you said all the time.

Interviewer: What do you do when you find that a learner has difficulties in understanding the lesson which you present in English?

Interviewee: I organize extra time for them, those who are willing, but the learner does not co-operate with me in organizing the extra lesson.

Interviewer: Do you sometimes use isiXhosa in your lessons?

Interviewee: Yes

Interviewer: When exactly?

Interviewee: When I'm explaining something and I see that some of the learners do not understand, then I switch to isiXhosa so that they can understand.

Interviewer: Does that happen often?

Interviewee: No

Interviewer: Do you plan in advance to use isiXhosa?

Interviewee: No, I do not plan it.

Interviewer: Coming to learners' writing, are they allowed to use their mother tongue?

Interviewee: No they are not allowed



## **APPENDIX 4**

**GRADE: 11**

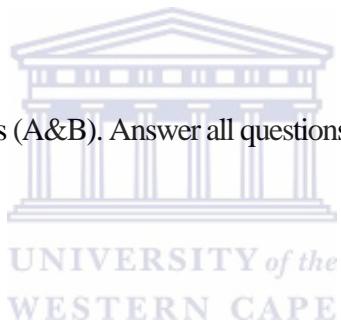
**SUBJECT: BIOLOGY**

**MARKS: 300**

**TIME: 3 HOURS**

### **INSTRUCTIONS**

This paper consists of two sections (A&B). Answer all questions and write neatly.



## **QUESTION 1**

Various possibilities are suggested as answers to the following questions. Indicate the correct answer.

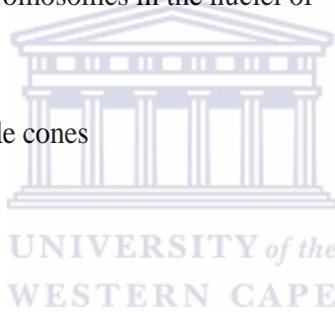
1. Which of the following is not a nitrogenous base of DNA?  
A. Thymine              C.Guanine  
B. Cytosine              D. Uracil
2. Which of the following is not found in DNA?  
A. Ribose              C.Deoxyribose  
B. Thymine              D. Cytosine
3. Which of the following carbohydrates form a monomer of DNA?  
A. Glucose              C.Deoxyribose  
B. Maltose              D. Fructose
4. Which of the following describe nucleic acids and nucleotides the best?  
A. Nucleic acids are monomers of nucleotides  
B. Nucleic acids are acids, nucleotides and are bases  
C. Nucleotides are monomers of nucleic acids  
D. Nucleotides are large molecules and nucleic acids are small molecules
5. The configuration of base pairing in the DNA molecules is  
A. C=T, A~G            C.A=G,T=U  
B. T=G, C=A            D. C=G, A=T
6. The DNA of one species differs from others in its  
A. Sugars    C. Site of production  
B. Base-pair sequence    D. Phosphate groups
7. When DNA replication commences  
A. Old strands move to find new strands before bonding  
B. The two strands of the double helix unwind  
C. The two strands condense tightly for transfer of nitrogenous bases  
D. Two DNA molecules combine
8. DNA replica produces  
A. Two double-stranded molecules totally different from parent molecule B.  
Two double-stranded molecules, one with the old strands and one with  
newly assembled strands  
C. One double-stranded molecule genetically the same as parent molecule D.  
Two half-old, half new double-stranded molecules
- 9.
10. Ribosomes consist of  
A. RNA and proteins              C. DNA proteins  
B. RNA and deoxyribose

11. Which of the following statements is true of RNA?
- A. It is a double helix of nucleotides
  - B. It is wound up as a helix
  - C. It contains uracil
  - D. It has a longer chain than DNA
12. During the replication of DNA, thymine always joins up with
- A Cytosine              C.Guanine
  - B. A nucleotide        D. Adenine
13. If the sequence of base in a region of a single DNA strand is: Thymine-cytosine-thymine-guanine, the sequence of bases in the complement strand will be
- A. Thymine-cytosine-thymine-guanine
  - B. Adenine-guanine-adenine-cytosine
  - C. Cytosine-thymine-guanine-thymine
  - D. Adenine-thymine-uracil-guanine
14. DNA nucleotide consists of
- A. A phosphate ion plus ribose plus a base
  - B. Deoxyribose plus a base
  - C. A phosphate ion plus a base
  - D. A sugar molecule plus a base plus a phosphate ion
15. The purine bases of the DNA molecule are
- A. Adenine and thymine
  - B. Cytosine and uracil
  - C. Guanine and adenine
  - D. Guanine and thymine.
16. What is the complementary sequence for the sequence AGT?
- A. AGT
  - B. TCA
  - C. UCA
  - D. CTG
17. DNA replicates by breaking the bonds between its two strands, after which each strand
- A. Synthesises a new strand
  - B. Coils back upon itself
  - C. Grows to double length
  - D. Takes a spiral appearance
18. The coded material that migrates from the cell nucleus to a ribosome where a particular polypeptide will be synthesized, is called
- A. Ribosomal RNA
  - B. Codon DNA
  - C. Messenger RNA
  - D. Transfer RNA
19. Which DNA strand acts as a template during DNA replication?
- A. Both strands of DNA
  - B. The one with all four nitrogenous bases
  - C. The first to receive a nucleotide

- D. The eldest of the two strands
20. Which is the most unstable RNA?
- A. All RNA is of equal stability
  - B. .mRNA
  - C.Tma
  - D.Rrna
21. The transcription of TGA, codes for
- A. ACA in DNA
  - B. TGA in RNA
  - C. ACU in DNA
  - D. ACU in RNA
22. In the life cycle of Pinus the nucleus is the
- A. Mega spore
  - B. Microspores
  - C. Female gametophyte
  - D. Megasporangium
23. The chromosome number of the nuclei in the endosperm of gymnosperms is
- A. Dиплоид
  - B. N
  - C. 2n
  - D. 3n
24. Which of the following forms part of the gametophyte generation in gymnosperms?
- A. Meiosis
  - B. Pollution
  - C. Endosperm
  - D. Megaspore mother cells
25. Which of the following must occur for a sporophyte to produce spores?
- A. meiosis
  - B. Pollination
  - C. Germination
  - D. Spore dispersal
26. An ovule is to a seed, as an ovary is to a(n)
- A. Ovule
  - B. Pollen grain
  - C. Sporophyll
  - D. Fruitt
27. Which of the following describe sexual reproduction best? The production of offspring
- A. From one parent
  - B. From two parents
  - C. By the fusion of two zygotes
  - D. By the fusion of two gametes
28. In gymnosperms the sperm are carried to the ovum by
- A. Ovules

- B. Pollen tubes  
C. Nucellus  
D. Water
29. Which of the following is not true regard to the branches of Pinus sp?  
A. Lateral branches are carried as a series of whorls around stems  
B. Dwarf shoots develop in the axils of bract  
C. Lateral branches have limited growth  
D. Dwarf shoots also grow on the lateral branches
30. The correct sequence of five phases in the life cycle of Pinus sp is  
A. Microspore, Zygote, Male gamete, Embryo, Tree  
B. Microspore, Embryo, Tree, Male gamete, Zygote  
C. Microspore, Embryo, Zygote, Male gamete, Tree
31. The structure numbered 4, which develops into angiosperm at 1, is the  
A. Zygote  
B. Spore  
C. Seed  
D. Endosperm
32. Which three of the following make up the embryo of a seed?  
1. endo sperm, 2. plumule, 3 percarp, 4 cotyledon, 5 testa, 6 radicle  
A. 3,4,5  
B. 1,2,6  
C. 1,2,4  
D. 2,4,6
33. In which of the following parts of a flowering plant does meiosis occur?  
A. Cotyledon  
B. Anthers  
C. Pollen grains  
D. Pollen tube
34. Each of the following is a characteristic of Angiosperm except that they all  
A. Bear ovules in an ovary  
B. Have a separate calyx and corolla  
C. Have either one or two cotyledons  
D. Have a prominent diploid stage in their life cycle
35. The endosperm of the ovule in Angiosperms is the  
A. Is the product of pollination  
B. Diploid production of fertilization  
C. Diploid tissue of the ovary  
D. Nutritive tissue of the embryo
36. Double fertilization in Angiosperms results in  
A. Two cotyledons developing in the embryo  
B. A triploid zygote and diploid endosperm cell  
C. a diploid zygote and a triploid endosperm  
D. Fusion of the ovum and a primary endosperm nucleus

37. Which of the following is a process of sexual reproduction in plants?
- A. Spore formation in fungi
  - B. Spore formation in ferns
  - C. Seed formation in pea
  - D. Spore formation
38. In many cases plants can be pure in their reproduction than animals. The reason for this
- A. Reproduce by means of seed
  - B. Reproduce vegetatively
  - C. Are cross-pollinated
  - D. Are more stable as far as their genes are concerned
39. Angiosperms are different from Gymnosperms in that in Gymnosperms
- A. Water is not required for fertilization
  - B. The endosperm is formed before fertilization
  - C. Double fertilization occurs
  - D. The sporophyte generation is dominant
40. If the nuclei of the pollen grains of a gymnosperm contain 20 chromosomes, there will be 20 chromosomes in the nuclei of
- A. Egg cells
  - B. Cells of the cortex of the stem
  - C. Ovuliferous scales of the female cones
  - D. Cells of nucellus tissue
41. The RNA molecule is
- A. A double helix
  - B. Usually single-stranded
  - C. Always double stranded
  - D. Usually double-stranded
42. The exact copying of the information stored as codons in DNA, onto a messenger RNA molecule take place
- A. In the cytoplasm
  - B. After translation
  - C. In the nucleus
  - D. On ribosomes
43. The anticodon in tRNA for AAA in DNA molecule is
- A. UUU
  - B. TTT
  - C. UAT
  - D. AAA
44. The coded genetic instructions for forming polypeptide chains are carried to the ribosomes by
- A. RRNA
  - B. DNA
  - C. mRNA
  - D. tRNA



## QUESTION 2

Column A	Column B
1 , Pyrimidines	A. Are autotrophic organisms
2. Anticodon	B. Are xyle and vessels
... Phycophytes	C. Base triplets on Trna molecule which pair with specific Mrna codon
4. purines	D. Are small green plants
Bryophytes	E. Collects and delivers amino acids to ribosomes
tRNA	F. Are algae, of which spirogyra is an example
	G,C ,T ,U

(12)

2.2 Give the biological term for each of the following terms

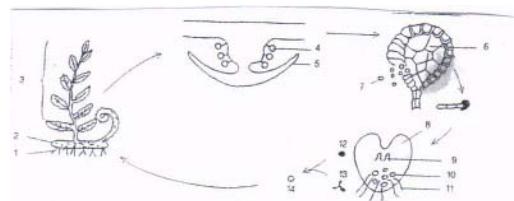
- 2.2.1 The ripened ovary wall of a fruit  
 2.2.2 One half of a chromosome as seen during cell division  
 2.2.3 The base in the DNA molecule which always pairs off with guanine  
 2.2.4 Zygote with resistant wall  
 2.2.5 Thallus plants are morphologically similar but physiologically different

(5)

## SECTION B

### QUESTION3

Study the diagram, which represents the life cycle of a fern-plant



- 3.1 Identify structure number 7 (1)  
 3.2 By what process is the structure produced (1)  
 3.3 What is the importance of this process with reference to reproduction and alternation of generations (3)  
 3.4 Identify the structure number 8 (1)  
 3.5 What is the chromosome composition of this structure (1)

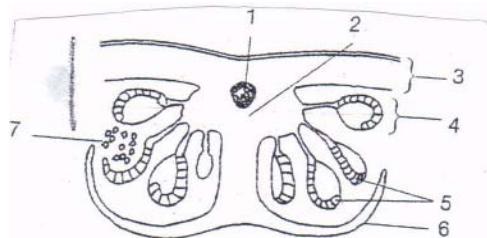
3.6 Draw a labeled diagram to show the structure of a mature

- (i) female organ on the gametophyte of a moss plant
- (ii) male organ on the gametophyte of a fern plant

(10)

#### QUESTION 4

Study the diagram of sorus of fern plant and answer the questions

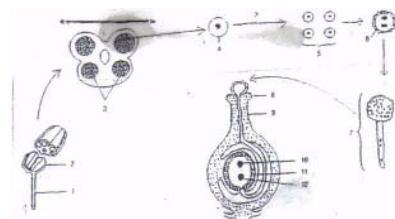


- (a) Of what generation does the sorus form part? (1)
- (b) Exactly where is a sorus found on the fern? (1)
- (c) Identify the parts numbered I to 6 (6)
- (d) What is the function of the part numbered 6? (1)
- (e) What process takes place in the part numbered 2, and why? (2)
- (f) With which process do you associate the part numbered 5? And with which structures in Bryophytes could you associate this process ? (2)

(13)

#### QUESTION 5

5.1 The diagram below represent the life cycle of an angiosperm. Study these and answer the questions.



- (a) Identify the parts numbered 1 to 12

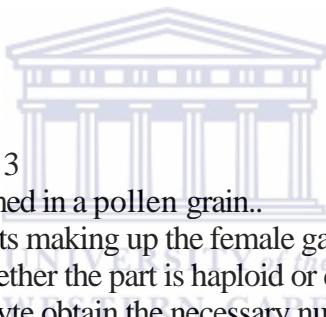
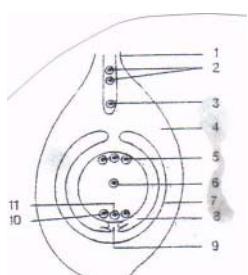
- (b) What process is taking place at X?

(c) Which numbered part represents the

- (i) megasporangium
- (ii) microsporangium
- (iii) male gametophyte

(15)

(c) the following diagram represents a section through a portion of an angiosperm gynaecium. Answer the questions using relevant numbers and names.



(i) Identify the parts numbered 2 and 3

Explain how these parts were formed in a pollen grain..

(ii) Write down the names of the parts making up the female gametophyte

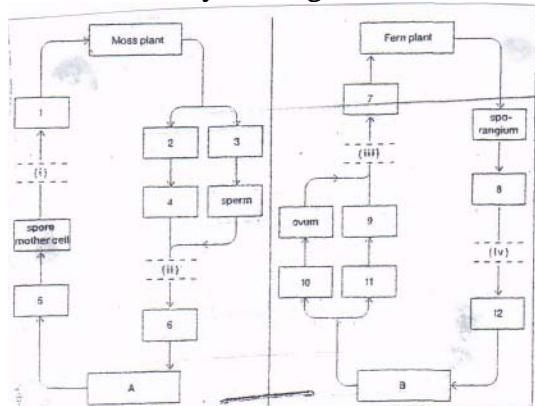
Opposite each name indicate whether the part is haploid or diploid.

(iii) How does the female gametophyte obtain the necessary nutrients for its development?

(iv) From observation of the diagram, what features indicate that it is a structure of an angiosperm and not of a gymnosperm?

(20)

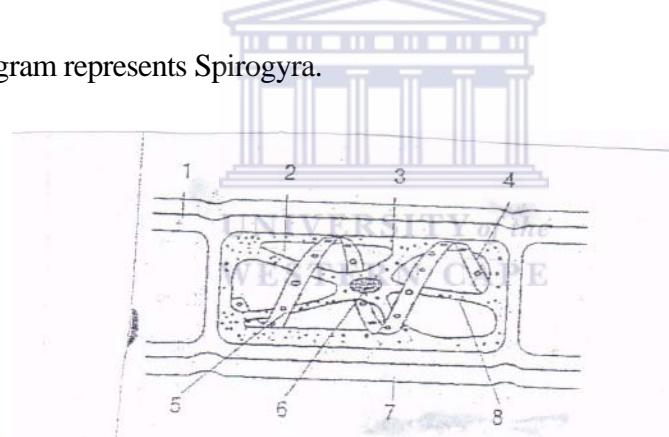
5.2 in the life cycle of bryophytes and pteridophytes an alternation occurs. The simplified diagrams below represent the alternation of generations of a moss plant and a fern. Study the diagrams and answer the questions.



- (a) What is meant by the term alternation of generation? (2)
- (b) Identify the process numbered (i) to (iv) (4)
- (c) (i) Name the moss plant and fern that you have studied. (2)
- (ii) What part of the life cycle do A and b represent respectively? (2)
- (d) Answer the following questions concerning structure A.
- (i) What is the name of this structure? (2)
- (ii) State the chromosome number of this structure. (2)
- (iii) Briefly describe the nutrition of This structure. (6)
- (iv) Draw a labeled diagram of this structure. (10)
- (e) (i) Identify the structures numbered 1 to 6. (6)
- (ii) State the chromosome number of structure 1, 4 and 6 respectively. (3)
- (iii) Where are structures numbered 2 and 3 found on the moss plant respectively? (2)
- (f) Briefly describe where and how process (ii) takes place. (4)
- (g) What is the name of structure B? Briefly describe its structure. (4)
- (h) (i) Identify the structures numbered 7 to 11. (2)
- (ii) State the chromosome number of structures 7, 8, 9 and 12 respectively. (4)
- (i) Briefly describe the process in which structure 12 is released. (10)

(76)

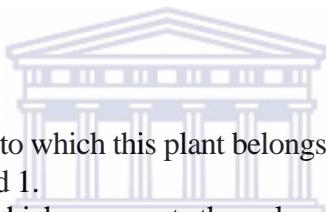
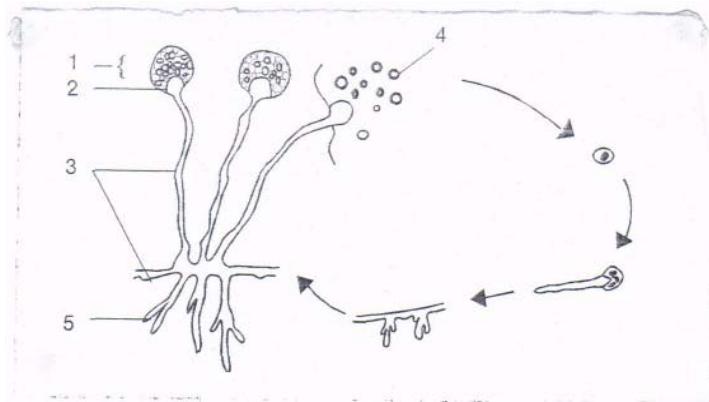
53. The diagram represents Spirogyra.



- (a) Name the group of plant to which this plant belongs. (1)
- (b) Identify the parts numbered 1-8 (8)
- (c) State one function of part numbered (i) 4, and (ii) 5 (2)
- (d) Does part numbered 6 contain a haploid or diploid number chromosomes? (1)
- (e) Mention three environmental conditions in which Spirogyra flourishes. (6)
- (f) Briefly describe the habitat and nutrition of algae. (9)

5.2 in the life cycle of bryophytes and pteridophytes an alteration occurs. The simplified diagrams below represent the alternation of generations of a moss plant and a fern. Study the diagrams and answer the questions.

5.4 The diagram below represents the life cycle of the fungus you have studied. Answer the following questions.



- (a) Name the group of plants to which this plant belongs. (2)
- (b) Identify the part numbered 1. (2)
- (c) Write down the number which represents the only cross wall developed in this plant.  
What is this cross wall called? (2)
- (d) Identify the part numbered 4. How is it released and dispersed? (4)
- (e) What type of reproduction is shown here? (1)
- (f) Identify structure numbered 5. Where is it growing? How does it obtain food?  
Is this an example of extracellular digestion? (4)
- (g) Is this plant a parasite or sporophyte? (2)
- (h) What colouring matter or pigment is this plant lacking, which is found in a normal flowering plant, e.g a sweet pea? (2)

## APPENDIX 5

### Learning Area Composite Schedule

**Dec-04**

### BIOLOGY (HG)

**Grade: Grade 11**

		Cass 100	Exams 300			Total 400	%	Symbol
1		38	109			147	36.7	F
2		73	170			243	60.7	C
3		66	134			200	50	D
4		53	84			137	34.2	F
5		56	82			138	34.5	F
6		73	94			167	41.7	E
7		49	85			134	33.5	F
8		71	132			203	50.7	D
9		73	139			212	53	D
10		81	113			194	48.5	E
11		64	102			166	41.5	E
12		65	104			169	42.2	E
13		86	221			307	76.7	B
14		68	176			244	61	C
15		60	117			177	44.2	E
16		81	160			241	60.2	C
17		55	173			228	57	D
18		64	122			186	46.5	E
19		70	89			159	39.7	F
20		68	149			217	54.2	D
21		65	155			220	55	D
22		71	131			202	50.5	D
23		38	119			157	39.2	F
24		43	63			106	26.5	G
25		83	173			256	64	C
26		70	159			229	57.2	D
27		68	169			237	59.2	D
28		64	124			188	47	E
29		45	169			214	53.5	D
30		47	74			121	30.2	FF
31		23	175			198	49.5	E
32		60	119			179	44.7	E
33		59	128			187	46.7	E
34		81	205			286	71.5	B
35		64	92			156	39	F
36		65	80			145	36.2	F

37		63	110				177	44.2	E
38		64	113				147	36.7	F
39		57	90				174	43.5	E
40		48	126				211	52.7	D
41		68	143				245	61.2	C
42		77	168				188	47	E
43		71	117				262	65.5	C
44		71	191				207	51.7	D
45		59	148				150	37.5	F
46		61	89				173	43.2	E
47		77	152				229	57.2	D
48		99	221				320	80	A
49		71	107				178	44.5	E
50		82	125				207	51.7	D
51		57	102				159	39.7	F
52		58	70				128	32	FF
53		75	59				134	33.5	F



## Learning Area Composite Schedule

Dec-04

### BIOLOGY (SG)

Grade: Grade 11

		Cass 75	Exams 225			Total 300	%	Symbol
1		27	52			79	263	G
2		48	54			102	34	F
3		36	40			76	253	G
4		34	60			94	313	FF
5		5	43			48	16	H
6		31	44			75	25	G
7		59	42			101	336	F
8		42	78			120	40	E
9		20	44			64	213	GG
10		26	54			80	266	G
11		48	71			119	396	F
12		44	59			103	343	F
13		59	92			151	503	D
14		34	56			90	30	FF
15		32	72			104	346	F
16		44	52			96	32	FF
17		41	60			101	336	F
18		24	78			102	34	F
19		24	27			51	17	H
20		38	45			83	276	G
21		26	51			77	256	G
22		47	83			130	433	E
23		35	80			115	383	F
24		33	31			64	213	GG
25		47	58			105	35	F
26		32	79			111	37	F
27		43	75			118	393	F
28		26	64			90	30	FF
29		22	38			60	20	GG
30		25	27			52	173	H
31		59	79			138	46	E
32		31	53			84	28	G
33		16	44			60	20	GG
34		54	46			100	333	F
35		30	93			123	41	E
36		14	37			51	17	H

37	38	85			23	41	E
38	26	38			64	213	GG
39	23	30			53	176	H
40	50	82			132	44	E
41	40	37			77	25.6	GG
42	22	37			59	196	H
43	0	0			0	0	H
44	38	42			80	266	G
45	0	0			0	0	H
46	33	37			70	233	GG
47	70	73			143	47.6	E
48	51	77			128	426	E
49	38	73			111	37	F
50	25	39			64	213	GG
51	35	36			71	236	GG
52	41	46			87	29	G
53	32	38			70	233	GG
54	55	46			101	336	F
55	29	28			57	19	H
56	4	57			61	203	GG
57	38	56			94	313	FF
58	42	98			140	466	E
59	27	49			76	253	G
60	28	30			58	193	H
61	48	52			100	333	F
62	44	34			78	26	G
63	27	59			86	286	G
64	27	39			66	22	GG
65	12	26			38	126	H
66	47	38			85	283	G
67	20	65			85	283	G
68	27	85			112	373	F
69	45	47			92	306	FF
70	29	74			103	343	F
71	41	43			84	28	G
72	37	62			99	33	FF
73	28	46			74	246	GG
74	39	52			91	303	FF
75	42	60			102	34	F
76	44	44			88	293	G
77	5	19			24	8	H
78	26	43			69	23	GG
79	42	55			97	323	FF
80	38	69			107	356	F
81	44	58			102	34	F
82	39	56			95	316	FF
83	20	23			43	143	H
84	4	33			37	123	H

85	42	59				101	336	F
86	11	37				48	16	H
87	24	62				86	286	G
88	55	98				153	51	D
89	37	66				103	343	F
90	40	39				79	263	G
91	46	59				105	35	F
92	48	57				105	35	F
93	43	41				84	28	G
94	41	92				133	443	E
95	13	15				28	9.3	H
96	34	117				151	503	D
97	50	73				123	41	E
98	8	43				51	17	H
99	27	62				89	296	G
100	23	38				61	203	GG
101	47	52				99	33	FF
102	38	62				100	333	F
103	23	52				75	25	G
104	25	44				69	23	GG
105	45	83				128	426	E
106	31	44				758	25	G
107	41	37				78	26	G
108	52	41				93	31	FF
109	12	26				38	126	H
110	36	83				119	396	E
111	27	53				80	266	G
112	40	64				104	346	F
113	30	52				82	273	G
114	47	64				111	37	F
115	35	75				110	366	F
116	40	51				91	303	FF
117	0	0				0	0	H
118	58	79				137	456	E
119	31	55				86	286	G
120	25	21				46	153	H
121	38	55				93	31	FF
122	23	30				53	176	H
123	18	44				62	206	GG
124	65	101				166	553	D
125	38	54				92	306	FF
126	49	93				142	473	E
127	34	32				66	22	GG
128	40	68				108	36	F
129	47	66				113	376	F
130	20	19				39	13	H
131	41	59				100	333	F
132	47	73				120	40	E

133	48	39			87	29	G
134	5	0			5	1.6	H
135	24	48			72	24	GG
136	40	40			80	626	G
137	41	52			93	31	FF
138	23	45			68	226	GG
139	60	92			152	506	D
140	48	69			117	39	F
141	30	32			62	206	GG
142	24	48			72	24	GG
143	23	48			71	236	GG
144	38	91			129	43	E
145	41	41			82	273	G
146	25	75			100	333	F
147	32	139			171	57	D
148	38	59			97	323	FF
149	38	30			68	226	GG
150	28	80			108	36	F
151	30	62			92	306	FF



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