



# UNDERPERFORMANCE

Getting underperforming learners to the required  
level in the subject mathematics

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A study on the most appropriate teaching method to get underperforming learners to the required level in the subject mathematics in Grade 3 of the Dambuza Primary School in Port Alfred.

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*Every student can learn, just not on the same day or in the same way. – George Evans*

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## 1. Introduction

There are different types of learners in the primary school. Learners that get lessons below their learning level, learners that get the right learning level which fits perfectly and learners for whom the learning level is too high. The way teachers give education is based on the majority of the class. It is very important that every learner gets an equal chance to use their full potency during their school time, because it will increase the motivation and it will ensure that talents will be used better (Cornelisz & Van Halem, 2016). A way this potency can get out is by using different ways of teaching, especially with more individual attention (Van Vliet, 2013). This research focuses on the underperforming learners, those who are not on the required level. "Underperforming means that the performance is (much) lower than expected based on the learners abilities and talents. There is a discrepancy between talent and performance" (Kerpel, 2014).

The research will be done on the Dambuza Primary School in Nemato, the Nelson Mandela Township in Port Alfred. This is a former black township with four primary schools and with friendly but unemployed and poor Xhosa people (Matlanyane, 2017). The Dambuza Primary School is providing primary education from Grade R till Grade 7. Currently 659 learners are being taught at this school. The Dambuza Primary School is a school with learners who have a low level. According to Mr. Dikeni, this school could use recommendations on how the number of underperforming learners can be reduced, so that is why this research is taking place there. I am personally interested in the nascence of underperformance and how to reduce this, because this is a big problem in the townships of South Africa (Motshekga, 2014). This is the reason why our supportive teacher Mr. Dikeni from Stenden South Africa has placed me at this school.

If the talent of learners in primary school is insufficiently recognized, it can lead to underperformance. It can also lead to incomplete development of the abilities of individual learners and that is hard or not even possible to change this. Attention to cognitive talent in primary schools can counteract this and provide for better utilization of talent in each of the education sectors (Maslowski & Riemersma, 2007). Underperformance is something to prevent as much as possible because it is crucial that a learner can keep up with the learning goals, otherwise it can have a negative influence on the learner (De Vos, 2012). When a learner cannot keep up with the learning goals he will keep falling behind on schedule and can develop working attitude problems (Ter Heerdt, 2017). This can have many consequences, such as bullying, failure, extreme uncertainty, but it can also lead to rebellious and busy behaviour of the learner in the classroom (Start Media B.V., 2017). That is why underperformance needs to be recognized and a plan needs to be made to get the learner back on track. There can be different approaches for getting underperforming learners back on the required level. This document shows the results of research which will be done to find the best way to get more learners in Grade 3 at the required level in the subject mathematics.

The research is specifically targeted on Grade 3 and the subject mathematics. The reason why this demarcation is necessary is because of the width of the subject underperformance. The advantage of this demarcation is that the research is much more accurate and the suggestions that will be given are more applicable. The research will be done on different areas so that the information flows will be more reliable and will show the full perspective. The information can be divided into two parts, in particular theoretical and practical. The theoretical part consists of desk research into studies which already have been finished. Also important persons of the Dambuza Primary School and experts on this topic will be interviewed. Next, the theoretical part will be brought into practice by trying different teaching methods to reduce underperformance. This experiment will be done on the same school with several learners. All these insights will be melted together and this will finally give the input for the suggestions for the school. There will be a strategic and practical advice for the school on how to signal underperformance, how to cope with it and how to keep monitoring the education.

## 2. Problem Analysis

In this chapter the problem will be analysed and the urgency of researching this problem will be described. This will be done by looking at the real problem, whose problem it is, when this problem arises, why it is a problem, where the problem is located and what the cause of the problem is. The problem will be analysed from different perspectives to create a total view.

In a class with learners there are differences between the learning levels. There are learners with a lot of different needs, but not in everyone's need can be provided. The South African education system is very traditional (classical), and that is not for all learners the right way to learn (Du Plessis, 2005). In a conversation with Mr. Nombambela from the Department of Education appeared that some learners experience academic barriers. According to Mr. Nombambela all the learners do have a lot of talents but not all talents are utilized through the academic education system. The academic barriers causes that those learners are underperforming (look at Appendix 1 for an overview of the conversation). There are two different species of underperforming learners: absolute and relative underperformers (Van Gerven, 2001; Drent & van Gerven, 2002). According to Kerpel (2014), relative underperforming learners achieve lower grades than expected, according to their capacities, but they are still on the required level. Absolute underperforming learners achieve results under the required level (Kerpel, 2014). In this research will be focused on the absolute underperforming learners.

According to an article published by MacCarthy & Oliphant (2013), the Trends in International Mathematics and Science Study (TIMSS) showed in 2011 that the teaching of mathematics in South African schools is amongst the worst on the world. This article shows that of all 21 middle-income countries that participated in the TIMSS, South African learners have the lowest performance. According to McCarthy & Oliphant, the development of South Africa as a knowledge economy depends partly on improving the teaching of mathematics and numeracy. The high youth unemployment is also closely linked to the quality of schooling the mathematics competency. (McCarthy & Oliphant, 2013).

At the Dambuza Primary School there are a lot of learners and each class has approximately around 40 to 65 learners. The school counts 659 learners and fifteen teachers. If all the learners would be divided among the teachers there would be an average of 43 learners per class. In the Dambuza Primary School there are two types of teaching, namely class teaching and subject teaching. In Grade R to Grade 3 they are doing class teaching and that means that one class has one teacher. Grade 4 to Grade 7 are getting subject teaching, that means there are more teachers for one class. Because of the previously mentioned fact, the fifteen teachers are divided unevenly over the classes and therefore some classes got a very large number of learners.

The current Grade 3 for which this research is done has 64 learners in total. According to Miss Toni, the teacher of Grade 3, there are big differences between the learning levels of these learners. Some of these learners are participating very well during the lessons and others are less responding to questions and assignments of the teacher. There are also big differences between the motivation of the learners. Some learners are excited to learn and others are only at school because their parents want them to be there. Look at Appendix 2 for the interview with Miss Toni, the teacher of Grade 3. It is really hard to give the learners enough individual attention because of the large number of learners in this class. The mathematics lessons consist of a general, classical instruction and the teacher has interaction with the learners. After the instruction, the learners work independently on their assignments. During the lessons attended by the researcher, no check and accompaniment for the low level learners has been seen. According to the timetable for Grade 3 the mathematics lessons should take one and a half hour. However, the teacher always waits until all the learners have finished their work. Most of the time this takes more than one and a half hour.

An analysis of the test results of the first semester of Grade 3 from the Dambuza Primary School has shown that almost half of the class is underperforming in mathematics. Looking at the individual levels, it shows that 27 of the 64 learners are performing far below the required level in mathematics, see Appendix 3 for the complete information. According to McCarthy & Oliphant (2013), major improvements in the mathematical area of the public schooling system are vital for South Africa's socio economic prospects: for the learners as well as the development of the country as whole.

According to the analysis in Appendix 3 there are a lot of learners in Grade 3 of the Dambuza Primary School who are not on the required level in mathematics. This is a problem because mathematics is an important subject. According to an article about the results of the matriculation (high school exam), passing matric well and potentially obtaining a university degree is traceable from the early grades in primary school (Jansen-Thomas et al, 2017). For most learners passing this test is unattainable by the time those learners reach the end of Grade 3 when they are not on the required level in that moment (Van der Berg, 2015). The article about matric results has shown that learners acquire learning deficits in the early grades and this is the root of underperformance in the later grades. This means that the poor quality in early grades causes a smaller chance to develop the potential of learners (Jansen-Thomas et al, 2017).

The underperforming learners can get a negative self-image because they do not meet the expectations of the curriculum. The parents and the school have to play an active role to change depressive feelings or performance anxiety that learners can get from underperforming (Kerpel, 2014). Because of these serious consequences, the learners are not the only ones dealing with the problem of underperformance. Teachers, parents and the school have to cooperate with the various steps that can be made to get the underperforming learners to the required level.

There can be different causes for underperforming in mathematics. According to Miss Toni, the most obstructive causes in the Dambuza Primary School are overcrowded classrooms and a lack of individual support. In a conversation with Miss Toni appeared that the Dambuza Primary School does not have suitable lesson material for underperforming learners. According to Kerpel (2014) there can be other causes for underperforming. Underperforming learners can also deal with a lack of motivation in which they perform under the required level. Another important cause can be a bad learning or work strategy. Next to all these causes it is also possible that underperforming learners have emotional- or concentration problems that makes them perform under the required level (Kerpel, 2014).

Based on multiple studies can be concluded that underperformance in mathematics can have a lot of different causes and also a lot of different effects. In this research an appropriate approach for this problem will be examined and tested.

### 3. Theoretical Framework

Different sources have been used for this theoretical framework. This is the basis for this research. The sources date from 1975 until 2017, of which the majority in the recent years, and give the most actual insights about the mathematics curriculum, assessment, underperformance, mathematical proficiency and different teaching methods. The articles and websites contribute to answering the sub questions and the central research question: “How can the Dambuza Primary School get more learners in Grade 3 to the required level in the subject mathematics?”

#### 3.1 Mathematics curriculum in Grade 3

According to Motshekga (2011), the current national curriculum of South Africa is the culmination of the efforts of the department of education over a period of seventeen years to transform the curriculum bequeathed to them by apartheid. From the beginning of democracy the department has built a curriculum on the values that inspired the constitution. From 2012, the various revised circulated versions of this curriculum since 1997 have been combined in one single document. This document is called the National Curriculum Statement and contains the following points:

- Curriculum and Assessment Policy Statements (from now on called the ‘CAPS’) for all subjects;
- National policy pertaining to the programme and promotion requirements of the NCS;
- National Protocol for Assessment (Motshekga, 2011).

#### **Explanation of CAPS**

CAPS represents a single, comprehensive and concise policy document for every subject in each grade. This document provides details on what teachers need to teach and assess on a basis of grades and subjects per topic. The goal of this curriculum review is to reduce the administrative load on teachers and to ensure that there is a clear guidance and consistency for teachers when teaching (Variend, 2011). According to the CAPS document, learners in the early grades should be exposed to mathematical experiences that give them many opportunities to do, talk and record their mathematical thinking. The learners have to develop different specific skills, namely:

- Develop the correct use of the language of Mathematics;
- Develop number vocabulary, number concept and calculation- and application skills;
- Learn to listen, communicate, think, reason logically and apply the mathematical knowledge gained;
- Learn to investigate, analyse, represent and interpret information;
- Learn to pose and solve problems;
- Build an awareness of the important role that Mathematics plays in real-life situations

(Department of Basic Education, 2011).

#### **Desired skills**

The mentioned skills must be achieved during the whole primary school time. A clear overview has been made for every grade in the CAPS document with the different skills per content area in which the learners have to perform and develop in one school year. A school year is divided into four periods called terms. In the CAPS document it has been described exactly what the learners must learn and control per term. These points have been represented in a clearly overview, separately for the different content areas that the mathematical curriculum covers: ‘numbers, operations and relationships’, ‘patterns, functions and algebra’, ‘space and shape (geometry)’, ‘measurement’ and ‘data handling (statistics)’ (Ramollo, 2014).

The following figure shows the table with the different content areas, the weighting of it in percent’s,

the suggested time per content area per week and the topics the content areas include for Grade 3 (Department of Basic Education, 2011).

**Figure 1: Diagram view content areas**

Content Area	Weighting of Content Area	Suggested Time per Week	Topics
<b>Numbers, Operations and Relationships</b>	58%	120 min	<ul style="list-style-type: none"> <li>- Counting: 0-1000</li> <li>- Number Recognition: 0-1000</li> <li>- Identify and describe whole numbers: 0-999</li> <li>- Number Sense: 0-1000</li> <li>- Solving Problems: addition and subtraction, repeated addition leading to multiplication, grouping and sharing leading to division, sharing leading to fractions, money</li> </ul>
<b>Patterns, Functions and Algebra</b>	10%	80 min	<ul style="list-style-type: none"> <li>- Copy, extend and create own patterns: geometric patterns and number patterns</li> </ul>
<b>Space and Shape (Geometry)</b>	13%	80 min	<ul style="list-style-type: none"> <li>- Recognise, identify and name 2D shapes/pictures: circles, triangles, squares, rectangles</li> <li>- Geometric shapes: symmetry</li> <li>- Build 3D objects using concrete materials: spheres, prisms, cylinders, pyramids, cones with clay, toothpicks, straws etc.</li> <li>- Spatial relations: compare shapes</li> <li>- Directionality: informal maps, top views and collection of objects</li> </ul>
<b>Measurement</b>	14%	80 min	<ul style="list-style-type: none"> <li>- Time: telling time, calculate length of time and passing of time</li> <li>- Length: estimate, measure, compare, order and record length</li> <li>- Mass: estimate, measure, compare, order and record mass</li> <li>- Capacity: estimate, measure, compare, order and record capacity</li> </ul>
<b>Data Handling (Statistics)</b>	5%	60 min	<ul style="list-style-type: none"> <li>- Collect, sort, draw, read and represent data: lists, tally marks, tables, pictographs, bar graphs</li> </ul>
<b>Total</b>	100%	420 min	

For an extensive overview with the learning points per term for Grade 3, look at Appendix 4.

### 3.2 Assessments

Assessments can be divided in two categories: formal and informal assessments. Formal assessments are called standardized measures. These assessments have data which support conclusions made

from the test and this data is shown as default scores. Informal assessments are not data driven but execution driven. (Weaver, 2017). According to the Department of Basic Education (2011), this type of assessment is done through observations, discussions, practical demonstrations, informal classroom interactions, etcetera. The records of a learner are provided by a formal assessment, this gives input for the learner’s conceptual progression within a grade. These records have to be reported by the teachers in percentages per subject (Department of Basic Education, 2011). In the table below the various achievement levels and the corresponding percentages are shown.

**Figure 2: Codes and percentages for recording and reporting**

Rating code	Description of competence	Percentage
7	Outstanding achievement	80 - 100
6	Meritorious achievement	70 - 79
5	Substantial achievement	60 - 69
4	Adequate achievement	50 - 59
3	Moderate achievement	40 - 49
2	Elementary achievement	30 - 39
1	Not achieved	0 - 29

(Department of Basic Education, 2011).

According to this table there are seven rating codes. Rating code 1, 2 and 3 represent an insufficient score and rating code 4 to 7 represent a sufficient to excellent score. Underperforming learners who are not on the required level achieve scores from 1 to 3 and that means they accomplish less than 50% on an assessment.

### 3.3 Causes of underperformance

Underperformance can be associated with ethnic origin, social environment or gender (Hoover-Schultz, 2005; Van Langen & Driessen, 2006). The causes of this can be discrepancies between home and school languages, different value systems, certain cultured differences in education and stereotyping by teachers (Driessen & Mooij, 2007). Underperformance does not always have a noteworthy cause, it may be related to accidental circumstances before or during the test such as insufficient sleep, food or drink shortage, a headache, arguments at home etcetera. (Driessen & Mooij, 2007). When underperformance is not related to accidental circumstances there can be serious causes. According to an article of Ter Heerdt (2017) about underperformance, the following different factors can influence the beginning of underperformance among learners:

- **Inadequate learning content.** This means that learners who get education that is far below their real level can get bored, with the result of decreasing concentration and making careless mistakes.
- **Selective listening strategy.** When the instruction is geared towards the average learner the not average learners can think they already understand and can stop paying attention. When something new is being explained by the teacher these learners are not paying attention anymore and are not focused when new information is being presented.
- **General negative attitude towards school.** Learners who have gained negative experiences due to disappointing performances, inadequate learning or negative relations between themselves and the teacher or other learners can develop an aversion against school over time.
- **The relationship between parents and learners.** When parents do not encourage their children to perform at school it can result in motivation issues at school. (Ter Heerdt, 2017).

According to Kuipers (2009) the underperformance can also be caused by different factors in the school. Such as:

- An inadequate way of signalling the learner levels;
- An inadequate learning experience;
- Not enough room for creative thinking;
- Not enough attention to metacognitive skills;
- Inadequate pedagogical didactic qualities of the teacher (Kuipers, 2009).

According to Olivier (2009) the biggest factor influencing children's performance in South Africa is the incompetence of teachers. Olivier (2009) is fully consistent with Kuipers (2009) about the inadequate qualities of the teachers as cause for underperformance. The causes for the inadequate qualities can arise from the past of a teacher. South African teachers received poor education and that influences their understanding of education. (Olivier, 2009). Teachers tend to teach as they were taught. They use transmission pedagogy learned from the teachers they had as learners. (Lortie, 1975). According to Suan (2014) "teachers are responsible to the kind of learning and experiences the learners may engage everyday as well as setting of educational goals and total personality development". From the previously mentioned data can be concluded that the teachers can contribute in underperformance.

Another cause of underperformance can be language barrier issues (Gwaza, 2015). There are different languages in South Africa and learners need for their teachers to communicate in the classroom in a language all of them could understand. Another factor that can influence underperformance in South Africa is a shortage and need for teaching resources according to previously mentioned research. To aid their teaching, a lot of teachers try to look for resources but there is a shortage in this. The research about factors that lead to underperformance also shows that South African learners experience that teachers do not care about whether learners understand what is being taught. Ignoring incomprehension can cause underperformance because the learners cannot keep up with what is expected of them. (Gwaza, 2015). According to Gwaza (2015) the attitude towards learning mathematics can also be a key factor leading to underperformance in mathematics. Also the learning environment can affect the learning process of the desired learning outcomes. The learning outcomes depends on the learner's perception that identify the situational factors characteristic in influencing the motivations of learners to learn. (Lizzio et al., 2002).

In an article on the quality of education in South Africa, Spaul (2013) suggests that many South African learners are acquiring debilitating learning deficits early on in their schooling careers and that this is the root cause of underperformance in later years. The main reason is that learners do not always master the elementary mathematical skills in early grades which are needed from further learning. The need to focus on the primary grades is not only driven by the fact that underperformance is so frequent in these early years but also because remediation is most possible and most cost-effective when children are still young. (Spaul, 2013). Remediation means eliminating the shortages of certain groups of learners (KU Leuven, 2017). This is primarily possible at a young age because the human brain is most malleable in early childhood and thus particularly susceptible to beneficitation or harm. Due to the cumulative negative effects of learning deficits, particularly in mathematics, it is not usually possible to fully remediate pupils if the intervention is too late. (Spaul, 2013). Because of the previously mentioned facts, it is important to increase underperformance in mathematics in the early grades.

### 3.4 Mathematical proficiency

According to an article about enhancing mathematical learner performance in the primary grades (Stott, 2015), successful mathematics learning comprises five interwoven components:

- **Conceptual understanding.** This means having comprehension of mathematical concepts, operations and relations.
- **Procedural fluency.** This means having the skill in carrying out procedures flexibly, accurately, efficiently and appropriately.
- **Strategic competence.** This means having the ability to formulate, represent and solve mathematical problems.
- **Adaptive reasoning.** This means having the capacity for logical thought, reflection, explanation and justification.
- **Productive disposition.** This means having the habitual inclination to see mathematics as sensible, useful and worthwhile coupled with a belief in diligence and one's own efficacy.

These previously mentioned five components are separate but interwoven and they are interdependent. Successful mathematical learning (mathematical proficiency) is only present when all components are developed and proficiency will be developed over time. When these proficiencies will be taken together, they can lead to progressive mathematics learning. While the promotion of all five components of mathematical proficiency is very important, the research of Stott (2015) shows that a special focus has to be given on the development of number sense and fluency. This has to be done because it is really important for young learners to control this. Fluency can be explained as: speed, accuracy, mastery of facts, rapid recall and computation skills. (Stott, 2015). According to Askew (2012) a lack of fluency in basic facts and methods can impede conceptual understanding. The reason for this is that constantly working out the basics before doing anything else can take up too much working memory and attention is diverted from thinking about the bigger picture (Askew, 2012). Developing number sense and working with numbers in different ways can be the best way to develop fluency (Boaler et al., 2014).

### 3.5 Level increasing teaching methods

Increasing underperformance in mathematics and develop fluency can be done in different ways. The biggest factor that influences learner's performance in South Africa is the incompetence of teachers (Olivier, 2009). It can be concluded that the most important way can be searched in the teaching methods of teachers. There are many different teaching methods that can be used in mathematics lessons. Below are a few appropriate teaching methods for increasing the education level at the Dambuza Primary School mentioned and explained:

- **Brainstorming approach.** "Brainstorming is a teaching strategy in which the teacher elicits from the learners as many ideas as possible but refrains from evaluating them until all possible ideas have been generated" (Labarosa, 2013. p.11).
- **Contextual learning.** "Contextual learning is a method of instruction that enables learners to apply new knowledge and skills to real-life situations" (Pritchett, 2008).
- **Cooperative learning.** Characteristic for cooperative learning is the need for learners to work together in small groups. Learners are supposed to explain each other and provide information and complement each other's weaknesses (Veenman, 2009).
- **Demonstration approach.** This approach is a teaching strategy in which the teacher engages in a learning task other than just talking about it (Labarosa, 2013).
- **Games in mathematics lessons.** Mathematical games support and stimulate the goal of mathematical education. Playing games does not feel as learning and motivates and stimulates learners to be good at what they do (Volgens Bartjens, 2017).
- **Inquiry Based Learning or Discovering Learning.** This makes learners learn to see connections and it is not feeling like it is about learning loose facts (Kerpel, 2014).
- **Mastery learning.** Mastery learning focuses on mastering a topic before the learner move on to a more advanced one (Renard, 2017).
- **Problem-solving.** Problem-solving is "a learner-directed strategy in which learners think patiently and analytically about complex situations in order to find answers to questions" (Bautista, 2014).

- **The Direct instruction Model.** Direct instruction provides the teacher with a structured opportunity to apply effective learning (Ter Keurs, 2017).

In consultation with Miss Toni, the Grade 3 teacher of the Dambuza Primary School there has been chosen for Cooperative Learning and The Direct Instruction Model as most appropriate teaching methods. Look at Appendix 5 for the tabulation with important criteria according to the researcher and according to the teacher. The chosen methods have been explained below.

### Cooperative learning

Cooperative learning in mathematics means that the learners do not only learn from interaction with the teacher but also from the interaction with each other. (Leraar24, 2011). Cooperative learning has many advantages. It stimulates the involvement and active participation of the learners and cooperative learning also promotes social skills and thereby contributes to an improved atmosphere in the group. The development of social skills goes very naturally and cooperative learning also often has a positive influence on the self-confidence of the learners. (Kerpel, 2014). The use of cooperative learning will create that the learners are actively engaged in the content of the lesson, they talk about it with each other and this will give the content of the lesson more meaning to them. (Leraar24, 2011). According to an article about cooperative learning and mathematics, cooperative learning will clarify the learners thinking processes and improves learning outcomes (BCO Onderwijsadvies, 2017). Cooperative learning is also an effective form of class management, because the teacher uses the ability of learners to help each other. According to Veenman (2009), underperforming learners perform better at schools with cooperatively arranged groups with different levels, than comparable learners who do no cooperative activities.

In this research there will be made use of formal cooperative learning groups. The duration of working in these groups can vary from one lesson to classes extending over a few weeks. In these study groups the learners work together to realize common learning goals by ensuring that each member of the group successfully performs the learning tasks. (Veeman, 2009). According to Kerpel (2014) there are seventeen cooperative working methods that the teacher can put into practice. Look at Appendix 6 for an overview and explanation of the most appropriate different cooperative working methods for the Dambuza Primary School. These cooperative working methods are most appropriate for the subject mathematics and can be applied in a class with a lot of learners.

### The Direct Instruction Model

To gain understanding of the learners a good instruction is very important. According to Kerpel (2014) an effective instruction cannot be done without careful planning and efficient timing. The role of the teacher is very important in this part. Direct instruction is an educational method that emphasizes structure, clarity and positive learner's support (Ebbens & Ettehoven, 2009). Direct instruction has as primary purpose of supporting learners in actively and constructively acquiring new knowledge and skills (Van der Kaar, 2017). The Direct Instruction Model has been developed in order to be a tool for an effective instruction. It is composed of six phases:

1. **Review.** Each lesson starts with the retrieval of the previous lesson and / or the acquisition of prior knowledge.
2. **Orientation.** This phase starts with an introduction of the new substance and this phase includes the learning goal of the lesson. The learning goal for the lesson will be written on the blackboard because this has to be really clear for the learners to motivate them to reach the goal.
3. **Explanation.** This phase starts with an overview of what the teacher wants to achieve this lesson. After that the teacher introduces the new substance step by step using examples. The teacher regularly checks whether the learners understand the substance.

4. **Guided practice.** During the supervised practice the teacher can ask a lot of questions. In this phase it is important to keep all learners involved.
5. **Independent practice.** The learners process the subject matter independently. The teacher creates a learning environment in which the learners use their learning time effectively. He checks the learner's work as soon as possible so that he can give immediate feedback on their work. For weak learners there can be an extended instruction in this phase.
6. **Evaluation.** The teacher will evaluate the learning goal for the lesson with the learners. The teacher has interaction with the learners and gives a lot of feedback, especially process feedback. The teacher encourages a lot to keep the class motivated.

(Kerpel, 2014).

According to Rebel (2007) The Direct Instruction Model has many advantages. The Direct Instruction Model gives lessons on the basis of a number of phases. By adjusting these lessons to the different phases, the learners will know how the lessons are built up and they will know what they can expect. The model makes a distinction between learners who take up the content of the lesson quickly and learners who are struggling with it. By distinguishing between the different learners, the teacher can get a clear overview of the learning abilities of the learners. (Rebel, 2007). With the use of this teaching method, underperformance can be signalled and a plan can be made.

## 4. Problem Statement

Not every learner succeeds in showing his potency at school. Some learners do not get high performances and develop different forms of problem behaviour. This can be seen as a problem because where does the underperformance come from and above all, what can you do about it? There is no ready-made answer to this problem because every underperforming learner can be underperforming for other reasons and every underperforming learner can develop other problems. (Van Gerven, 2014).

### 4.1 Research purpose

The purpose of this research is to find an appropriate way for how the underperforming learners can get to the required level in the subject mathematics in Grade 3 of the Dambuza Primary School. To find the most efficient way to get the underperforming learners to the required level it is important to know where the underperformance comes from.

The suggestions for the Dambuza Primary School will be based on the outcome of this research and will hopefully help the school on how they can get more learners to the required level in mathematics. There will be strategic and practical suggestions for the Dambuza Primary School on how to signal underperformance, how to cope with it and how to keep monitoring the education. As can be deduced from the problem analysis, these suggestions are important to be followed up. This is important because reducing underperforming learners is not only important for the further development of the learners themselves, but also for the development of the South African country (McCarthy & Oliphant, 2013 & Jansen-Thomas et al, 2017).

For this research, there will be made use of methods and materials that are achievable and useful for the school, so that they can actually implement the recommendations. The boundary for this research, therefore, lies with what is not achievable for the Dambuza Primary School.

### 4.2 Research question

In order to achieve an applicable and correct recommendation, a clear research question has been composed. The research question is supported with multiple sub questions and these will lead to the answer of the main question. In that way it will get clear which appropriate teaching methods can be used to get underperforming learners of Grade 3 to the required level in mathematics. The main question is as follows:

“How can the Dambuza Primary School get more learners in Grade 3 to the required level in the subject mathematics?”

### 4.3 Sub questions

1. What is the curriculum of the subject mathematics in Grade 3 and what is the minimum required level of performance for this subject in Grade 3?
2. What are the possible causes of underperformance for the learners in Grade 3 for the subject mathematics?
3. What might be appropriate teaching methods to get more learners to the required level in mathematics?
4. What teaching methods might work best in the Dambuza Primary School to get more learners to the required level in the subject mathematics?

Sub question one, two and three are theoretical questions. Most of the information that answers these questions will be searched in literature and by close observation in the school. Sub question

two and three also include a practical part. Possible causes of underperforming will be searched in literature and this output will be enriched with an interview with the social worker of the Dambuza Primary School. This will be done to make clear the possible causes of underperforming in Grade 3. There will be searched for appropriate teaching methods in the literature and it will be discussed with the teacher. There will also be conversations with experts on the mathematical teaching topic. Sub question four is a practical question. To receive an answer on this question, different teaching methods will be experimented at the Dambuza Primary School.

#### 4.4 Hypothesis

Looking at the research goal, the following hypothesis can be made based on experiences of the researcher and research which already has been done.

##### More individual attention

More learners can get to the required level in the subject mathematics if more individual attention will be added in the lessons.

A research from the education council from the Netherlands about improving learning performances shows that 78% of the questioned education contributors thinks that more personal attention for learners can improve the learning performances (Bulsink, 2011).

##### Use of differentiation

Differentiation is necessary to add to the mathematics lessons because in this way the needs of underperforming learners can be met better.

In a presentation about differentiation in mathematics lessons from the mathematics and language centre Albeda a quote about differentiation from Tomlinson (1999) is used: "Differentiation is an organized but flexible way to proactively adjust the education, to respond to the level where learners are and help them grow maximally." (Jonker, 2011).

##### Use of more activating and motivating teaching methods

Activating and motivating working methods can improve the motivation and concentration of the underperforming learners.

An article from the educational research service from America about identifying and motivating underachievers shows that teachers should use motivational techniques that speak specifically to each underachieving learner. Through this process the learners will learn and stop underperforming. (Rahal, 2010).

The topic of this research has been discussed with the teacher of Grade 3 in the Dambuza Primary School and the teacher confirmed the importance of this topic. It is a clear problem that a too big part of Grade 3 is underperforming in the important subject mathematics and the school is looking forward to receive recommendations about reducing the number of underperforming learners in mathematics.

## 5. Research Strategy

The research strategy will ultimately result in the reciprocation of the research question. This question is: “How can the Dambuza Primary School get more learners in Grade 3 to the required level in the subject mathematics?”

The way to get to the answer of the research question is by first answering multiple sub questions. These sub questions are both theoretical and practical. There are different research tools which will be needed to answer these sub questions. A couple of examples of research tools are: literature study, conducting interviews, doing experiments and to test and observe several cases.

The research question will be answered with the information from the sub questions.

In the table below the research tools which will be used per sub question have been shown.

**Figure 3: Research tools**

Method of research	How can the Dambuza Primary School get more learners in Grade 3 at the required level in the subject mathematics?			
	Sub question 1	Sub question 2	Sub question 3	Sub question 4
Study	X	X	X	
Observe	X			X
Question	X	X	X	
Experiment				X

### 5.1 Research goal

The research goal is to find a way for how the underperforming learners can get to the required level in the subject mathematics in Grade 3 of the Dambuza Primary School. It is also important to know what the causes of underperformance are. When the cause is known, the way to improve and prevent this can be found.

#### The research

The research will take place in Grade 3 at the Dambuza primary school. The research will be held for the learners in the subject mathematics. The demarcation of this study is done so the results will be best applicable and also more reliable because of less external influences. All the research that will be done shall focus on obtaining the required level for the subject mathematics and on how the learners can achieve this.

### 5.2 Research method

Eventually the goal of this research is to find an appropriate teaching method to increase the level of underperforming learners. To reach this goal in a structured manner, this research can be divided in three steps.

Step one is about inventory. In this step the level of the learners in Grade 3 has to be made clear and this is also the starting point from which results of the different teaching methods can be seen. This will be done by an analysis of the test results of term 2, term 3 and a consultation with the teacher.

This has to be done to ultimately know if and how the levels will increase. This step also includes the pre research about possible ways to increase levels in mathematics. This pre research will consist literature review and interviews with experts in this subject. These experts can recommend appropriate teaching methods in mathematics.

Step two is about determining which teaching methods are theoretically most applicable in the school context. To decide which teaching method is most applicable there has to be investigated what the literature says about applicability. In addition, there will be consultation with the teachers of the Dambuza Primary School about the teaching method they are most interested in. This needs to be done because the final result of this research has to be of a useful value for the school. The Dambuza Primary School has to determine some criteria about important requirements for, according to them, an appropriate teaching method. Important criteria from the literature has to be added to this list, and a tabulation has to be made with the criteria and the possible appropriate teaching methods from the literature and interviews. These data have to be quantified by marking the appropriate critical points per teaching method. The two most appropriate teaching methods, according to the criteria, have to be tested in practice. The reason why only two teaching methods will be tested, is because the research has to be finished within seven weeks. If more teaching methods should be tested in this time, the results could be less clear and reliable because each teaching method has to be done in very little time.

Step three is about determining which teaching method is most applicable, according to the experiences in practice. The conclusion has to be made by a comparison of test results from every teaching method. Before a teaching method starts, a test will be given to measure the levels. The same test will be given after finishing that teaching method to accurately measure if the level has increased. The tests need to be compiled by using different assignments from the literature, experts and the mathematics method of the school. All these assignments have to be compiled according to the National Curriculum Statement (NCS) Grade 3, Term 4. On the basis of advice from Dr Pamela Vale, researcher at the Rhodes University in Grahamstown, the topic whole numbers will be central in the teaching methods and tests. The teaching methods will both be about different operations with whole numbers. Look at Appendix 4 for requirements for whole numbers and the operations. According to Dr Vale, whole numbers are very important for Grade 3 learners because they have to control this topic very good at the end of Grade 3 for their further development in primary school. Look at Appendix 7 for the conversation with Dr Vale. The teaching methods will be given in English and at necessary moments the teacher has to translate it in Xhosa for all the learners to understand.

### 5.3 Research groups

During the research I will observe, question and experiment with different groups of people. Below I have summed up all the research groups. Each research group has a different approach and every approach has been described below.

#### Learners

The learners of Grade 3A at the Dambuza Primary School are central in this research. Grade 3A is a group with 64 learners and it is a composite group of boys and girls with different levels. There is a group of learners that cannot read and write very well. This group is sitting in front of the teacher and this group receives regular help from an attending teacher. This teacher works together with a psychologist to teach these learners to read and write. These learners are supposed to go to special education because their level is too low for the school, but this takes a long time. The cause of that is because the government does not cooperate, according to the teacher of Grade 3A. This group will not be the central group in this research, but the central research group will be chosen per teaching method by testing the levels of all learners. The goal of this research is to increase the level of the low level learners in mathematics, so that is the most important research group. The learners have to

collaborate with the different teaching methods that will be tested in practice. The final result depends to a large extent on their cooperation. The majority of this group understands and talks English, but a small part does not. This is the group that cannot read and write very well. For this small part of the whole group, some moments in practices of the teaching methods have to be translated by the teacher in Xhosa.

#### Teacher

Miss Toni, the teacher of Grade 3A has an important role in the research. This teacher will be observed during the mathematics lessons and she will also be interviewed to get a practical view on underperformance. Miss Toni works every day and so she is the standard teacher for this group. This teacher is representative of the mathematics lessons in Grade 3 in the Dambuza Primary School because she guides the teacher of Grade 3B in giving mathematics lessons. The way of giving mathematics lessons can be one of the causes of the learners levels. It is important to let the teacher know this research is to improve the education level and not to improve their teaching method.

#### Experts

The people in this research group are experts in the field of mathematics and have knowledge about different possible teaching methods to increase learning levels. These experts have experiences with these areas and are able to recommend different teaching methods, based on literature and own experiences. The experts are an important research group because they can provide very useful information about the ins and outs of different appropriate teaching methods and why those approaches have a positive effect on the learning levels in mathematics.

### 5.4 Quality requirements

To make sure that the research will be done properly some requirements need to be made to be able to guarantee the quality of the research. This will be done by two pillars, trustworthiness and validity. In the trustworthiness part it is necessary to make sure that the research will be done with the right persons and according to the right way. The validity will make sure that will be measured what needs to be measured.

#### Trustworthiness

To make this research reliable, different applications have to be done. Interviews will be made in English, but will also be translated in Xhosa so that a Xhosa speaking interviewee will surely understand the questions. After asking a question the interviewees will be asked if the questions were clear and otherwise the questions will be explained with other possible words. This will be done to make sure that the correct answers will be given in the interviews. To make sure to not forget about important things in the interviews, the interviews will be recorded on a mobile phone. In that way the interviews can be listened over again and the whole interview can be written down.

To make sure the level of the learners will really increase, the same test will be given before the teaching method and after it. In that way the exact same skills will be measured, so there can be made a reliable conclusion for increase or no increase. Different tests will be used in experimenting the results between teaching methods. In that way, memorizing the questions cannot be a cause of level increase.

With the first test before starting the first teaching method, sixteen underperforming learners will be chosen to be the research group for the first method. Sixteen is 25% of the 64 learners in the whole class and that makes a reliable research group, according to professor Irwin. The results of these sixteen learners from the test after the teaching method will be compared with the results of the first test and a conclusion will be made about if these learners have achieved the required level. The same approach will be used for the other teaching method. It is possible that the amount of

underperforming learners will be lower than sixteen in the second teaching method. Then there will be made a new reliable research group.

It would be good to compare the results of the different teaching methods with a group that does not get different teaching methods. It would be ideal to compare with Grade 3B of the Dambuza Primary School. Unfortunately, this is not possible because in Grade 3B another research in mathematics will take place. The other research can have an influence on the levels of the learners, so it will not be reliable to compare with that group.

It is also not possible to divide Grade 3A in half and use one half as a control group, because there is no room and teacher left to teach the half of Grade 3A.

### Validity

“Validity means that you actually measure the phenomenon that you intend to measure.” (Siljee, 2017). To reach the goal of increased levels and measure the levels in a reliable and valid way, tests have to be made. These tests will be based on the National Curriculum Statement (NCS) Grade 3, Term 4. To get valuable tests there will be intervision with experts and teachers about the assignments in the tests. The assignments will also be made based on appropriate literature. After the content of the tests are known, it will be validated with the teacher of Grade 3A. There will be looked if the test measures the part of Term 4 that the teaching method should contribute.

### 5.5 Research period

The research has to be done in seven weeks, from 9 October 2017 till 24 November 2017. In these weeks the three steps of this research will be completed and a conclusion will be made. Each teaching method will be carried out for two weeks. These two weeks include two tests and four lessons per teaching method. After these four weeks conclusions and recommendations have to be made.

### 5.6 Research method per sub question

To get a good answered research question, it will be analysed on the basis of sub questions. Below you can see the approach per sub question.

#### Sub question 1

“What is the curriculum of the subject mathematics in Grade 3 and what is the minimum level of performance for this subject in Grade 3?”

For this sub question the tools study, observe and question will be used. This sub question will be answered with the use of desk research, observations and interviews. Literature has to be studied to collect data about the curriculum of the subject mathematics in Grade 3 and also about the minimum level of performance for this subject in this grade. A literature review needs to be made in which different scientific articles have to be studied and compared. The mathematics methods of the school have to be observed to get a view of the curriculum and required level. This has to be done with a qualitative approach and the findings have to be captured in a descriptive text. Interviews will be done with the principal of the school and the teacher of Grade 3A. In these interviews open questions will be asked to achieve the highest possible qualitative yield. (van der Donk & van Lanen, 2016)

#### Sub question 2

“What are the possible causes of underperformance for the learners in Grade 3 for the subject mathematics?”

For this sub question the tools study and question will be used. Literature has to be studied to collect data about the possible causes of underperformance for the learners in Grade 3 for the subject mathematics. There will be made a literature review in which different scientific articles will be studied and compared. Interviews will be done with the teacher of Grade 3 and the social worker of the school to get answers about the causes of the underperforming learners of this group. In these interviews open questions will be asked to achieve the highest possible qualitative yield. (van der Donk & van Lanen, 2016)

Sub question 3

“What might be appropriate teaching methods to get more learners to the required level in mathematics?”

For this sub question the tools study and question will be used. Literature has to be studied to collect data about different teaching methods to get more learners to the required level in mathematics. There has to be made a literature review in which different scientific articles have to be studied and compared. Interviews have to be done with experts who know a lot about different teaching methods in mathematics. In these interviews open questions have to be asked to achieve the highest possible qualitative yield. (van der Donk & van Lanen, 2016)

Sub question 4

“What teaching methods might work best in the Dambuza Primary School to get more learners to the required level in the subject mathematics?”

For this sub question the tools observe and experiment will be used. The results of the different appropriate teaching methods have to be observed and analysed to find out which method works best according to the practical experience. This has to be done with a qualitative approach and the findings have to be captured in a descriptive text (van der Donk & van Lanen, 2016). Two appropriate teaching methods will be tried in practice and that can be seen as experimenting. The different teaching methods have to be tried to find out which approach provides the best results and shows most level increase.

**Figure 4: Diagram view sub questions**

Sub question	Method of data collection	Hypothesis	Research activities	Requirements	Data processing
Motivation sub question 1	To know what the curriculum of the subject mathematics in Grade 3 and the minimum required level is, a literature review is required. Interviewing teachers and the principal of the school is necessary to know how the school is handling the curriculum and how the school gauges the minimum required level. For answering the main question this Sub question it is necessary to chart the curriculum and required level because it can be used as the starting point.				
<b>Sub question 1:</b> What is the curriculum of the subject mathematics in Grade 3 and what is the minimum	Doing a literature review and interviewing the teacher of Grade 3 and the	Getting a clear review of the curriculum of the subject mathematics in Grade 3	Searching for literature from the department of education about the curriculum in the subject mathematics and also about what is	Making an interview with questions about what curriculum the school uses and how	Processing in theoretical framework. To make clear the level of the learners, an analysis of the test results from Term 2 and Term 3 will be

required level of performance for this subject in Grade 3?	principal of the school.	and what's the required level for the learners in Grade 3.	the minimum level for this subject. In this way it will get clear what is nationally established. Interviewing the teachers and principal of the school to make clear how the school uses the national established curriculum.	the school gauges the minimum required level of performance.	made to get an overview of the underperforming learners.
Motivation sub question 2	To know different possible causes of underperformance, it is necessary to do a literature review and interview the people who know about circumstances and restrictions of the underperforming learners. For answering the main question of this research it is necessary to know different possible causes, because when the cause is known it can be solved.				
<b>Sub question 2:</b> What are the possible causes of underperformance for the learners in Grade 3 for the subject mathematics?	Doing a literature review and interviewing the teacher and social worker of Grade 3 of the school.	Getting an overview of different possible causes of underperforming.	Searching for literature on the internet and in books about causes of underperformance. Interviewing the teacher of the class and the social worker of the school about causes of the underperformance of the learners in Grade 3.	Making an interview with questions about the circumstances that the learners are dealing with at home and in their family and also about possible restrictions.	Processing in theoretical framework.
Motivation sub question 3	To know what might be different appropriate teaching methods to increase the level of underperforming learners, it is necessary to do a literature review and interview experts to get a clear overview of possibilities. To get an answer for the main question of this research it is important to know about different appropriate ways to get more learners on the required level, because when you know different ways you can try a few in practice and test the results.				
<b>Sub question 3:</b> What might be appropriate teaching methods to get more learners to the required	Doing a literature review and search for experts who know a lot about	Getting an overview of different appropriate teaching methods that work	Searching for literature on the internet and in books about different teaching methods for level increase?	Making an interview with questions about different teaching	Processing in theoretical framework.

level in mathematics?	different teaching methods in mathematics and interview them.	positively on getting an higher level.	Searching for experts on the internet or mathematics experts from Stenden to interview them about appropriate teaching methods in mathematics.	methods in mathematics, how to teach those and what material is needed.	
Motivation sub question 4	To know which teaching method might work best at the Dambuza Primary School, two approaches need to be tested and results have to be measured to take any conclusions. This Sub question is very important to answer the main question because this questions can give recommendations to the Dambuza Primary School to get more learners to the required level in mathematics.				
<b>Sub question 4:</b> What teaching methods might work best in the Dambuza Primary School to get more learners to the required level in the subject mathematics?	Trying two or three different teaching methods in the school and collect results by testing the level before trying the approach and after trying the approach with the same test.	Find out which teaching method provides the best results and shows most level increase.	Bringing two or three teaching methods into practice and taking tests to measure the results per approach.	Getting or making tests to measure the results of the different tried approaches to conclude which approach might work best.	Processing in results.

## 5.7 Ethical issues

The results of this research will be focused on the group underperforming learners and the research goal is to get the underperforming learners to the required level. That does not mean that the good performing learners will be disadvantaged. By using the teaching method on the whole class, all the learners should improve their results and experience education in a different way. However, the results of underperforming learners will lead the investigation and conclusions will be based on these outcomes. All learners will be treated the same during the teaching methods. There will be no distinction between motivated learners and unmotivated learners. In addition, the degree of mastery of the English language should not make a difference in approach. When assembling cooperative working groups, there will be no selection based on knowledge, but it will be a mixed group. In that way, strong learners and weak learner can support each other. Different degrees of levels and motivation will affect each other. In that way it will yield the best outcomes and it will show that learners will be strong together.

## 5.8 Timetable

**Figure 5: Timetable**

Weeknumber	Activities	Requirements
1 (9 oct. - 15 oct.)	Start with the first teaching method.	Take test before starting and analyse test. Test on Monday and lessons on Wednesday and Thursday.
2 (16 oct. - 22 oct.)	First teaching method again.	Take test after finishing and analyse test. Lessons on Monday and Wednesday and test on Thursday.
3 (23 oct. - 29 oct.)	Analyse results of the first teaching method and start second teaching method.	Take test before starting and analyse test. Test on Monday and lessons on Wednesday and Thursday.
4 (30 oct. - 5 nov.)	Second teaching method again.	Take test after finishing and analyse test. Lessons on Monday and Wednesday and test on Thursday.
5 (6 nov. - 12 nov.)	Analyse results of the second teaching method and compare with the results of the first teaching method.	Use a tabulation to receive a clear comparison.
6 (13 nov. - 19 nov.)	Collecting all the results of the research. Making conclusions, recommendations and discussion.	Use the rubrics.
7 (20 nov. - 26 nov.)	Making the summary of the whole research. Making a presentation.	Use the rubrics.

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## Appendices

### Appendix 1: Conversation with Mr. Nombambela

Mr. Nombambela from the Department of Education visited the Dambuza Primary School on 16 August 2017 to organize an event for the development of woman and children. I was talking to him about doing research about underperformance in the school. He knew a lot about this subject and began to tell about it.

He told that there are a lot of learners in the South African schools who need special education. Teachers do not have the knowledge to teach learners with special needs. If the teachers had the knowledge, the government would be a problem because the government does not give accommodations to teach these learners with special needs. If learners with special needs do not get the right approach, they could be bullied by other learners. The reason for this is that other learners can pick up that this special learner is not performing very well and then they can start laughing and bullying this learner. The self-confidence of the special learner can decrease by this and the development can get a negative turn. Mr. Nombambela was also talking about academic barriers. Learners can have a lot of different talents but it is possible that these talents do not show through books and the academical education system. All the education we see in South Africa is academical education so these learners cannot perform sufficient, while they are having a lot of talents.

According to Mr. Nombambela schools are able to complete a form for learners who need special support. These forms will be studied by an psychologist and there will be made a rapport of the outcomes. In this way a learner can be referred to a special school. This sounds very good, but the problem is the government. The government does not promote this trajectory and makes it take long time till a learner can get to a special school, so nothing really happens. Young learners stay in the same class because their level does not increase and nothing has been done about it. The next year these learners will be placed in the higher grade but their learning problems have not been solved. Because of this these learners will go to high school with a huge learning backlog.

### Appendix 2: Interview with Miss Toni, Grade 3 teacher

In an interview with the teacher of Grade 3 of the Dambuza Primary School appeared a lot information about the teaching in the class and about the learners. I asked a lot of questions and the teacher answered them. Her answers are written below.

The teacher of Grade 3A has worked at a lot of primary schools in the Eastern Cape of South Africa and is now working for two years at the Dambuza Primary School. The teacher of Grade 3A thinks it is very important in the lessons that the teacher knows that the learners understand the lesson content. To know if the learners understand you, it is good to ask questions. In mathematics lessons the teacher thinks it is a big challenge that the math lessons are supposed to be given in Xhosa. It would be much easier when it should be given in English because the English words are more easy. Because the government makes the mathematics workbooks in Xhosa, not the whole lesson can be given in English but the teacher always tries to give the biggest part of the lesson in English. She also thinks that giving mathematics in English is important to learn for the learners, because from Grade 4 and up all lessons will be given in English.

The teacher of Grade 3A knows the levels of the learners through the tests they have to make once in four weeks and through checking their work. When learners are not on the required level, there cannot be given more attention to these learners, because the number of learners in the class is too high. The school also does not have special methods or materials for learners with disadvantages, so

special attention would also be hard to give. The teacher thinks it is very important for the development of the learners that schools get smaller classes. In smaller classes the teacher can pay more individual attention to the low level learners.

Some of these learners in Grade 3A are participating very well during the lessons and others are less responding to questions and assignments of the teacher. According to the teacher of Grade 3 there are also big differences between the motivation of the learners. Some learners are excited to learn and others are at school only because their parents want them to be there. There is a group of learners that cannot read and write very well and this group gets help from a supportive teacher. This teacher works together with a psychologist and they determined that these learners need to go to special education schools. According to the teacher of Grade 3A the government makes this impossible because they do not cooperate with taking these learners to special schools.

### [Appendix 3: Analysis test results semester 1](#)

To know the learning levels of the learners in Grade 3A, there has been made an analysis of the test results of the first semester of 2017. This semester includes Term 1 and Term 2. The results follow below.

The total number of learners in Grade 3A: 64

#### Test results Term 1

Level 1: 3 learners  
Level 2: 3 learners  
Level 3: 3 learners  
Level 4: 3 learners  
Level 5: 5 learners  
Level 6: 15 learners  
Level 7: 31 learners

The test results from Term 1 show that most of the learners are at the required level in mathematics. Only 9 learners are performing under the required level.

#### Test results Term 2

Level 1: 20 learners  
Level 2: 3 learners  
Level 3: 4 learners  
Level 4: 17 learners  
Level 5: 8 learners  
Level 6: 7 learners  
Level 7: 4 learners

The test results from Term 2 show that almost 27 learners are performing under the required level. This is almost half of the all the learners of Grade 3A.

The following pages show the overview of test results for Term 1 and Term 2.

**DAMBUZA PUBLIC PRIMARY SCHOOL**

Mathematics (Gr 03)

Class : 3A

Term1 : 2017/01/11 - 2017/03/31

No	Asc No	Learner	Gender	Term /Date	TASKS		TASK Numbers, operations and		TASK Space and shape (Geometry)		TASK Data handling		TASK Measurement		TOTAL Weighted Mark	Term %	Level
					Activities	Weighting	Assessment 1	Assessment 2	Assessment 1	Assessment 2	Assessment 1	Assessment 2	Assessment 1	Assessment 2			
Marks: -1 = Absent, -2 = Not Captured																	
Include in SBA Year Mark																	
1	13/559	ANDRIES, Lwando	Male														
2	13/453	APLENI, Asanele	Female														
3	15/837	BOOI, Ibanathi	Female														
4	13/535	DASTILE, Lathitha	Male														
5	14/642	DAYIMANI, Khanyisa	Female														
6	14/684	DURUWE, Siphokuhle	Female														
7	13/491	FEZILE, Anaso	Female														
8	16/996	GAGA, Bathandwa	Male														
9	13/481	GAYI, Asisipho	Female														
10	13/597	GODLWANA, Yomelela	Female														
11	14/650	HILTA, Sesethu	Female														
12	13/489	HINA, Yonela	Male														
13	13/488	HLANGANA, Olona	Female														
14	13/496	HOYI, Bavuyile	Female														
15	13/518	JEKANA, Masimbonge	Male														
16	13/462	KELEMANI, Aliphayiya	Female														
17	13/497	KETISO, Aviwe	Male														
18	12/399	KULA, Zanoxolo	Male														
19	16/1059	KULATI, Onelisa	Female														
20	15/921	MAGQUNTULU, Liyakhanya	Male														
21	14/768	MARAWULA, Owam	Female														
22	11/212	MATINYANA, Avuya	Male														
23	15/817	MATOMELA, Emihle	Female														
24	13/479	MBATSHA, Alulutho	Female														
25	11/211	MDANISWANA, Salma	Female														
26	15/840	MELANI, Aphwe	Female														
27	14/748	MGWEBE, Zukhanye	Male														
28	14/736	MKWANAZI, Fazeka	Female														
29	11/229	MPINI, Aihini	Male														
30	13/455	MRALAZA, Amela	Male														
31	15/819	MTANA, Athamikele	Female														
32	14/634	MTSATSE, Emihle	Male														



**DAMBUZA PUBLIC PRIMARY SCHOOL**

Mathematics (Gr 03)  
Class : 3A  
Term2 : 2017/04/18 - 2017/06/30  
All Learners

No.	Age No.	Learner Name	Gender	TASKS		TASKS		TASKS		TASKS		TASKS		TASKS		TASKS		TOTAL Weighted Mark	Term %	Level	
				Activities	Weighting	Assessment 1	Assessment 2	Assessment 3	Assessment 4	Assessment 5	Assessment 6	Assessment 7	Assessment 8	Assessment 9	Assessment 10	Assessment 11	Assessment 12				Assessment 13
1	13/559	ANDRIES, Lwando	Male																		
2	13/453	APLENI, Asanale	Female																		
3	15/637	BOOI, banathi	Female																		
4	13/535	DASTILE, Lathiba	Male																		
5	14/642	DAYIMANI, Khanyisa	Female																		
6	14/654	DURUWE, Siphothu	Female																		
7	13/491	FEZILE, Anaso	Female																		
8	16/966	GAGA, Bathandwa	Male																		
9	13/481	GAYI, xisipho	Female																		
10	13/597	GOOLWANA, Yonellela	Female																		
11	14/450	HILTA, Sesethu	Female																		
12	13/489	HINA, Yonela	Male																		
13	13/488	HLANGANA, Olona	Female																		
14	13/496	HOYI, Duvuyile	Female																		
15	13/518	JEKANA, Masimbonge	Male																		
16	13/462	KELEMANI, Aluqhayiya	Female																		
17	13/487	KETISO, Anwe	Male																		
18	12/959	KULA, Zenoxolo	Male																		
19	15/621	MAGQINTULU, Luyakhiyaya	Male																		
20	14/760	MARAWULA, Owam	Female																		
21	11/212	MATINYANA, Avoya	Male																		
22	15/617	MATOMELA, Emhle	Female																		
23	13/479	MBATSHA, Aluutho	Female																		
24	11/211	MDANISWANA, Salina	Female																		
25	15/940	MELANI, Aphwe	Female																		
26	14/748	MOWEBA, Zukhanye	Male																		
27	14/736	MKWANAZI, Fozeka	Female																		
28	11/229	MPINI, Alheli	Male																		
29	13/455	MPALAZA, Amela	Male																		
30	15/619	MPANA, Athamkole	Female																		
31	14/834	MTSATSE, Emhle	Male																		
32	12/362	MTWALO, Ovyo	Male																		
33	12/340	MTYAPA, Luyolo	Male																		
34	12/343	NAKANI, Ayabonga	Male																		
35	13/475	NAKANI, Chweyita	Female																		
36	12/349	NAKANI, Siphiso	Female																		
37	12/393	NDAVULE, Anesipho	Female																		
38	16/942	NGALO, Athetkosi	Male																		
39	10/52	NGESI, Anathi	Female																		
40	16/1092	NGQOYIYA, Ovyo	Female																		
41	13/447	NOXINGO, Phumela	Female																		
42	428	NOBEBE, Sinawe	Female																		
43	13/468	NONTAYI, Banale	Male																		
44	14/668	NORONGWANA, Oyena	Female																		
45	14/630	NOTOZINI, Sibabonga	Male																		
46	13/514	NUTLELA, Liyena	Male																		
47	13/443	PETRUS, Asomhala	Female																		
48	16/1000	PLAATJIE, Thembakazi	Female																		
49	13/482	QOLOMA, Lowethu	Female																		
50	13/471	QONONO, Khanyisa	Female																		
51	12/373	QUMA, Aphlele	Male																		



Appendix 4: Grade 3 overview per term

GRADE 3 OVERVIEW				
1. NUMBERS, OPERATIONS AND RELATIONSHIPS				
TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<b>NUMBER CONCEPT DEVELOPMENT: Count with whole numbers</b>				
<b>1.1 Count objects</b>	<p>Group to at least 200 objects to estimate and count reliably.</p> <p>Give a reasonable estimate of a number of objects that can be checked by counting.</p> <p>The strategy of grouping is encouraged.</p>	<p>Group to at least 500 objects to estimate and count reliably.</p> <p>Give a reasonable estimate of a number of objects that can be checked by counting.</p> <p>The strategy of grouping is encouraged.</p>	<p>Group to at least 700 objects to estimate and count reliably.</p> <p>Give a reasonable estimate of a number of objects that can be checked by counting.</p> <p>The strategy of grouping is encouraged.</p>	<p>Group to at least 1 000 objects to estimate and count reliably.</p> <p>Give a reasonable estimate of a number of objects that can be checked by counting.</p> <p>The strategy of grouping is encouraged.</p>
<b>1.2 Count forwards and backwards</b>	<p>Count forwards and backwards in:</p> <ul style="list-style-type: none"> <li>• 1s, from any number between 0 and 200</li> <li>• 10s from any multiple of 10 between 0 and 200</li> <li>• 5s from any multiple of 5 between 0 and 200</li> <li>• 2s from any multiple of 2 between 0 and 200</li> <li>• 3s from any multiple of 3 between 0 and 200</li> <li>• 4s from any multiple of 4 between 0 and 200</li> <li>• 100s to at least 500</li> </ul>	<p>Count forwards and backwards in:</p> <ul style="list-style-type: none"> <li>• 1s, from any number between 0 and 500</li> <li>• 10s from any multiple of 10 between 0 and 500</li> <li>• 5s from any multiple of 5 between 0 and 500</li> <li>• 2s from any multiple of 2 between 0 and 500</li> <li>• 3s from any multiple of 3 between 0 and 500</li> <li>• 4s from any multiple of 4 between 0 and 500</li> <li>• 50s, 100s to at least 1 000</li> </ul>	<p>Count forwards and backwards in:</p> <ul style="list-style-type: none"> <li>• 1s, from any number between 0 and 700</li> <li>• 10s from any multiple of 10 between 0 and 700</li> <li>• 5s from any multiple of 5 between 0 and 700</li> <li>• 2s from any multiple of 2 between 0 and 700</li> <li>• 3s from any multiple of 3 between 0 and 700</li> <li>• 4s from any multiple of 4 between 0 and 700</li> <li>• 20s, 25s, 50s, 100s to at least 1 000</li> </ul>	<p>Count forwards and backwards in:</p> <ul style="list-style-type: none"> <li>• 1s, from any number between 0 and 1 000</li> <li>• 10s from any multiple of 10 between 0 and 1 000</li> <li>• 5s from any multiple of 5 between 0 and 1 000</li> <li>• 2s from any multiple of 2 between 0 and 1 000</li> <li>• 3s from any multiple of 3 between 0 and 1 000</li> <li>• 4s from any multiple of 4 between 0 and 1 000</li> <li>• 20s, 25s, 50s, 100s to at least 1 000</li> </ul>

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<b>NUMBER CONCEPT DEVELOPMENT: Represent whole numbers</b>				
<b>1.3 Number symbols and number names</b>	<p><b>Identify, recognise and read numbers</b></p> <ul style="list-style-type: none"> <li>Identify, recognise and read number symbols 0 to 500</li> <li>Write number symbols 0 to 500</li> <li>Identify, recognise and read number names 0 to 250</li> <li>Write number names 0 to 100</li> </ul>	<p><b>Identify, recognise and read numbers</b></p> <ul style="list-style-type: none"> <li>Identify, recognise and read number symbols 0 to 1 000</li> <li>Write number symbols 0 to 1000</li> <li>Identify, recognise and read number names 0 to 250</li> <li>Write number names 0 to 250</li> </ul>	<p><b>Identify, recognise and read numbers</b></p> <ul style="list-style-type: none"> <li>Identify, recognise and read number symbols 0 to 1 000</li> <li>Write number symbols 0 to 1000</li> <li>Identify, recognise and read number names 0 to 500</li> <li>Write number names 0 to 500</li> </ul>	<p><b>Identify, recognise and read numbers</b></p> <ul style="list-style-type: none"> <li>Identify, recognise and read number symbols 0 to 1 000</li> <li>Write number symbols 0 to 1000</li> <li>Identify, recognise and read number names 0 to 1 000</li> <li>Write number names 0 to 1000</li> </ul>
<b>NUMBER CONCEPT DEVELOPMENT: Describe, compare and order whole numbers</b>				
<b>1.4 Describe, compare and order numbers</b>	<p>Describe, compare and order numbers to 99.</p> <ul style="list-style-type: none"> <li>Compare whole numbers up to 99 using smaller than, greater than, more than, less than and is equal to</li> <li>Order whole numbers up to 99 from smallest to greatest, and greatest to smallest</li> </ul>	<p>Describe, compare and order numbers to 500.</p> <ul style="list-style-type: none"> <li>Compare whole numbers up to 500 using smaller than, greater than, more than, less than and is equal to</li> <li>Order whole numbers up to 500 from smallest to greatest, and greatest to smallest</li> </ul>	<p>Describe, compare and order numbers to 700.</p> <ul style="list-style-type: none"> <li>Compare whole numbers up to 700 using smaller than, greater than, more than, less than and is equal to</li> <li>Order whole numbers up to 700 from smallest to greatest, and greatest to smallest</li> </ul> <p><b>Use ordinal numbers to show order, place or position</b></p> <ul style="list-style-type: none"> <li>Use, read and write ordinal numbers, including abbreviated form up to 31<sup>st</sup></li> </ul>	<p>Describe, compare and order numbers to 999.</p> <ul style="list-style-type: none"> <li>Compare whole numbers up to 999 using smaller than, greater than, more than, less than and is equal to</li> <li>Order whole numbers up to 999 from smallest to greatest, and greatest to smallest</li> </ul>
<b>NUMBER CONCEPT DEVELOPMENT: place value</b>				
<b>1.5 Place value</b>	<p><b>Recognise the place value of numbers to 99</b></p> <ul style="list-style-type: none"> <li>Know what each digit represents</li> <li>Decompose two-digit numbers up to 99 into multiples of tens and ones/units</li> <li>Identify and state the value of each digit</li> </ul>	<p><b>Recognise the place value of numbers to 500</b></p> <ul style="list-style-type: none"> <li>Know what each digit represents</li> <li>Decompose three-digit numbers up to 500 into multiples of hundreds, tens and ones/units</li> <li>Identify and state the value of each digit</li> </ul>	<p><b>Recognise the place value of numbers to 700</b></p> <ul style="list-style-type: none"> <li>Know what each digit represents</li> <li>Decompose three-digit numbers up to 700 into multiple of hundreds, tens and ones/units</li> <li>Identify and state the value of each digit</li> </ul>	<p><b>Recognise the place value of numbers to 999</b></p> <ul style="list-style-type: none"> <li>Know what each digit represents</li> <li>Decompose three-digit numbers up to 999 into multiple of hundreds, tens and ones/units</li> <li>Identify and state the value of each digit</li> </ul>

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<b>SOLVE PROBLEMS IN CONTEXT</b>				
<b>1.6 Problem-solving techniques</b>	<p>Use the following techniques when solving problems:</p> <ul style="list-style-type: none"> <li>building up and breaking down numbers</li> <li>doubling and halving</li> <li>number lines</li> </ul>	<p>Use the following techniques when solving problems:</p> <ul style="list-style-type: none"> <li>building up and breaking down numbers</li> <li>doubling and halving</li> <li>number lines</li> <li>rounding off in tens</li> </ul>	<p>Use the following techniques when solving problems:</p> <ul style="list-style-type: none"> <li>building up and breaking down numbers</li> <li>doubling and halving</li> <li>number lines</li> <li>rounding off in tens</li> </ul>	<p>Use the following techniques when solving problems and explain solutions to problems:</p> <ul style="list-style-type: none"> <li>building up and breaking down numbers</li> <li>doubling and halving</li> <li>number lines</li> <li>rounding off in tens</li> </ul>
<b>1.7 Addition and subtraction</b>	Solve word problems in context and explain own solution to problems involving addition and subtraction with answers up to 99.	Solve word problems in context and explain own solution to problems involving addition and subtraction with answers up to 400.	Solve word problems in context and explain own solution to problems involving addition and subtraction with answers up to 800.	Solve word problems in context and explain own solution to problems involving addition and subtraction with answers up to 999.
<b>1.8 Repeated addition leading to multiplication</b>	Solve number problems in context and explain own solution to problems involving multiplication with answers up to 50.	Solve number problems in context and explain own solution to problems involving multiplication with answers up to 75.	Solve number problems in context and explain own solution to problems involving multiplication with answers up to 75.	Solve number problems in context and explain own solution to problems involving multiplication with answers up to 100.
<b>1.9 Grouping and sharing leading to division</b>	Solve number problems in context and explain own solutions to problems that involve equal sharing and grouping up to 50 with answers that may include remainders.	Solve number problems in context and explain own solutions to problems that involve equal sharing and grouping up to 75 with answers that may include remainders.	Solve number problems in context and explain own solutions to problems that involve equal sharing and grouping up to 75 with answers that may include remainders.	Solve number problems in context and explain own solutions to problems that involve equal sharing and grouping up to 100 with answers that may include remainders.
<b>1.10 Sharing leading to fractions</b>	Solve and explain solutions to practical problems that involve equal sharing leading to solutions that include unitary and non-unitary fractions e.g. $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{3}{4}$ etc.	Solve and explain solutions to practical problems that involve equal sharing leading to solutions that include unitary and non-unitary fractions e.g. $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{3}{4}$ , $\frac{5}{8}$ etc.	Solve and explain solutions to practical problems that involve equal sharing leading to solutions that include unitary and non-unitary fractions e.g. $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{3}{4}$ , $\frac{5}{8}$ etc.	Solve and explain solutions to practical problems that involve equal sharing leading to solutions that include unitary and non-unitary fractions e.g. $\frac{1}{2}$ , $\frac{1}{4}$ , $\frac{3}{4}$ , $\frac{5}{8}$ etc.
<b>1.11 Money</b>	<ul style="list-style-type: none"> <li>Recognise and identify the South African coins and bank notes</li> <li>Solve money problems involving totals and change in rands or cents</li> </ul>	<ul style="list-style-type: none"> <li>Recognise and identify the South African coins and bank notes</li> <li>Solve money problems involving totals and change in rands or cents</li> </ul>	<ul style="list-style-type: none"> <li>Recognise and identify the South African coins and bank notes</li> <li>Solve money problems involving totals and change in rands or cents</li> <li>Convert between rands and cents</li> </ul>	<ul style="list-style-type: none"> <li>Recognise and identify the South African coins and bank notes</li> <li>Solve money problems involving totals and change in rands or cents</li> <li>Convert between rands and cents</li> </ul>

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<b>CONTEXT-FREE CALCULATIONS</b>				
<b>1.12 Techniques (methods or strategies)</b>	<p>Use the following techniques when performing calculations:</p> <ul style="list-style-type: none"> <li>building up and breaking down numbers</li> <li>doubling and halving</li> <li>number lines</li> </ul>	<p>Use the following techniques when performing calculations:</p> <ul style="list-style-type: none"> <li>building up and breaking down numbers</li> <li>doubling and halving</li> <li>number lines</li> <li>rounding off in tens</li> </ul>	<p>Use the following techniques when performing calculations:</p> <ul style="list-style-type: none"> <li>building up and breaking down numbers</li> <li>doubling and halving</li> <li>number lines</li> <li>rounding off in tens</li> </ul>	<p>Use the following techniques when performing calculations:</p> <ul style="list-style-type: none"> <li>building up and breaking down numbers</li> <li>doubling and halving</li> <li>number lines</li> <li>rounding off in tens</li> </ul>
<b>1.13 Addition and subtraction</b>	<ul style="list-style-type: none"> <li>Add up to 99</li> <li>Subtract from 99</li> <li>Use appropriate symbols (+, -, =, □)</li> <li>Practise number bonds to 20</li> </ul>	<ul style="list-style-type: none"> <li>Add up to 400</li> <li>Subtract from 400</li> <li>Use appropriate symbols (+, -, =, □)</li> <li>Practise number bonds to 30</li> </ul>	<ul style="list-style-type: none"> <li>Add up to 800</li> <li>Subtract from 800</li> <li>Use appropriate symbols (+, -, =, □)</li> <li>Practise number bonds to 30</li> </ul>	<ul style="list-style-type: none"> <li>Add up to 999</li> <li>Subtract from 999</li> <li>Use appropriate symbols (+, -, =, □)</li> <li>Practise number bonds to 30</li> </ul>
<b>1.14 Repeated addition leading to multiplication</b>	<ul style="list-style-type: none"> <li>Multiply numbers 1 to 10 by 2, 5, 3, 4</li> <li>Use appropriate symbols (x, =, □)</li> </ul>	<ul style="list-style-type: none"> <li>Multiply 2, 4, 5, 10, 3 to a total of 50</li> <li>Use appropriate symbols (x, =, □)</li> </ul>	<ul style="list-style-type: none"> <li>Multiply 2, 3, 4, 5, 10 to a total of 100</li> <li>Use appropriate symbols (x, =, □)</li> </ul>	<ul style="list-style-type: none"> <li>Multiply 2, 3, 4, 5, 10 to a total of 100</li> <li>Use appropriate symbols (x, =, □)</li> </ul>
<b>1.15 Division</b>	<ul style="list-style-type: none"> <li>Divide numbers to 50 by 2, 5, 10</li> <li>Use appropriate symbols (+, =, □)</li> </ul>	<ul style="list-style-type: none"> <li>Divide numbers to 50 by 2, 4, 5, 10, 4</li> <li>Use appropriate symbols (+, =, □)</li> </ul>	<ul style="list-style-type: none"> <li>Divide numbers to 99 by 2, 4, 5, 10, 3,</li> <li>Use appropriate symbols (+, =, □)</li> </ul>	<ul style="list-style-type: none"> <li>Divide numbers to 99 by 2, 3, 4, 5, 10</li> <li>Use appropriate symbols (+, =, □)</li> </ul>

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<p><b>1.16 Mental mathematics</b></p>	<p><b>Number concept: Range 200</b></p> <ul style="list-style-type: none"> <li>Order a given set of selected numbers. Range 200</li> <li>Compare numbers to 200 and say which is:               <ul style="list-style-type: none"> <li>1 more or 1 less</li> <li>2 more or 2 less</li> <li>3 more or 3 less</li> <li>4 more or 4 less</li> <li>5 more or 5 less</li> <li>10 more or 10 less</li> </ul> </li> </ul> <p><b>Rapid recall:</b></p> <ul style="list-style-type: none"> <li>Addition and subtraction facts to 20</li> <li>Add or subtract multiples of 10 from 0 to 100</li> </ul> <p><b>Mental strategies</b></p> <p>Use calculation strategies:</p> <ul style="list-style-type: none"> <li>Put the larger number first in order to count on or count back</li> <li>Number line</li> <li>Doubling and halving</li> <li>Building up and breaking down</li> <li>Use the relationship between addition and subtraction</li> </ul>	<p><b>Number concept: Range 500</b></p> <ul style="list-style-type: none"> <li>Order a given set of selected numbers. Range 500</li> <li>Compare numbers to 500 and say which is:               <ul style="list-style-type: none"> <li>1 more or 1 less</li> <li>2 more or 2 less</li> <li>3 more or 3 less</li> <li>4 more or 4 less</li> <li>5 more or 5 less</li> <li>10 more or 10 less</li> </ul> </li> </ul> <p><b>Rapid recall:</b></p> <ul style="list-style-type: none"> <li>Addition and subtraction facts to 20</li> <li>Add or subtract multiples of 10 from 0 to 100</li> </ul> <p><b>Mental strategies</b></p> <p>Use the following calculation strategies:</p> <ul style="list-style-type: none"> <li>Put the larger number first in order to count on or count back</li> <li>Number line</li> <li>Doubling and halving</li> <li>Building up and breaking down</li> <li>Use the relationship between addition and subtraction</li> </ul>	<p><b>Number concept: Range 750</b></p> <ul style="list-style-type: none"> <li>Order a given set of selected numbers</li> <li>Compare numbers to 200 and say which is:               <ul style="list-style-type: none"> <li>1 more or 1 less</li> <li>2 more or 2 less</li> <li>3 more or 3 less</li> <li>4 more or 4 less</li> <li>5 more or 5 less</li> <li>10 more or 10 less</li> </ul> </li> </ul> <p><b>Rapid recall:</b></p> <ul style="list-style-type: none"> <li>Addition and subtraction facts to 20</li> <li>Add or subtract multiples of 10 from 0 to 100</li> </ul> <p><b>Mental strategies</b></p> <p>Use the following calculation strategies:</p> <ul style="list-style-type: none"> <li>Put the larger number first in order to count on or count back</li> <li>Number line</li> <li>Doubling and halving</li> <li>Building up and breaking down</li> <li>Use the relationship between addition and subtraction</li> <li>Use the relationship between multiplication and division</li> </ul>	<p><b>Number concept: Range 999</b></p> <ul style="list-style-type: none"> <li>Order a given set of selected numbers</li> <li>Compare numbers to 1000 and say which is:               <ul style="list-style-type: none"> <li>1 more or 1 less</li> <li>2 more or 2 less</li> <li>3 more or 3 less</li> <li>4 more or 4 less</li> <li>5 more or 5 less</li> <li>10 more or 10 less</li> </ul> </li> </ul> <p><b>Rapid recall:</b></p> <ul style="list-style-type: none"> <li>Addition and subtraction facts to 20</li> <li>Add or subtract multiples of 10 from 0 to 100</li> <li>Multiplication and division facts for the:               <ul style="list-style-type: none"> <li>two times table up to 2 x 10</li> <li>ten times table up to 10 x 10</li> </ul> </li> </ul> <p><b>Mental strategies</b></p> <p>Use the following calculation strategies:</p> <ul style="list-style-type: none"> <li>Put the larger number first in order to count on or count back</li> <li>Number line</li> <li>Doubling and halving</li> <li>Building up and breaking down</li> <li>Use the relationship between addition and subtraction</li> <li>Use the relationship between multiplication and division</li> </ul>

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<p><b>1.17 Fractions</b></p>	<ul style="list-style-type: none"> <li>Use and name unitary fractions including halves, quarters thirds, fifths</li> <li>Recognise fractions in diagrammatic form</li> <li>Write fractions as 1half, 1third</li> </ul>	<ul style="list-style-type: none"> <li>Use and name unitary fractions including halves, quarters eighths, thirds, sixths, fifths</li> <li>Recognise fractions in diagrammatic form</li> <li>Write fractions as 1 half, 1third</li> </ul>	<ul style="list-style-type: none"> <li>Use and name unitary and non-unitary fractions including halves, quarters, eighths, thirds, sixths, fifths</li> <li>Recognise fractions in diagrammatic form</li> <li>Begin to recognise that two halves or three thirds make one whole and that 1 half and 2 quarters are equivalent</li> <li>Write fractions as 1 half, 2 third</li> </ul>	<ul style="list-style-type: none"> <li>Use and name unitary and non-unitary fractions including halves, quarters, eighths, thirds, sixths, fifths</li> <li>Recognise fractions in diagrammatic form</li> <li>Begin to recognise that two halves or three thirds make one whole and that 1 half and 2 quarters are equivalent</li> <li>Write fractions as 1 half, 2 third</li> </ul>

GRADE 3 OVERVIEW

2. PATTERNS, FUNCTIONS AND ALGEBRA

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
2.1 <b>Geometric patterns</b>	<p><b>Copy, extend and describe</b></p> <p>Copy, extend and describe in words</p> <ul style="list-style-type: none"> <li>• simple patterns made with physical objects</li> <li>• simple patterns made with drawings of lines, shapes or objects</li> </ul> <p><b>Range of patterns:</b></p> <ul style="list-style-type: none"> <li>• Simple patterns in which shapes or groups of shapes are repeated in exactly the same way.</li> </ul> <p><b>Create and describe own patterns</b></p> <ul style="list-style-type: none"> <li>• Create own geometric patterns</li> <li>- with physical objects</li> <li>- by drawing lines, shapes or objects.</li> <li>• Describe own patterns</li> </ul>	<p><b>Copy, extend and describe</b></p> <p>Copy, extend and describe in words</p> <ul style="list-style-type: none"> <li>• simple patterns made with physical objects</li> <li>• simple patterns made with drawings of lines, shapes or objects</li> </ul> <p><b>Range of patterns:</b></p> <ul style="list-style-type: none"> <li>• Simple patterns in which shapes, or groups of shapes are repeated in exactly the same way</li> <li>• Patterns in which the number or size of shapes in each stage changes in a predictable way i.e. regularly increasing patterns</li> </ul> <p><b>Create and describe own patterns</b></p> <ul style="list-style-type: none"> <li>• Create own geometric patterns</li> <li>- with physical objects</li> <li>- by drawing lines, shapes or objects.</li> <li>• Describe own patterns</li> </ul>	<p><b>Copy, extend and describe</b></p> <p>Copy, extend and describe in words</p> <ul style="list-style-type: none"> <li>• simple patterns made with physical objects</li> <li>• simple patterns made with drawings of lines, shapes or objects</li> </ul> <p><b>Range of patterns:</b></p> <ul style="list-style-type: none"> <li>• Patterns in which the number of shapes in each stage changes in a predictable way i.e. regularly increasing patterns</li> </ul> <p><b>Create and describe own patterns</b></p> <ul style="list-style-type: none"> <li>• Create own geometric patterns</li> <li>- with physical objects</li> <li>- by drawing lines, shapes or objects.</li> <li>• Describe own patterns</li> </ul>	<p><b>Patterns around us</b></p> <p>Identify, describe in words and copy geometric patterns</p> <ul style="list-style-type: none"> <li>• in nature</li> <li>• from modern everyday life</li> <li>• from our cultural heritage</li> </ul>
2.2 <b>Number patterns</b>	<p><b>Copy, extend and describe</b></p> <p>Copy, extend and describe simple number sequences to at least 200.</p> <p>Sequences should show counting forwards and backwards in:</p> <ul style="list-style-type: none"> <li>• the intervals specified in Grade 2 with increased number ranges</li> <li>• 100s to at least 500</li> </ul>	<p><b>Copy, extend and describe</b></p> <p>Copy, extend and describe simple number sequences to at least 500.</p> <p>Sequences should show counting forwards and backwards in:</p> <ul style="list-style-type: none"> <li>• the intervals specified in Grade 2 with increased number ranges</li> <li>• 50s, 100s to at least 1 000</li> </ul>	<p><b>Copy, extend and describe</b></p> <p>Copy, extend and describe simple number sequences to at least 750.</p> <p>Sequences should show counting forwards and backwards in:</p> <ul style="list-style-type: none"> <li>• the intervals specified in Grade 2 with increased number ranges</li> <li>• 20s, 25s, 50s, 100s to at least 1 000</li> </ul> <p><b>Create and describe own number patterns</b></p>	<p><b>Copy, extend and describe</b></p> <p>Copy, extend and describe simple number sequences to at least 1 000 .</p> <p>Sequences should show counting forwards and backwards in:</p> <ul style="list-style-type: none"> <li>• the intervals specified in Grade 2 with increased number ranges</li> <li>• 20s, 25s, 50s, 100s to at least 1 000</li> </ul> <p><b>Create and describe own number patterns</b></p>

GRADE 3 OVERVIEW

3. SPACE AND SHAPE (GEOMETRY)

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
3.1 Position, orientation and views		<p><b>Position and views</b></p> <ul style="list-style-type: none"> <li>Match different views of the same everyday object</li> <li>Name an everyday object when shown an unusual view of it</li> </ul> <p><b>Position and directions</b></p> <ul style="list-style-type: none"> <li>Follow directions to move around the classroom and school</li> <li>Give directions to move around the classroom and school</li> </ul>	<p><b>Position and views</b></p> <ul style="list-style-type: none"> <li>Read, interpret and draw informal maps, or top views of a collection of objects.</li> <li>Find objects on maps</li> </ul> <p><b>Position and directions</b></p> <ul style="list-style-type: none"> <li>Follow directions from one place to another on an informal map</li> </ul>	

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<p>3.2 3-D objects</p>	<p><b>Range of objects</b> Recognise and name 3-D objects in the classroom and in pictures</p> <ul style="list-style-type: none"> <li>• ball shapes, (spheres)</li> <li>• box shapes (prisms)</li> <li>• cylinders</li> </ul> <p><b>Features of objects</b> Describe, sort and compare 3-D objects in terms of:</p> <ul style="list-style-type: none"> <li>• 2-D shapes that make up the faces of 3-D objects</li> <li>• flat or curved surfaces</li> </ul> <p><b>Focused activities</b> Observe and build given 3-D objects using concrete materials such as cut-out 2-D shapes, clay, toothpicks, straws, other 3-D geometric objects</p> <p><b>Suggested focus and sequencing of activities for Term 2</b> Work with spheres, prisms and cylinders as they did in Grade 2; name them and group them. Focus on the kind of surfaces on each type of object. Distinguish surfaces according to whether they are curved or flat. Use cut-out cardboard squares to make a box. Talk about the flat surfaces on prisms and cylinders and describe them according to whether they are circular, square or rectangular.</p> <p>Work is consolidated through written exercises.</p>	<p><b>Range of objects</b> Recognise and name 3-D objects in the classroom and in pictures</p> <ul style="list-style-type: none"> <li>• ball shapes (spheres)</li> <li>• box shapes (prisms)</li> <li>• cylinders</li> <li>• pyramids</li> <li>• cones</li> </ul> <p><b>Features of objects</b> Describe, sort and compare 3-D objects in terms of:</p> <ul style="list-style-type: none"> <li>• 2-D shapes that make up the faces of 3-D objects</li> <li>• flat or curved surfaces</li> </ul> <p><b>Focused activities</b> Observe and build given 3-D objects using concrete materials such as cut-out 2-D shapes, clay, toothpicks, straws, other 3-D geometric objects</p> <p><b>Suggested focus and sequencing of activities for Term 3</b> Work with spheres, prisms, cylinders, pyramids and cones. Focus on the kind of surfaces on each type of object. Distinguish surfaces according to whether they are curved or flat. Talk about the flat surfaces on prisms and cylinders and describe them according to whether they are circular, square, rectangular or triangular Name and group the geometric objects above. Use toothpicks, straws, or rolled paper to make a pyramid. Work is consolidated through written exercises.</p>	<p><b>Range of objects</b> Recognise and name 3-D objects in the classroom and in pictures</p> <ul style="list-style-type: none"> <li>• ball shapes (spheres)</li> <li>• box shapes (prisms)</li> <li>• cylinders</li> <li>• pyramids</li> <li>• cones</li> </ul> <p><b>Features of objects</b> Describe, sort and compare 3-D objects in terms of:</p> <ul style="list-style-type: none"> <li>• 2-D shapes that make up the faces of 3-D objects</li> <li>• flat or curved surfaces</li> </ul> <p><b>Suggested focus and sequencing of activities for Term 4</b></p>	<p><b>Range of objects</b> Recognise and name 3-D objects in the classroom and in pictures</p> <ul style="list-style-type: none"> <li>• ball shapes (spheres)</li> <li>• box shapes (prisms)</li> <li>• cylinders</li> <li>• pyramids</li> <li>• cones</li> </ul> <p><b>Features of objects</b> Describe, sort and compare 3-D objects in terms of:</p> <ul style="list-style-type: none"> <li>• 2-D shapes that make up the faces of 3-D objects</li> <li>• flat or curved surfaces</li> </ul> <p><b>Suggested focus and sequencing of activities for Term 4</b></p>

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<p><b>3.3</b> <b>2-D shapes</b></p>	<p><b>Range of shapes</b></p> <ul style="list-style-type: none"> <li>• Circles</li> <li>• Triangles</li> <li>• Squares</li> <li>• Rectangles</li> </ul> <p><b>Features of shapes</b></p> <p>Describe, sort and compare 2-D shapes in terms of:</p> <ul style="list-style-type: none"> <li>• shape</li> <li>• straight sides</li> <li>• round sides</li> </ul> <p><b>Suggested focus of activities for Term 1</b></p> <p>Name and group shapes.</p> <p>Focus on the kind of sides that each shape has.</p> <p>Distinguish shapes by talking about whether their sides are round or straight.</p> <p>Draw circles, squares, rectangles and triangles.</p> <p>Work is consolidated through written exercises.</p>		<p><b>Range of shapes</b></p> <ul style="list-style-type: none"> <li>• Circles</li> <li>• Triangles</li> <li>• Squares</li> <li>• Rectangles</li> </ul> <p><b>Features of shapes</b></p> <p>Describe, sort and compare 2-D shapes in terms of:</p> <ul style="list-style-type: none"> <li>• shape</li> <li>• straight sides</li> <li>• round sides</li> </ul> <p><b>Suggested focus of activities for Term 3</b></p> <p>Name them and group shapes.</p> <p>Focus on the kind of sides that each shape has.</p> <p>Distinguish shapes by talking about whether their sides are round or straight.</p> <p>Draw circles, squares, rectangles and triangles.</p> <p>Work is consolidated through written exercises.</p>	
<p><b>3.4</b> <b>Symmetry</b></p>	<p><b>Symmetry</b></p> <p>Determine line of symmetry through paper folding and reflection</p> <p><b>Suggested focus of Term 2</b></p> <p>Paper folding activities that develop an understanding of symmetry include:</p> <ul style="list-style-type: none"> <li>• activities in which wet paint is placed on the page before folding</li> <li>• activities in which paper is cut or torn from the fold line</li> </ul>	<p><b>Symmetry</b></p> <p>Determine line of symmetry through paper folding and reflection</p> <p><b>Suggested focus of Term 2</b></p> <p>Paper folding activities that develop an understanding of symmetry include:</p> <ul style="list-style-type: none"> <li>• activities in which wet paint is placed on the page before folding</li> <li>• activities in which paper is cut or torn from the fold line</li> </ul>	<p><b>Symmetry</b></p> <p>Recognise and draw line of symmetry in 2-D geometrical and non-geometrical shapes</p> <p><b>Suggested focus of Term 4</b></p> <p>Written exercises should include examples where</p> <ul style="list-style-type: none"> <li>• the line of symmetry is not always a vertical line</li> <li>• there is more than one line of symmetry in the shape or object</li> </ul>	<p><b>Symmetry</b></p> <p>Recognise and draw line of symmetry in 2-D geometrical and non-geometrical shapes</p> <p><b>Suggested focus of Term 4</b></p> <p>Written exercises should include examples where</p> <ul style="list-style-type: none"> <li>• the line of symmetry is not always a vertical line</li> <li>• there is more than one line of symmetry in the shape or object</li> </ul>

**GRADE 3 OVERVIEW**  
**4. MEASUREMENT**

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<p><b>4.1</b> <b>Time</b></p>	<p><b>Telling the time</b></p> <ul style="list-style-type: none"> <li>• Read dates on calendars</li> <li>• Place birthdays, religious festivals, public holidays, historical events, school events on a calendar</li> <li>• Tell 12-hour time in               <ul style="list-style-type: none"> <li>- hours</li> <li>- half hours</li> <li>- quarter hours</li> <li>- minutes</li> </ul> </li> </ul> <p>on analogue clocks and digital clocks and other digital instruments that show time e.g. cell phones</p>	<p><b>Telling the time</b></p> <ul style="list-style-type: none"> <li>• Read dates on calendars</li> <li>• Place birthdays, religious festivals, public holidays, historical events, school events on a calendar</li> <li>• Tell 12-hour time in               <ul style="list-style-type: none"> <li>- hours</li> <li>- half hours</li> <li>- quarter hours</li> <li>- minutes</li> </ul> </li> </ul> <p>on analogue clocks and digital clocks and other digital instruments that show time e.g. cell phones</p> <p><b>Calculate length of time and passing of time</b></p> <p>Use calendars to calculate and describe lengths of time in days or weeks or months</p> <ul style="list-style-type: none"> <li>• Use clocks to calculate length of time in hours or half hours</li> </ul>	<p><b>Telling the time</b></p> <ul style="list-style-type: none"> <li>• Read dates on calendars</li> <li>• Place birthdays, religious festivals, public holidays, historical events, school events on a calendar</li> <li>• Tell 12-hour time in               <ul style="list-style-type: none"> <li>- hours</li> <li>- half hours</li> <li>- quarter hours</li> <li>- minutes</li> </ul> </li> </ul> <p>on analogue clocks and digital clocks and other digital instruments that show time e.g. cell phones</p> <p><b>Calculate length of time and passing of time</b></p> <p>Use calendars to calculate and describe lengths of time in days or weeks or months including</p> <ul style="list-style-type: none"> <li>• converting between days and weeks</li> <li>• converting between weeks and months</li> </ul> <p>Use clocks to calculate length of time in hours, half hours and quarter hours</p>	<p><b>Telling the time</b></p> <ul style="list-style-type: none"> <li>• Read dates on calendars</li> <li>• Place birthdays, religious festivals, public holidays, historical events, school events on a calendar</li> <li>• Tell 12-hour time in               <ul style="list-style-type: none"> <li>- hours</li> <li>- half hours</li> <li>- quarter hours</li> <li>- minutes</li> </ul> </li> </ul> <p>on analogue clocks and digital clocks and other digital instruments that show time e.g. cell phones</p> <p><b>Calculate length of time and passing of time</b></p> <p>Use calendars to calculate and describe lengths of time in days or weeks or months including</p> <ul style="list-style-type: none"> <li>• converting between days and weeks</li> <li>• converting between weeks and months</li> </ul> <p>Use clocks to calculate length of time in hours, half hours and quarter hours</p>



TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<p>4.3 Mass</p>		<p><b>Informal measuring</b></p> <ul style="list-style-type: none"> <li>Estimate, measure, compare, order and record mass using a balancing scale and non-standard measures e.g. blocks, bricks, etc.</li> <li>Use language to talk about the comparison e.g. light, heavy, lighter, heavier</li> </ul> <p><b>Introducing formal measuring</b></p> <ul style="list-style-type: none"> <li>Compare, order and record the mass of commercially packaged objects which have their mass stated in kilograms e.g. 2 kilograms of rice and 1 kilogram of flour or in grams, e.g. 500 grams of salt</li> <li>Where bathroom scales are available, learners can measure their own mass in kilograms using a bathroom scale. The expectation is that learners only read to the nearest numbered gradation line. They describe their mass as almost/nearly/close to/a bit more than/more or less/or exactly the number (of kilograms) they read off the scale</li> <li>Where balancing scales with mass pieces calibrated in grams are available, learners can measure mass or different objects</li> </ul> <p>(No conversions between grams and kilograms required)</p>		<p><b>Introducing formal measuring</b></p> <p>Learners do written tasks to consolidate the following, including reading pictures of</p> <ul style="list-style-type: none"> <li>products with mass written on them</li> <li>bathroom scales where the needle points to numbered gradation lines</li> </ul>

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
<p>4.4 Capacity/ Volume</p>	<p><b>Informal measuring</b></p> <ul style="list-style-type: none"> <li>Estimate, measure, compare and order the capacity of containers (i.e. the amount the container can hold if filled) by using non-standard measures e.g. spoons and cups</li> <li>Describe the capacity of the container by counting and stating how many of the informal units it takes to fill the container e.g. the bottle has the capacity of four cups</li> </ul> <p><b>Introducing formal measuring</b></p> <ul style="list-style-type: none"> <li>Estimate, measure, compare, order and record the capacity of objects by measuring in litres, half litres and quarter litres <ul style="list-style-type: none"> <li>using bottles with a capacity of 1 litre, or containers whose capacity is stated in millilitres e.g. cool drink cans</li> <li>measuring jugs in which numbered calibration lines show litres, half litres and quarter litres</li> <li>measuring jugs which have numbered calibration lines for millilitres</li> <li>measuring cups and teaspoons which indicate their capacity</li> </ul> </li> <li>Compare, order and record the capacity of commercially packaged objects whose capacity is stated in litres e.g. 2 litres of milk, 1 litre of cool drink, 5 litres of paint, or in millilitres e.g. 500 ml of milk, 340 millilitres of cool drink, 750 millilitres of oil</li> <li>Know that a standard cup is 250 millilitres</li> <li>Know that a teaspoon is 5 millilitres (No conversions between millilitres and litres required)</li> </ul>			<p><b>Introducing formal measuring</b></p> <p>Written tasks to consolidate the following, including reading pictures of</p> <ul style="list-style-type: none"> <li>products with their capacity written on them in order to sequence in order</li> <li>jugs where the volume is near to a numbered 1 litre or 2 litre gradation line or half litre or quarter litre</li> <li>jugs where the volume is near to a numbered millilitres gradation line. The expectation is that learners only read to the nearest numbered gradation line. They describe their volume as almost/nearly/ close to/ a bit more than/ more or less/ or exactly the number (of litres) they read off the jug</li> </ul> <p>(No conversions between millilitres and litres required)</p>

TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
4.5 Perimeter			<b>Perimeter</b> Investigate the distance around 2-D shapes and 3-D objects using direct comparison or informal units.	
4.6 Area				<b>Area</b> Investigate the area using tiling.
<b>GRADE 3 OVERVIEW</b> <b>5. DATA HANDLING</b>				
TOPICS	TERM 1	TERM 2	TERM 3	TERM 4
5.4 Collect and organise data	<b>Recommended:</b> Whole data cycle to make bar graph. Collect data about the class or school to answer questions posed by the teacher. Use tallies to record data in categories provided. Represent data in		<b>Recommended:</b> Re-organise data provided in a list or tally or table in a bar graph. Represent data on bar graph. Answer questions about data on bar graph	
5.5 Represent data	<ul style="list-style-type: none"> <li>• Tables</li> <li>• Bar graphs</li> </ul> Talk about and answer questions about data in tables and bar graphs.	Analyse data from representations provided. <b>Recommended</b> <ul style="list-style-type: none"> <li>• At least one pictograph with one-to-one correspondence</li> <li>• At least one bar graph</li> </ul>		
5.6 Analyse and interpret data				Analyse data from representations provided. <b>Recommended</b> <ul style="list-style-type: none"> <li>• At least one pictograph with one-to-one correspondence</li> <li>• At least one bar graph</li> </ul>

## Appendix 5: Tabulation for determining teaching methods

To decide which teaching method is most applicable at the Dambuza Primary School there has been made a tabulation with criteria from the school and criteria from the researcher. This criteria has been quantified by marking the appropriate critical point per teaching method. In a consultation with the school, the decisive answer for the most appropriate teaching method has been given. The tabulation with criteria has been represented below.

Every teaching method is represented with a number as the following:

- 1 = Brainstorming approach
- 2 = Contextual learning
- 3 = Cooperative learning
- 4 = Demonstration approach
- 5 = Games in mathematics lessons
- 6 = Inquiry based learning or Discovering learning
- 7 = Mastery learning
- 8 = Problem-solving
- 9 = The direct instruction model

Criteria	Methods								
	1	2	3	4	5	6	7	8	9
Structured learning						X		X	X
Motivated learning	X	X	X	X	X	X		X	X
Meaningful learning		X	X	X	X	X		X	X
Active learning		X	X	X	X	X	X	X	X
Learners know why they are learning		X	X	X		X		X	X
Extended instruction		X	X	X			X		X
Possibility to ask questions	X	X	X	X	X	X	X	X	X
Simple materials to use	X	X	X				X	X	X
Not much preparation before class	X		X				X		X
Only one teacher needed	X	X	X	X	X	X	X	X	X
No additional space required	X	X	X				X		X
No retraining needed	X	X	X	X	X	X	X	X	X
<b>Total</b>	7	10	11	8	6	8	8	9	12

The tabulation shows that teaching method 3 and 9 get the highest score based on the criteria. The school was also most curious about these two teaching methods and that is why these two teaching methods will be experimented.

## Appendix 6: Overview cooperative working methods

According to Kerpel (2014) there are seventeen different cooperative working methods a teacher can use in the lessons. Looking at the Dambuza Primary School seven different cooperative working methods would be appropriate to use there. Below there is made an overview and explanation of these working methods.

### Thinking – Sharing – Exchange

The teacher gives an assignment or asks a question. The learners will have two minutes to think about the answer. Then they will discuss in pairs. Finally, the answers will be exchanged classically. This is a useful cooperative working method to activate the prior knowledge or to orientate on an assignment. The teacher can also use this form in independently processing. Also for reflection or

look back, this method is suitable. This cooperative working method is suitable for all grades. The collaboration skills that will be addressed are: listening and exchanging information. The time duration is about five minutes. (Kerpel, 2014).

#### Flash

The teacher teaches the children a certain skill, for example the table of 6. Then he hands out flash cards, on the one hand the sum and, on the other hand, the answer. It is most useful when every learner makes his own set. The learners need to be in pairs. The one reads the sum, the other names the answer. If the answer is right, the learner will get the card. If the answer is wrong then the card goes down the bottom of the stack. This goes on for as long as the learners need to get the whole stack of cards. After that, the learners will change their role. At the end, the teacher discusses how it went. This form of cooperative working method can be used as independently processing. This method is very helpful in automating. This cooperative working method is suitable for Grade 1 and higher grades. The cooperation skills that will be addressed are: giving / asking and waiting for each other. The time duration is about ten to fifteen minutes. (Kerpel, 2014).

#### Duo's

The teacher makes heterogeneous duo's and explains the assignment. The learners, in turn, make a sum, thinking out loud. If one learner makes a sum, then the other learner observes and gives help if needed. The teacher discusses the outcomes with the whole class. This cooperative working method can be used in guided practice or independently processing. This method is suitable for all grades. The collaboration skills that will be addressed are: discussing, encouraging, giving help / asking and waiting for each other. The total time duration is about ten to fifteen minutes. (Kerpel, 2014).

#### Numbered heads

All the learners in the group will get a number. The teacher gives an assignment, which at the end everyone needs to know. Each learner thinks about this for himself and writes the answer. Then, in turn, the learners tell their answer to the other group members. They will discuss what the right answer is and every learner must know the answer at the end. After all, the teacher calls a number. In each group, the learner with that number has the task of telling the class what their group response is. This cooperative working method can be used at different times of the lesson. This method is suitable for all grades. The collaboration skills that will be addressed are: discuss and reach agreement. The time duration is about 5 minutes. (Kerpel, 2014).

#### Placemat

Each group of four learners gets a sheet of paper, with a rectangle in the middle. From the corners of the rectangle, the learners have to draw lines to the corners of the paper. In this way, there are four boxes, one for each group member. The teacher gives an assignment and each learner writes his ideas and answers in his own box. Then the learners will discuss and formulate a common answer. They write the answer in the common rectangle. Then follows the classical exchange. The placemat is a form of independently processing. This cooperative working method is suitable for Grade 1 and higher grades. The collaboration skills that will be addressed are: listening, consulting and reaching agreement. The time duration is 10 to 15 minutes. (Kerpel, 2014).

#### Angles

The teacher explains the corners in the class. In the corners, for example, papers with theses are attached. The learners walk to the corner they agree with. There they will discuss in duos why they chose that corner. Then the learners have to cross to the opposite corner and form a duo with someone from that corner. The one is then for the statement, the other is against. They will argue their choice and remember what the other tells. Finally, everyone goes back to his own corner and

explains the reasons why other learners have chosen for a different angle. During the classical discussion, the teacher asks learners why their partner chose a different angle. This cooperative working method is a form of independently processing. This method is to be used in Grade 1 and higher grades. It is also possible for younger children to use, but then it is better to choose subjects or materials. The cooperation skills that will be addressed are: listening and summarizing. The time duration is 10 to 15 minutes. (Kerpel, 2014).

#### Walk – Exchange

All learners have to be spread independently in the classroom. When the teacher says "Stand still!", everyone has to stop. Each student will make a duo with the closest learner. The teacher asks a question or gives an assignment. The duo's have to exchange their answers. This cooperative working method can be used for guided practice, independently processing or as a reflection assignment. This method is suitable for all grades. The collaboration skills that will be addressed are: listening and exchanging information. The time duration is about five minutes. (Kerpel, 2014).

#### Appendix 7: Conversation with Dr Vale

On 24 August 2017 I went to Rhodes University in Grahamstown to meet Dr Pamela Vale. Dr Vale is a professor for Qualitative Social Research, Educational Psychology and Mathematics Education. She invited all the researching learners of Stenden South Africa with a mathematics topic to come over and talk about the topics. I told Dr Vale this research was going to be about underperforming learners in mathematics in Grade 3 and that the purpose of this research was to get these learners back on the required level. Dr Vale was excited about this topic and told me that she had a lot of information about it. She would send this information to me by e-mail. I told Dr Vale that I would try two different teaching methods in the school and told her I would take topics from Term 4. She advised me to choose the topic whole numbers. Because according to her, whole numbers is a very important subject for the early grades. The early grade learners need to manage the topic whole numbers well because this is a basis for their further school development. I told her that I would like follow her advice but I had one question. If I would use the topic whole numbers in both teaching methods, the results from the second teaching method would not be reliable because the topic whole numbers was also already used in the first teaching method. Therefore it would be logical if the learning levels in whole numbers would increase. Dr Vale recommended me to choose two different operations with whole numbers and experiment with it separate per teaching method. I told her I thought that was a good idea.